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**AN ANALYSIS OF TOTAL QUALITY MANAGEMENT
IMPLEMENTATION IN MEXICAN LARGE INDUSTRY**

BY

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THE AWARD OF THE DEGREE OF
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ABSTRACT

At the beginning of the 1980s Mexico's Federal Government decided to end the imports-substituting policy to join the General Agreement on Trade and Tariffs (GATT). As a result of the fast changes of the last decade in terms of international trade, Mexico's new policy rapidly evolved to one leading the country to a totally open-economy. This situation moved Mexican companies towards the need to improve their competitiveness for survival. Because of the previous success of Japan in achieving an outstanding improvement on the quality of its products, most Mexican large industrial organisations have introduced TQM into their management systems. Since there was no previous knowledge on how to do that in Mexican organisations, they have had to follow the strategies used in other countries for this purpose. However, because some companies have reported some trouble in this endeavour, the initial objective of this thesis was to investigate if TQM has been useful, in terms of improving the satisfaction of stakeholders and company's profitability, for Mexican large industrial organisations.

To probe the effectiveness of TQM in Mexican industry, a study was conducted on 82 large industrial organisations; 71 (86.6%) of them reported the implementation of TQM on their management system. Initially, the degree of penetration of TQM was measured. For this purpose, a conceptual business management system was developed, incorporating in it the more popular quality management concepts or techniques, grouped in 7 sub-systems. Then the degree of TQM implementation was measured for each company and correlated to stakeholders' satisfaction and financial profitability. A good degree of correlation, given the sample size, was found between stakeholders' satisfaction and TQM (0.45), but not between this variable and the financial profitability reported by the companies investigated (0.04). However, the research found a significant correlation between the degree of implementation of some of the sub-systems of the conceptual system and the profitability of certain sub-sectors of the industrial sector. For this reason, it was decided to analyse in a greater detail the strategies followed by organisations that showed a reasonable financial performance during the last four years. This analysis considered the influence of other internal and external non-TQM variables to succeed, financial speaking, in TQM implementation. As a result of the investigation, the thesis proposes a procedure for the design of a TQM system. This proposal is expected to increase the possibilities of a Mexican industrial organisation to improve its financial performance by an adequate incorporation of TQM into its management system.

ABBREVIATIONS

| | |
|-----------------------|---|
| ALFA | Grupo ALFA, SA |
| ANOVA | Analysis of Variance |
| ANSI | American National Standard Institute |
| AV/E | Assets value / employee ratio |
| BPR | Business Process Reengineering |
| C | Process control sub-system |
| CEMEX | Cementos Mexicanos, SA |
| CEO | Chief Executive Officer |
| C_{pk} | Process Capability |
| CSA | Canadian Standards Association |
| CWQC | Company-wide Quality Control |
| DESC | Grupo DESC, SA |
| DI index | Degree of TQM Implementation index |
| E index | Emphasis index |
| ED | Experimental design |
| EFQM | European Foundation for Quality Management |
| EQA | European Quality Award |
| GDJ | City of Guadalajara |
| GDP | Gross Domestic Product |
| GNP | Gross National Product |
| H | Management of Human Behaviour sub-system |
| IMF | International Monetary Fund |
| INEGI | Mexico's Institute of Statistics, Geography and Information |
| ISO | International Standards Organisation |
| ITESM | Monterrey Institute of Technology and High Studies |
| JIS | Japanese Industrial Standard |
| JUSE | Union of Japanese Scientists and Engineers |
| L | Leadership sub-system |
| M | Marketing sub-system |
| MaP | Macro management process |
| MBNQA | Malcolm Baldrige Quality Award |

| | |
|-----------------|--|
| MEX | Mexico City |
| MiP | Micro management process |
| MM | Middle Management |
| MNQA | Mexican National Quality Award |
| MTY | City of Monterrey |
| NAFTA | North America Free Trade Agreement |
| O | Management of Operations sub-system |
| OECD | Organisation for Economic Co-operation and Development |
| OP | Operational level |
| P | Management of suppliers sub-system |
| P index | Profitability index |
| PDCA | Plan-Do-Check-Act cycle |
| Q | Quality improvement sub-system |
| QC | Quality Control |
| QCC | Quality Control Circles |
| QFD | Quality Function Deployment |
| QM | Quality Management |
| QSC | Quality Steering Committee |
| ROI | Return on Investment |
| S | Strategic Planning sub-system |
| Su | Supervisors |
| SD | Self-diagnosis index |
| SE | Staff Employee |
| SMED | Speed Method for the Exchange of Dies |
| SPC | Statistical Process Control |
| SQC | Statistical Quality Control |
| SS index | Stakeholders' satisfaction index |
| TQ | Total Quality |
| TQC | Total Quality Control |
| TQM | Total Quality Management |
| UP | Upper Management |
| USA | United States of America |
| VITRO | Vitro Corporation, SA |
| W | Workers |

CHAPTER 1

INTRODUCTION AND CONTEXT

1.1 Introduction

Everywhere throughout the world, and Mexico is not the exception, customer satisfaction is the key to be competitive and succeed nowadays. An organisation succeeds when it is capable of providing the material and emotional elements needed to improve the quality of our lives. Companies dedicated to attend markets in which customers demand more quality, a better price, a shorter lead-time and respect to ecology, develop their competitive advantage by accomplishing these requirements.

Competitive organisations are the support of any healthy economy. Reaching a significant level of economic welfare is easier when the people in that country have the skills required for this purpose. People have to be capable to innovate, create, develop and operate competitive technological and organisational systems. As a consequence, these systems will generate the elements mentioned before. Quality people develop, support, and manage quality organisations that produce quality products and services. It does not mean that countries such as Mexico do not count with quality people, because its economy has not been capable to provide the welfare its society needs. Definitely there are, and will continue to be, quality people in every developing country, however, not in the proportion needed to make a change in their overall welfare. Developing countries need a larger proportion of quality people. This is perhaps the only way to reach world markets successfully, and make their economy create the welfare their society demands and deserves. For developing more quality people it is necessary to make significant changes in the cultural environment. It is fundamental that people, mainly the leaders at all levels (social, economical, political, and even religious), know and understand the characteristics of their society and how they can help to develop a culture of quality and competitiveness.

Most managers in Mexican organisations support their decisions on management concepts and techniques developed for organisations that operate in other countries under different circumstances, backgrounds, pressures, cultures, etc. Although there are many commonalities among organisations all over the world, and will be more in the future, Mexican organisations need management concepts developed and/or adapted to their own circumstances. Even multinationals established already in Mexico such as IBM, Coca Cola, General Motors, etc., are ahead of Mexican owned companies in the adaptation of their managerial processes to the Mexican environment. Perhaps it is easier for them because they start from knowledge already available and adapted to their technological system, which they also use for their operations in Mexico. This fact, instead of being an excuse, should encourage the urgent need for Mexico to invest in technology and management research. A sustained welfare in our country will be possible only if Mexican owned organisations were capable of competing successfully with international companies inside and outside Mexico. This does not mean that foreign competition is not good for Mexico's economy. On the contrary, given the current conditions of openness, a reinforcement of the competence of Mexican organisations will strengthen the economy.

The imports-substituting policy that operated until the mid 1980's, was very successful in reducing Mexico's dependency on imported goods. However, the authorities responsible for Mexico's economic and foreign trade policy were not able to anticipate on time the world tendency to open international markets, despite the advice of Robert Mundel in 1971. Mexican industry grew in an environment that let it work protected from international competitors making quick and easy profits, but a number of pitfalls eventually appeared. Fernández (1994) found in a study that manufacturing sectors that received more subsidy or import tariff protection were those with less increase in productivity for the period of time between 1960 and 1980. Additionally, Méndez (1994) found in a study the industrialisation policy adopted by Mexico since 1940 eventually created the following problems:

- Mexican industry never could achieve competitiveness in price and quality in international markets

- installed capacity in industrial organisations is always under-utilised, mainly in small and medium industry
- small and medium industry were always in a weak position to face economic problems like those which occurred in 1976, 1982, 1986 and 1994
- 70% of manufacturing value added is concentrated in the 3 metropolitan areas where is around 30% of the population, Mexico City, Guadalajara and Monterrey
- Mexico has been unable to develop its own technology, and depends always on foreign technology with the consequence of low competitiveness, and
- the disorder in which industry has grown, caused an increase in the pollution levels in some of the largest cities

Clearly, the lack of competition in the past created an environment in which management errors were not so critical as today. This condition reinforced the reluctance of Mexican companies to invest in technology and management research.

From another perspective, it is well known that the attitude of Mexicans is to assume that better quality comes from outside. This attitude discourages confidence to develop their own technology. Maybe that is why Mexicans have never been willing to support research of any kind, preferring to import technology and knowledge. Perhaps an academic reason for this is that most top managers of Mexican organisations received professional education in the United States or Europe (according to Grupo Editorial Expansion (April 1997), 48% of the most important CEOs in Mexico got their professional or post-graduate degree out of the country), the rest got it in Mexican universities which mainly use American management textbooks for teaching. As a consequence, universities are not able to acquire funds for research, especially in the field of management, so they prepare professionals with management knowledge developed outside, not based on Mexican needs. Perhaps the only exception is in the field of accountancy.

In the College of Public Accountants, new methods are always being developed to adapt them to the current conditions prevailing in Mexico's economic, trade and tax systems. The Income Tax Law suffered continuous modifications during the 1980s and until mid

1990s. These variations were caused by dramatic movements in some of the most important economic variables such as inflation, plus the need to increase the federal government's income by reducing tax evasion. The development of new methods of accountancy is supported on the search for a lower, or perhaps more fair tax rate. So, new developments in this case have a clear economical interest. However, it is important to understand that new developments in other areas of management will produce economic benefits as well.

Therefore, there is no doubt that nowadays it is imperative to be world-wide competitive, and although some of the managerial concepts are universal, it is crucial for Mexico to generate its own knowledge on management systems.

Apart from trying to understand how and why Mexico's economy changed to its current state of openness to foreign trade, it is causing a major turbulence on the social, economical and political internal systems. This strong turbulence on organisations all over the world is not temporarily but permanent (Kiernan 1996). The power without boundaries of the information and communications technology, as well as the emergence of a new economical and political order with less power for central governments and more power given to society, are encouraging an extremely fast change in markets and trade patterns. Traditional managerial practices (based on the initial concepts provided by Taylor, Mayo, Sloan, etc.) are still very effective for controlling operations and to stabilise any disturbance that could appear. However, disturbances nowadays occur not only once in a while, but more frequently every time. This new characteristic of economical systems world-wide is not temporal, it will never cease, considering that only 0.0001% of the potential capacity of information and communication technology is actually in the hands of consumers (Gilder 1995). So, the only option for Mexican organisations is to develop adequate knowledge on how to manage their businesses under permanently unstable conditions.

It is unquestionable that fast changes are occurring throughout the world in social, political and economical systems. Change is caused by people's ambition to succeed in a world in which the number of opportunities is smaller than the number of people and

organisations seeking for those opportunities as a way to increase their welfare. Nowadays, organisations need to be competitive in a dynamic environment, by a continuous adaptation to change and the creation of new opportunities. An organisation can be participant in the creation of changes and/or learn how to adapt and manage them. Otherwise it will be a victim of changes that will drive it out of business. Successful organisations create some of the changes, and manage to adopt others to succeed over competitors. Understanding how to create and manage change can help executives and any other person within an organisation to seize their opportunities for success (Felkins et al. 1993). The permanent search for changes, the continuous learning from experience, and the transfer of knowledge to new situations, enables the organisation to develop the capacity and resources to create and influence in its own future (Senge 1990).

A competitive organisation is capable of modifying every management system inside its boundaries, creating new patterns and structures, changing the way it responds to customers today, and the manner it will do business in the future. However, to influence some of the external macro systems is not an easy task for business organisations, so they must learn how to manage external forces. Change implies a modification in the way of thinking and acting, and involves a breakthrough and a shift in structures considered up to this point a paradigm. Paradigms block the minds of people and are the main barrier for change (Kuhn 1970). A paradigm shift occurs when many beliefs and actions change within an organisation, and involves three stages: normalcy (working within a paradigm), anomalies (appearance of events that contradict the paradigm), and replacement (changing the paradigm) (Bounds et al., 1994).

There is no doubt that Mexican companies of all types, even those that do not compete directly in international markets, will have to adopt a new paradigm in management. Mexican organisations now compete with companies from countries from where they get not only many inputs, but also technology to operate and manage their organisations. Our country is urged to develop its own know-how for both management and technology, if we want to improve society's welfare.

The objective of this research is to search for management knowledge on how to improve the profitability of Mexican organisations through the implementation of total quality management. It tries to contribute to enhance the knowledge we have available in Mexico on how to manage effectively an organisation in the actual environment of strong competition from inside and outside, in order to make it succeed in terms of profitability. The research is supported in the analysis of experiences of TQM implementation as a way of making successful a company, since this concept of Total Quality was immediately adopted by Mexican managers to cope with new trading rules. However, it will be extended to some other aspects of management seeking for answers regarding how companies that were very successful making money in the past in protected markets, should now be managed to make money and fulfil their mission in today's very competitive markets.

1.2 Research context and justification

To understand why this research in total quality management centres on industrial organisations, it is convenient first to present some general aspects of Mexico's economy and demography.

Mexico is a country of more than 92 million people, 47% of them under 19 years old (INEGI 1997). Approximately 40% of the economically active population (EAP) work in the service sector, 20% in industry and the other 40% in diverse sectors (INEGI 1997). Actually, industry contributes approximately 20% of the GDP, and its growth was 6.2% on average for the period of 1940 to 1982 (INEGI 1985) (Banco de Mexico 1992). The employment in the manufacturing sector is 3.6 million, and about 75% of the manufacturing value added comes from the following sectors: food, beverages, tobacco, textile, clothing, leather, chemicals, petrochemicals, rubber, plastics, metal products, machinery and equipment. In the near future, the industrial sector will be even more important to Mexico's economy. Highly industrialised countries are discarding most of their manufacturing operations shifting mainly to the information and communications business.

Mexico is frequently mentioned as the country that takes the second highest share of international investment after China (The Economist 1997); three factors are favouring this situation: Mexico's closeness to USA, an economical policy congruent with the interests of multinational companies, and the previous experience on getting quality and productivity (which will be commented upon later in more detail) by foreign companies already operating in the country. Based on these elements, the prediction that the industrial sector will grow even more in the near future is understandable. The industrialisation process started in Mexico at the end of the 19th. century with the production of textiles, food products, beer and tobacco. However, it was 1940 before a strong industrialisation movement based on an import-substituting policy started (Bonilla 1992). In addition to the consequences mentioned earlier regarding this policy, as industry progressed, demand for intermediate and capital goods increased, which could not be satisfied by domestic suppliers. Yet because of its strategy and related consequences, Mexico could not achieve a compensating increase in exports. As a result, the balance of trade in manufacture grew steadily worse. Mexico's GDP grew fast during the late 1970's and early 1980's, mainly in the manufacturing sector. However, this growth contributed to more serious balance of payments problems. The situation deteriorated due to the introduction of price controls in the 1970's and an unrealistic exchange rate policy, and finally became unsustainable in 1982 when external factors such as rising world interest rates and falling oil prices also came into play. A moratorium was declared on foreign debt repayment, and Mexico was forced to accept IMF measures for structural adjustment. The deterioration of Mexico's economical variables is evident in Table 1.1

Table 1.1 shows the average yearly growth experienced by the most important macro-economic variables during each of the 10 Federal Administration terms since the start of the import-substituting policy. Years 1995 and 1996 are shown separately to highlight the consequences of the severe financial crisis which occurred at the end of 1994. This is important for the research since part of the analysis later is supported by information from those years.

Table 1.1 Average yearly growth of the most important macro-economical variables in Mexico.

| | Imports substituting policy | | | | | | | Open economy | | | |
|------------------------|-----------------------------|---------|---------|---------|---------|---------|---------|--------------|---------|--------|-------|
| | 1941-46 | 1947-52 | 1953-58 | 1959-64 | 1965-70 | 1971-76 | 1977-82 | 1983-88 | 1989-94 | 1995 | 1996 |
| GDP | 6.1% | 5.7% | 6.3% | 6.7% | 6.8% | 6.0% | 6.0% | 0.1% | 2.6% | -6.2% | 5.1% |
| Population | 2.3% | 2.4% | 2.6% | 2.7% | 2.7% | 2.8% | 2.3% | 1.6% | 1.7% | 1.7% | 1.6% |
| Per Capita Income | 3.7% | 3.2% | 3.7% | 3.9% | 4.0% | 3.2% | 3.6% | -1.5% | 0.9% | -7.9% | 4.8% |
| Employment | 2.9% | 2.8% | 2.7% | 1.4% | 1.1% | 3.8% | 3.3% | 0.9% | 0.6% | -5.4% | 8.9% |
| Industrial Production | 8.8% | 7.7% | 7.3% | 8.7% | 8.5% | 5.7% | 6.6% | 1.2% | 4.5% | -3.1% | 10.5% |
| Productivity Increase | NA | NA | NA | NA | NA | 3.5% | 2.9% | 0.8% | 6.7% | 0.1% | 5.4% |
| Ex-change rate | 0.0% | 10.1% | 6.3% | 0.0% | 0.0% | 3.9% | 16.7% | 57.4% | 15.5% | 49.5% | 2.9% |
| Inflation | 14.4% | 9.7% | 5.7% | 2.3% | 2.6% | 12.7% | 28.9% | 91.1% | 16.4% | 51.7% | 27.7% |
| Imports | 20.2% | 1.9% | 5.7% | 6.8% | 8.2% | 18.4% | 15.7% | 14.1% | 18.4% | -8.7% | 23.5% |
| Exports | 15.3% | -2.2% | 4.0% | 6.0% | 2.3% | 17.8% | 29.9% | -1.4% | 13.9% | 30.6% | 20.7% |
| Direct Foreign Invest. | 2.0% | 4.7% | 5.8% | 4.3% | 4.1% | 5.4% | 11.4% | 13.3% | 15.9% | 0.1% | 38.6% |
| External Public Debt | NA | NA | NA | NA | 12.9% | 27.6% | 16.7% | 3.3% | -0.3% | 18.1% | -2.6% |
| International Reserves | NA | NA | NA | 6.0% | 6.1% | 3.8% | -1.2% | 1.1% | -0.5% | 156.0% | 11.2% |

Source: INEGI Data Base 1997 (<http://www.inegi.gob.mx/>)

The objective of the IMF adjustments in 1982 was to contract domestic demand through fiscal and monetary policies. However, by the mid-1980's trade liberalisation policies were introduced to encourage exports. Since that time, Mexican Government has signed or joined more than 25 trade agreements or international trade organisations to support the new trade policy (Blanco 1994), and the Mexican economy has experienced a significant transformation in response to a wide range of policy reforms aimed at reinforcing its international competitiveness.

The measures, which include a liberalisation and deregulation of the economy, the privatisation of state-owned companies (from 1155 state-owned companies in 1982 to only few strategic companies in 1997), and the reduction of import barriers (the average import tariff went from 30.5% in 1979 to 13.1% in 1992, and will go down to 6% in 1999). The acceleration of this process, despite the increase in productivity observed in recent years, is causing the erosion of some of the economic variables more related to the population's welfare like GDP, per capita income, and employment (see Table 1.1). However, macro-economic programmes like this one can not be evaluated in a short period of time, and require more time to bring the expected benefits in terms of welfare. The presence of other non-economical variables such as the political turbulence related to the consolidation of democracy, the improvement in the quality of education, and the modification of certain cultural values (honesty, responsibility, consciousness in the use

of resources, willingness to work, the habit of saving for the future, etc.) require perhaps 20 or 30 years to mature. In many aspects this change has started already. Much of the blame for Mexico's quality problems, attributed to a closed economy and the lack of competition, will be reduced because of the opening of the economy; the country faces now a global competition that forces companies to improve the quality of their products and services (Gutierrez 1994).

Perhaps the most important trade agreement joined by Mexico is the North American Free Trade Agreement (NAFTA). It set the basis for further structural change in manufacturing, and intends to stimulate new investment and promote greater competitiveness. In addition to the expected tangible gains with the reduction of barriers to and from the United States and Canada, Mexican industry will benefit from NAFTA by the experience and learning obtained in the process of being forced to compete with international standards. NAFTA provides a great opportunity for partnerships and joint ventures among non-NAFTA and North American firms. Although USA or Canadian firms based in Mexico, including in-bond companies, have not utilised a great amount of inputs for their products from Mexican suppliers, that could change under NAFTA. Given time to respond to market signals, it is possible that Mexican industrial firms in large industrial cities like Mexico City and Monterrey could increase their production, since for producers who pursue just-in-time manufacturing, the proximity to producers is essential.

NAFTA certainly will increase the demand for Mexican labour, and as a consequence, welfare of Mexicans will also improve. However, this process takes time and will not be immediate. Labour demand will remain stable because many large labour-intensive operations are already in Mexico. Wages may rise as a function of productivity improvements, but the very high level of under-employment in Mexico, plus the entry of 1 million first job seekers per year into the labour market should keep wages relatively low. However, as the Mexican labour force becomes more productive, managers desiring continuous improvement in their factories would have to reward their workers by paying higher salaries than those actually paid. This phenomenon was

observed already in the Mexican state of Chihuahua where actual salaries paid by in-bond companies are on average twice than those paid 10 years ago.

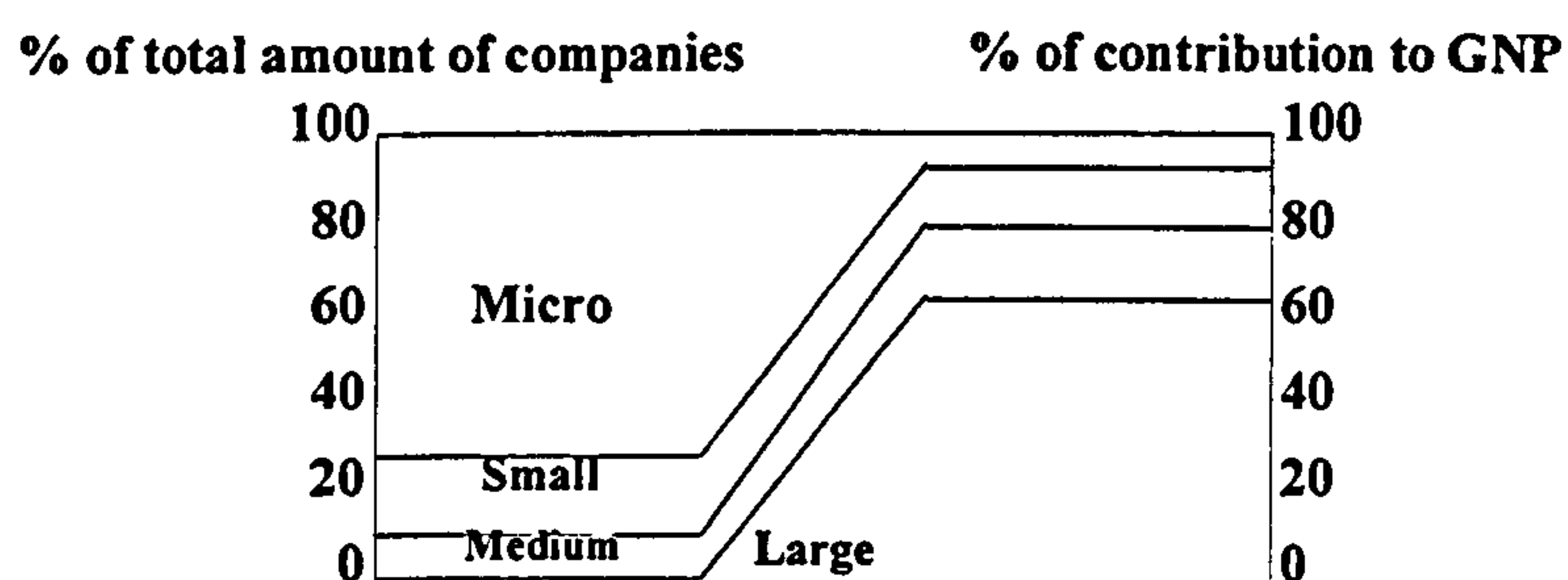
Although Mexico has a large pool of labour, and low wages constitute an important competitive advantage, a serious disadvantage is the lack of skills. Only about 30% of people entering the labour market each year have some form of industrial or professional training. Mexican industry has a major difficulty in developing and improving its own technology. The problem begins with primary education (the first 6 years of formal education) where the drop-out rate is more than 40% and continues throughout the rest of the educational process. Educational level is on average 4.7 years. Only about 2% of the population have a bachelor's degree. Just 13 out of 10,000 professionals are engineers compared to Japan's 595 (The Economist Intelligence Unit 1993). To tackle the root problem, the government started a reform in basic education in 1992 and a campaign to repatriate brains (only 20% of those given scholarships to study abroad in the 1980's have returned).

On the other hand, management style in Mexico was evaluated and compared in the 1991 World Competitiveness Report (OECD 1991). Management initiatives (entrepreneurial skills, drive and responsibility) were lower than in most countries considered as close competitors. Another study (Frucot & Shearon 1991) suggested that because Mexican managers tend towards more paternalistic and autocratic leadership styles, middle and lower management is less involved with decision making and more bound by rules and regulations.

Federal labour law gives considerable power to unions including the right to strike, and in some cases as in the primary sector, unions have a say in hiring and firing which can be costly for employers, if the matter has to be taken to arbitration. High adjustment costs are also implicit in the laws' tight job security provisions, with hefty severance settlements required in any case of "unfair" displacement. While there have been demands for the labour code to be revised to allow Mexican industry to become more competitive, political considerations have prevailed to date.

The size pattern in the manufacturing sector is characterised by a high degree of concentration, with large companies dominating important segments of their respective market segments. By May 1997, the size distribution of firms versus their contribution to GNP is shown in Figure 1.1 (INEGI 1997).

Figure 1.1 Size distribution of firms versus their contribution to Mexico's GNP



At the sector level, the distribution is as follows (by number of companies):

Micro industries (1 to 15 employees)

| | | | |
|-------------------------|----------|---------------|----------|
| Tortilla producers | (20.18%) | Clothing | (6.18%) |
| Metal tanks and boilers | (11.37%) | Printing | (4.80%) |
| Bakery products | (9.45%) | Clay products | (4.58%) |
| Wood furniture | (6.78%) | Other | (36.66%) |

Small industries (16 - 100 employees)

| | | | |
|----------------|----------|---------------------|----------|
| Metal products | (10.45%) | Bakery products | (5.22%) |
| Clothing | (10.45%) | Footwear | (5.22%) |
| Plastics | (6.60%) | Soft fibre textiles | (4.40%) |
| Printing | (5.91%) | Other | (51.75%) |

Medium industries (101 - 250 employees)

| | | | |
|---------------------|----------|----------------|----------|
| Soft fibre textiles | (11.65%) | Metal products | (7.77%) |
| Clothing | (9.70%) | Footwear | (5.82%) |
| Plastics | (7.77%) | Others | (57.29%) |

Large industries (251 or more employees)

| | | | |
|-----------------------|----------|------------|----------|
| Electrical/Electronic | (22.36%) | Automobile | (6.57%) |
| Soft fibre textiles | (9.21%) | Plastics | (5.26%) |
| Clothing | (6.57%) | Others | (50.03%) |

A particular characteristic of the industrial concentration in Mexico, perhaps as a consequence of the long time that the imports-substituting policy prevailed, is the dominance of large conglomerates. In the early 1990s, 10 largest conglomerates produced 20% of total manufacturing output, and their importance is still high. For example, Cementos Mexicanos (CEMEX) contributes to more than 70% of national cement production and VITRO to more than 90% of glass output. Just two companies, both belonging to the same holding company, are responsible for all Mexico's tyres and carbon. Three large conglomerates, DESC, CYDSA and ALFA produce 75% of country's secondary petrochemicals. Grupo Alum contributes with 60% of aluminium production, and Grupo Industrial Maseca controls more than 70% of the corn flour market.

Given the growing importance of the industrial sector and the changes experienced by Mexico's international trade policy, Mexican organisations are certainly being pushed to strengthen their management systems and to acquire or develop leading-edge process technology. This sounds easy, but implies an extensive and deep paradigm shift.

A paradigm shift results always as a consequence of a paradigm shift occurring in a system of higher order and has an effect on related systems. The change of paradigm in Mexico's trade policy forced Mexican industry to a new paradigm in management and technology. This new paradigm in management will promote a new paradigm in the way of living, behaving and performing of Mexican individuals. This new paradigm in culture will favour the emergence of new paradigms in related systems, such as in education and social infrastructure. As mentioned before, at the beginning of the 1980s Mexico had a trade policy based on protectionism through import substitution, designed to aid newly and already established national industries. This helped to develop certain industrial sectors, to create and reinforce a middle class and to accumulate capital for investment (Solís 1992). At that time, protectionism was a normal situation totally accepted (stage of normalcy). Later on, consumers started to suffer the increment in prices and margins, which tend to grow in a closed economy in addition to a reduction of quality and productivity (stage of anomalies). The alternative

solution to the problems associated with protectionism was the free flow of goods and services from outside the country, and free movement of prices by market forces within. The Mexican government had no choice but to adopt a new trade policy with greater competition for domestic suppliers, who are being forced to increase their efficiency, productivity and quality to international levels to stay in business. A new paradigm in management is needed as a consequence of these changes.

During the 40 years of the import's substitution policy, industrial organisations concentrated on variety rather than volume, and achieved large profit margins. The new policy forces Mexican organisations to search for opportunities in today's competitive world that require volume and quality at low cost. They needed a paradigm shift in their corporate culture and management systems, one in which people recognise that developing the habit of continuously searching for changes while staying ahead of competitors is a subject of survival. This dynamic paradigm is only possible in a culture of learning. A learning organisation (Senge 1990) is one in which people continually learn from experience and transfer this knowledge to new situations. The organisation becomes capable to influence, or even create, its own future. In a learning organisation its management system promotes a culture in which people are encouraged to search continually for changes to seize opportunities to be more competitive. Total Quality Management (TQM) and its cultural constituent are excellent options for this management system.

TQM has been widely accepted as a powerful managerial concept to cope with the new trading and competition rules soon after the opening of Mexico's economy. TQM programmes mainly concentrate on the improvement of stakeholders' satisfaction to as a consequence improve financial profitability. However, the general perception at the moment is that in most cases the results are not totally satisfactory, at least from a financial viewpoint. A significant cause, as commented earlier, could be the limitation in Mexico of research in management, despite the existence of many organisations that promote quality management. There are 27 Quality Centres affiliated to the Quality Network; hundreds of consultants; a Mexican Foundation for Quality; and a National Quality Award. The ITESM (Monterrey Institute of Technology) Quality Centre alone

has trained and educated more than 15,000 people from approximately 600 organisations in quality related subjects over the last 12 years.

The perception of Mexico as a country that only offers inexpensive labour is being replaced. Today, many of the world's top corporations, including American Express, Ford Motor Company, Chrysler and General Motors, report that their Mexican work forces offer a level of quality and reliability not found in other countries (Mexican Investment Board 1993). By adopting a quality management programme, American Express Mexico has achieved an impressive reduction in response time for billing inquiries. Ford is perhaps the company that started the quality movement in Mexico, when in 1982 began a strong suppliers' certification programme for its Mexican suppliers. The ITESM was asked to design and run an educational programme to train Ford's suppliers in the statistical aspects of the reduction of variation for process control. Ford intended to keep only about one tenth of the original amount of Mexican suppliers (from 3000 to approximately 300). This condition forced not only Ford's direct suppliers, but the whole industrial sector to start quality programmes, since the auto industry is related to many more industrial sectors (plastics, steel, glass, electronics, etc.).

Since then, many companies initiated a programme in quality management. Foreign companies, as well as domestic firms report substantial performance improvements in their products and services. Aeromexico has achieved tangible results through its efforts to promote quality in its service. The airline reports a 98.6 percent on-time rate in departures compared to an average of 77.3 percent in the United States. Hylsa, one of the leading steel manufacturers, has benefited from its dedication to quality, increasing productivity by 40 percent in the past few years (Sanderson & Hayes 1990).

To encourage the growth in the sophistication and competitiveness of its companies, Mexico instituted in 1989 its own version of Japan's Deming Award or USA's Baldrige Award for outstanding achievement in quality, customer responsiveness, and quality of work life. Companies that enter this competition must explicitly compare their quality improvements with those of other companies producing similar goods and services

(Sanderson & Hayes 1990). Since 1990, twenty companies have won the National Quality Award; only 3 of them from the service sector, and the rest were industrial companies, mainly large (75%). Sixty percent of the winners are Mexican owned organisations. Two plants of General Motors Mexico won the National Quality Award (in 1991 and 1992). The Mexican division of GM has one of the most quality effective operations among the corporation. Many Mexican companies are now capable of competing successfully with the world's most sophisticated enterprises.

Vitro, one of Mexico's largest corporations, established its own version of a quality award. The award, although it is very similar to the National Quality Award, represents a useful tool for auditing the quality programme of each company within the corporation.

Many foreign companies have recognised the benefits of establishing assembly facilities in Mexico. Today there are about 2,600 foreign assembly plants operating in Mexico employing more than 700,000 people (INEGI 1997). Originally dominated by U.S. companies like RCA and Zenith, there are now foreign assembly plants for most major electronics corporations, including Matsushita, Sony, Sanyo, Toshiba, and Samsung. Mexico constitutes one of the biggest centres in the world for assembling televisions.

Initially, the reason for establishing manufacturing facilities in Mexico was to gain advantage of the low labour cost. The concept of cheap labour may have been misunderstood, because in addition to the salary, there are very heavy fringe benefits required by labour law (Flynn 1994). Now investors from everywhere have to realise that the competitive factor is no longer cheap labour, but a young and easy trainable and motivated labour force located close to the world's largest economy, offering quality products and short delivery times. One recent study showed that the rates of productivity growth of the Mexican subsidiaries of U.S. and other foreign companies surpass those of the USA manufacturing sector as a whole (Sanderson & Hayes 1990).

Another study, the 1989 Initial Quality Survey conducted by J.D. Power and Associates, showed Ford's assembly plant in Hermosillo is in a virtual tie with the best assembly

plant in the world, run by Daimler-Benz, 26.1 defects per 100 cars. The same study showed all of Mexico's automobile assembly facilities to be better than world's average. Mexican plants have also proven near the world average for productivity, despite the disadvantage of a lower production volume. More important, the Hermosillo plant was considerably better than both world and USA averages in quality (Sanderson & Hayes 1990).

Although many companies in Mexico report outstanding achievements from the implementation of TQM (after all it is not good for a company's image to report problems associated to its quality programme), a study (Lawrence & Lewis 1993) suggests that successful implementation of TQM in this country requires the overcoming of a number of significant obstacles. Some of the most important are:

- weak employees' participation due to a low level of education and the characteristics of Mexican culture
- lack of contribution from suppliers because of unreliable delivery times
- low top management commitment due to different factors such as a strong decision making process based on short-term financial goals, and
- the limited information on TQM

A clear understanding of how to manage these obstacles is the first step towards a successful implementation of TQM in Mexico.

Mexican culture is usually criticised, mainly by Mexicans, as not being appropriate for TQM implementation. However, there are some external studies demonstrating that despite the peculiarities of Mexican culture, it is feasible to be successful in the implementation of TQM knowing how to manage its characteristics.

A study on Human Resource Management by the University of San Diego in 1991 found that, due to cultural similarities between Mexico and Japan, Japanese-owned companies located in Mexico were more effectively managing common human-resource

challenges. This allowed for easier implementation of TQM policies and increased productivity (McDermott 1994).

Another study (Hofstede 1980) characterises the Mexican culture as collectivist, but only relative to the family group, not transferring loyalty to the company, which difficult teamwork in work activities; with a high power distance; more masculine (social harshness) than feminine (social kindness); and with a tendency to avoid uncertainty. Based on the definitions given by Hofstede for his four cultural dimensions, the most logical characteristics of a culture appropriate for the operation of a quality management programme are the following:

- a tendency to collectivism with a sense of collaboration in work activities, and individuals highly oriented to teamwork
- a low power distance that permits a high degree of communication and integration among the different organisational level
- an intermediate position between masculinity and femininity, and
- a tendency to avoid uncertainty among operational employees, and to the opposite for the leaders of the organisation

These characteristics are opposite to those found by Hofstede in the case of Mexico; however, it is interesting to note that his study was conducted on IBM's employees and IBM won the National Quality Award in 1992 and its manufacturing operation in Mexico is one of its more productive in the world.

Another study (Lawrence and Yeh 1994) analysed Mexican culture in the context of the most important characteristics of Japanese manufacturing management techniques. They found the following potential conflicts:

- the hierarchical structure present in Mexico is perhaps the most significant obstacle to the implementation of Japanese techniques; managers are less likely to trust their subordinates to make decisions

- because individuals in Mexico tend to show loyalty only to their own family, it is difficult for them to adopt company's values
- the attitude towards work, in which due to historical reasons a feeling of exploitation still prevails among Mexican workers, disfavours an environment of mutual respect and collaboration
- time orientation is predominantly fatalist and focused to the present and the past, having a strong negative effect on any long term effort
- because problem solving often relies on intuition and emotion, those at the top are uncertain that decisions made by others will agree with their own beliefs and intuition
- Mexican culture does not promote the avoidance of excess, waste and unevenness at the work place

To overcome these problems, Lawrence and Yeh suggest the understanding of how Mexican culture may affect the use of quality management techniques to choose which techniques to use, which people to employ and how to modify the techniques and the values systems of the people employed (if this is feasible).

In today's global economy, and with free trade among Mexico, United States of America and Canada, NAFTA customers have more options than before. Mexico must ensure that its products and services are of the highest quality to capture the preferences of these customers. In this context, Mexican industry will benefit from its close ties to the economy of USA. Lower tariffs, inflows of advanced technology and capital, and growing interest in the Mexican domestic market will give Mexico an increased comparative advantage over its competitors from other regions of the World (Cohen 1994).

Suddenly, many businesses that previously had little outside competition are faced with more technologically advanced international companies. To succeed, many Mexican businesses will have to compensate for what they lack in advanced technology with greater attention to manufacturing and service quality. Workers must be made participants in total quality and be given a stake in the outcome of their efforts. Workers

must be compensated fairly and operate in an environment that promotes quality if they are to achieve it (Gutierrez 1994).

Mexico has taken major steps toward opening its economy and forcing the companies to be more competitive. Mexican companies have a unique opportunity to shape a new set of perceptions of themselves and the country. The process of deregulation-privatisation-global competition is well under way, and coupled with the NAFTA, opens a way for repositioning Mexico's economy. If Mexican companies are to succeed in the global competition, they must consider taking advantage of structural changes that have occurred in the country's socio-economic climate and craft a contemporary position (Elkin 1994).

Management theory used in Mexico comes from Western countries, mainly USA. From the beginning of the 1980s, more literature on management has arrived from Eastern countries, mainly Japan. Mexican organisations have tried to incorporate Japanese techniques for quality improvement into their management systems already in operation. This process has been done without any support of a previous investigation on the best way to do it. Most of the literature available just compares American management systems with those used in Japan. Every time, the conclusion reached a result of this comparison, is that the incorporation of Japanese techniques into American management systems requires a cultural change. However, it is important to understand that some cultural characteristics can change, but some others are almost impossible to change. They have been developed during many years, perhaps over generations. Mexican culture is not an exception, and obviously its modification as a necessary condition for the implementation of quality management techniques is a utopia. There is an urgent need in Mexico to investigate, given its cultural characteristics, the most appropriate way of incorporating the management ideas available already for quality improvement and organisational competitiveness.

These reasons unquestionably justify to focus this research on how Mexican industrial organisations should create the paradigm shift in the organisational culture required to be more competitive and succeed, financially speaking, in today's economic world. It is

intended to create knowledge on how to incorporate quality management concepts into the management system of a large industrial organisation in Mexico to make it more profitable.

1.3 Investigation approach

Given the objective of the research, which in fact is related to a very complex problem, it is important to accept from the beginning that the final conclusions can not be universal and extend to the whole industrial sector in Mexico. Every single company is different, faces different economical and social conditions, operates on a special cultural background, etc. However, it is undeniable that large industrial organisations also have many aspects in common. Every organisation is a system working within other systems of greater magnitude. At the same time, an organisation is composed of several systems interacting to drive it towards the fulfilment of its mission.

The approach of this research will be sustained in what is called “systems theory”. The problem of analysing how to make an industrial organisation a profitable one is too complex to be analysed in an isolated form. There is not a single cause and effect relationship between the research question and the potential answer for that question. There are of course many answers, but none of those answers is universally valid for all companies under any environment. Certainly, every answer found will be dependent on the circumstances; however, a broad analysis of the interaction between the systems involved will allow the extension of that answer to new situations.

The research will start with the review and analysis of Total Quality Management theory with the objective of developing a conceptual model for business management based on TQM. The literature review on Total Quality Management will go from the search for a definition of total quality management through the analysis of the most important thoughts of quality gurus (Crosby, Deming, Juran, Feigenbaum, Ishikawa, Mizuno, Taguchi, Shingo and Oakland), systematic approaches such as Quality Management Awards (Mexican Quality Award, Malcolm Baldrige Quality Award and the European Quality Award), and published TQM implementation and operation

guides. To examine other aspects of management theory, the following subjects will be reviewed: management as a social science, culture and organisations, organisational behaviour, change management, systems science, leadership, strategic planning, information systems, human resources management, operations management, marketing and business ethics.

The proposed model should be a system that incorporates every management concept or technique available, not only TQM, as well as the interaction and influence of external factors. On the other hand, it is very important to have clear identification of all the sub-systems of the model and to determine how interaction occurs among them. Finally, the proposal should consider the managerial and decision making processes within each sub-system, as well as the guidelines to implement and operate the system.

Unavoidably, any management system should direct an organisation towards the procurement of the economic resources required to fulfil its mission. Although these economic resources, called profits, come from outside the organisation, it is important to realise that only by making the appropriate decisions in the organisation will possible to get them.

For the purpose of this research work, profitability is the ability of an organisation to make profits. Profits are obtained throughout the income achieved in the market and a productive use of the internal resources. The system wanted will have to strengthen both.

Considering that profits are the consequence of good internal decisions and the effective management of the influences coming from external systems, the research approach will have to consider the interaction of the organisational system and all external systems. Concerning this interaction, the research departs from the following initial proposal:

“An organisation will be more capable of obtaining profits, and other ingredients required for stakeholders satisfaction, if it incorporates quality management in a systemic way into its management system”

To probe this hypothesis, a field investigation for data collection will be conducted among Mexican large industrial organisations. By this study it is expected to correlate the use of TQM components and the achievement of profits. Since it is not always easy to get information on profits, the sample will be selected from the list of the 500 largest companies in Mexico yearly published by Grupo Editorial Expansion. Companies that appear on this list are required to declare their financial situation of the previous year.

An interview will be conducted with one executive responsible for the quality function in each organisation, to measure to what extent TQM techniques are being used. The analysis of the information obtained in this survey will let us know the most significant TQM practices used by Mexican industry and how they must be managed to improve stakeholders satisfaction and profitability. The components of this analysis are: a comparison of TQM practices used in industry with those proposed in the model, the description of the most common obstacles for TQM implementation, the identification of TQM practices proven to lead to stakeholders satisfaction improvement and those more useful to improve profitability.

If after the analysis of the whole industrial sector the hypothesis is still not proven, a recursive approach will be used in search of knowledge related to the objective of the research. This recursive analysis will be performed on 4 different aspects:

- 1) an investigation to find the management sub-systems or processes could be having a more significant effect on profitability
- 2) an analysis of each stratum of the whole industrial sector in search for the characteristics of the organisations using TQM elements in their management system and having good profitability indices
- 3) the study of other external and internal factors affecting profitability, and
- 4) a critique on the strengths and weaknesses of the results and the conclusions of the field investigation

The information provided by the field investigation and its analysis will allow the elaboration of recommendations to industrial organisations on how to create a management system, with TQM as its key component, that assure the procurement of the economical resources required to fulfil their mission. The set of recommendations will include:

- 1) a diagnosis procedure to determine the weaknesses and core competencies of the organisation in which the system is going to be implemented
- 2) the selection of the most adequate sub-systems and TQM techniques that allow the organisation to improve its performance after implementation
- 3) the determination of the best strategies that assure an effective implementation of the system
- 4) a set of recommendations related to the operation of the system after implementation
- 5) an audit procedure to trace the performance of the system and to detect possible obstacles suggesting its redefinition, or to change the strategies being used for implementation

Finally, the research will be discussed in search of conclusions regarding four aspects:

- the originality of the new knowledge provided
- how previous knowledge was enhanced by the results of this research
- its importance to the Mexican economy and to knowledge in the area of business management, and
- its limitations, boundaries, and applicability

Considering the questions not answered by this research because of its scope and limitations, and the new questions appeared in the process, this discussion will go on to recommend future studies in the area.

CHAPTER 2

OBJECTIVES AND STRUCTURE OF THE RESEARCH

2.1 Objective of the Research

As introduced in Chapter 1, the objective of the research is to enhance the management knowledge already available in Mexico on how to guarantee the procurement of the economic resources required by Mexican organisations to fulfil their mission, through a business management system with total quality management as its key element.

To meet this objective, a data base on Mexican industrial experiences will be generated and related to total quality and management theory.

The expected structure of the system to be proposed at the end will contain the following elements:

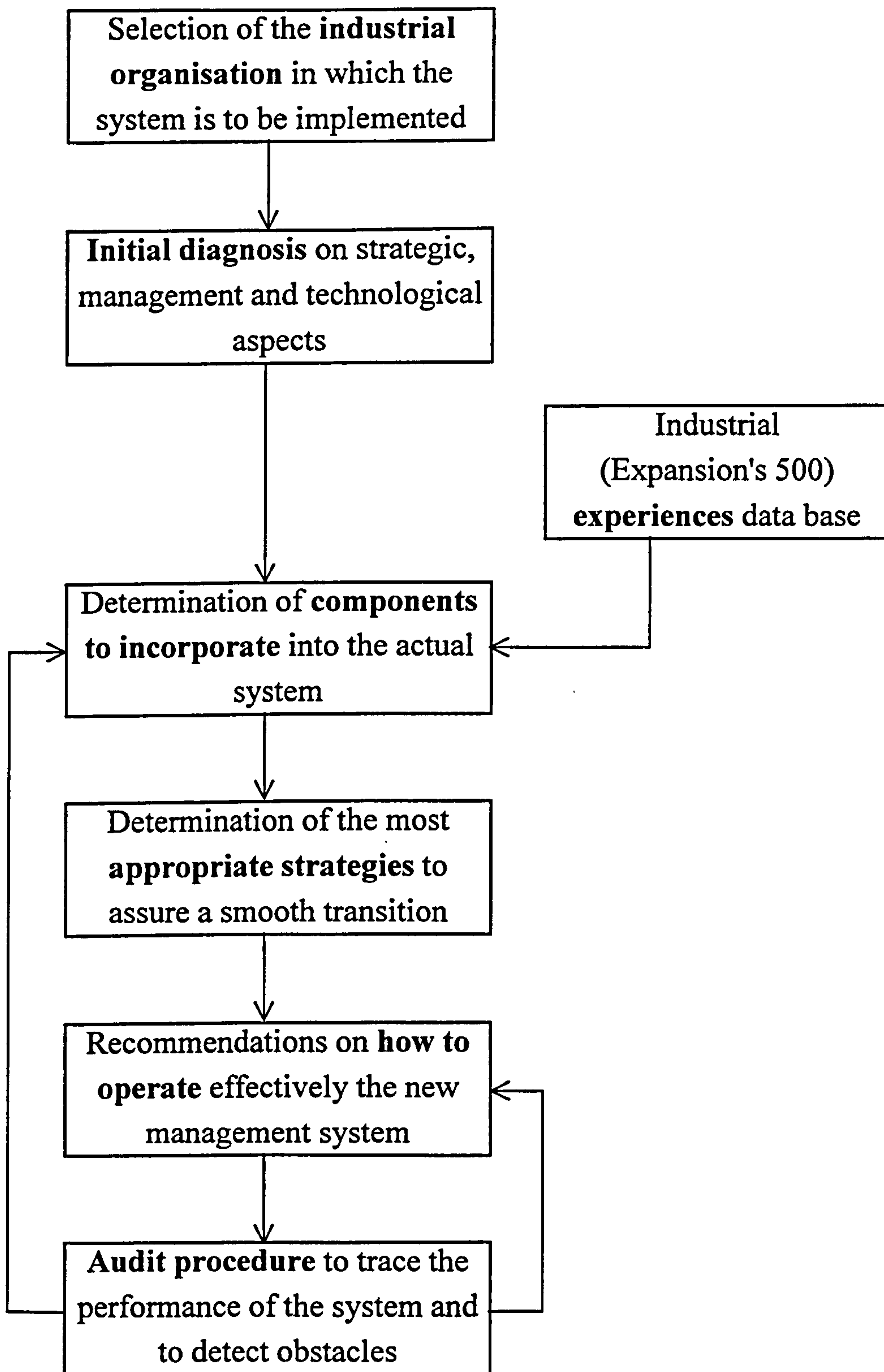
- 1.- An initial self-diagnosis on strategic, management and technological variables of the company in which the procedure will be implemented. The self-diagnosis will establish the most important technical, social and economical characteristics and antecedents of the organisation involved.
- 2.- Given the characteristics and antecedents of the organisation diagnosed, the next step will be to determine which TQM components or additional management techniques should be incorporated into the actual management system.
- 3.- Once having defined the elements to incorporate into the management system, next comes the determination of the most appropriate strategies that assure a smooth transition from the old system to the new one.
- 4.- A set of recommendations related to the operational aspects of the system after implementation.

5.- An audit procedure to trace the performance of the system and to detect possible obstacles suggesting its redefinition, or to change the strategies being used for implementation. The tools used for the self-diagnosis can be used once every 6 to 12 months to audit the TQM system and to monitor its evolution.

Figure 2.1 shows the structure of the intended procedure to design a management system oriented to profit assurance.

The data base will contain information on implementation experiences of large industrial companies located in Mexico City, Guadalajara and Monterrey. Given that these 3 cities concentrate more than 90% of the sales value of the companies listed in Expansion 500, the information gathered from them will be totally representative for the whole industrial sector. The information provided by the data base should help an industrial organisation to learn quickly from others' experiences, avoiding the waste of time and money and increasing the probability of having a successful incorporation of quality management principles into its management system.

Figure 2.1 Structure of the proposal procedure as a result of the research



To create the data base, this study is expected to supply information on at least the following variables:

- quality management techniques used by type of company
- problems faced during implementation and how to overcome them
- performance measurements for the effectiveness of the management system
- recommended sequence and strategies for implementation
- how to run the system and each sub-system
- how to manage each quality techniques

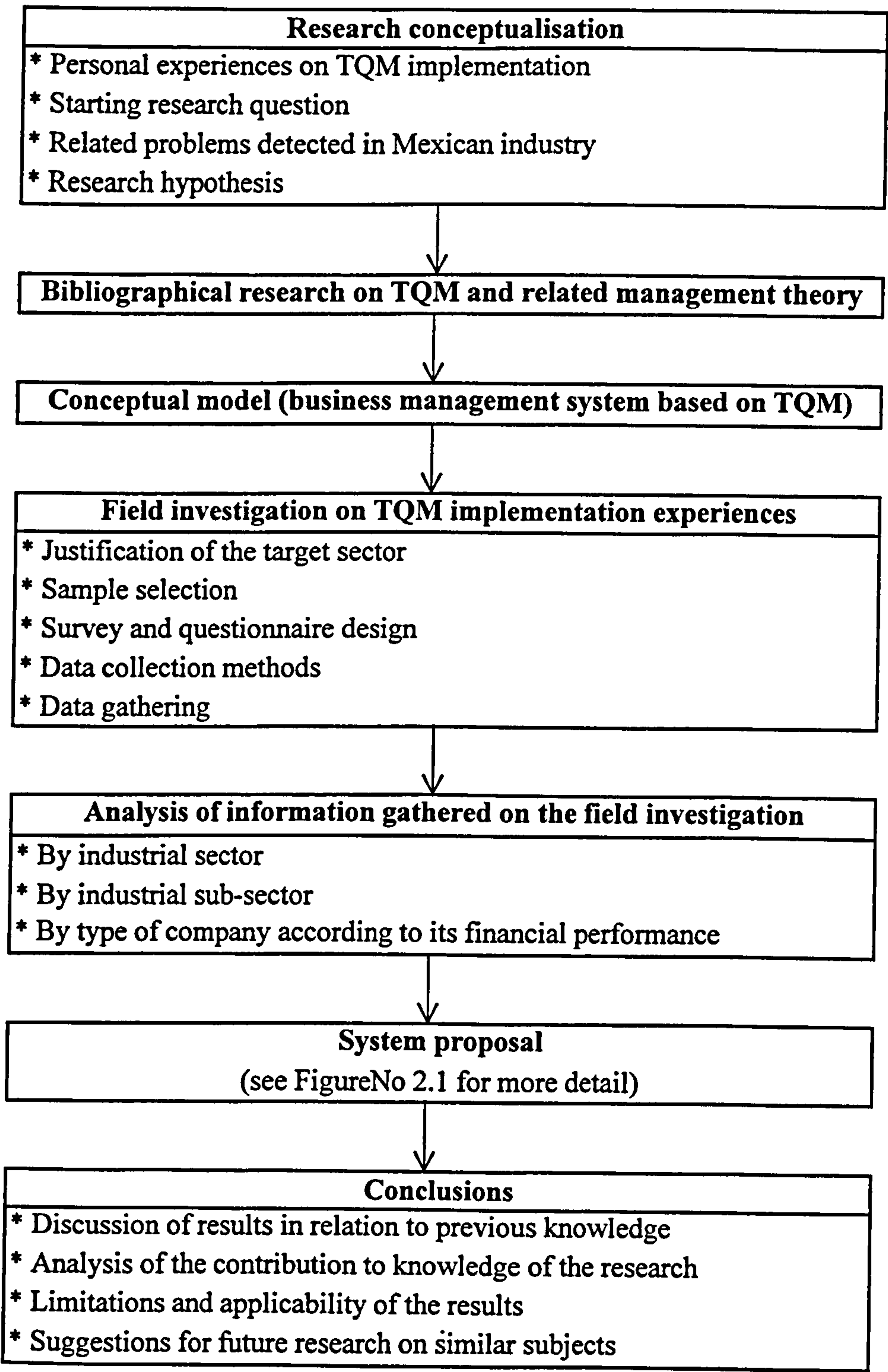
2.2 Structure of the investigation

The investigation is structured in several stages. Given its objective, it will start with the search of theoretical answers to a departing question related to the initial statement suggested in Chapter 1. A relationship analysis of these answers will be used to develop the research hypothesis. After a literature review on the topics suggested by the hypothesis, a conceptual business management system will be created. This model will be used as a reference for the field investigation that is expected to supply, after a detailed analysis, the information for the data base already mentioned.

There are many TQM implementation experiences in Mexico, some successful some not, from which we can learn. The practical research is focused to the labour intensive manufacturing sector in Mexico City, Monterrey and Guadalajara. It is important to involve a mixture of foreign owned companies and Mexican owned companies, since both types of companies develop a different organisational culture, and a comparison of them would give useful information.

After the field investigation, the intended system, suggested by the objective of this research, will be developed. It is impossible to have a universal model that can be applied to any organisation. For this reason, the proposal must include a procedure to choose the best strategies for the implementation and management of the system. Figure 2.2 presents a diagram explaining the research and structure.

Figure 2.2 Research structure



2.3 Research starting question and hypothesis

Chapter 1 presented an initial proposal based on the analysis of the antecedents and perspectives of Mexico's economy. This statement is now used to develop the initial research question, which is:

“What factors could be restraining an organisation to be more competent to obtain profits, and the other ingredients required for stakeholders satisfaction, when incorporating quality management into its management system?”

In search of a hypothetical answer to this question, the following analysis was performed. It presents a collection of symptoms of what a management system can cause against the long-term interests of the company, if its design is incorrect. These symptoms come from the author's experience as consultant in many industrial organisations, and as instructor in more than 80 seminars in total quality. The seminars have been offered regularly during the last 15 years. People that attend to them are executives from all types of organisations in Mexico and Central America. The analysis of the symptoms mentioned, constitutes an initial attempt to answer the research question. It is expected that it will help in the composition of the research hypothesis statement. For this reason, it is not intended, nor needed at the moment, to search for scientific evidence to support them. The search of this evidence to support the hypothesis will be conducted later during the investigation. The order in which symptoms are presented is insignificant.

1.- The performance of top managers is not evaluated in connection to company's mission and vision. These people are usually encouraged to achieve a certain short-term financial goal. The misunderstanding of financial management as an end and not as a means for business direction has interfered with the new ideas of customer satisfaction. Within this context, in the company's mission, shareholders are the most important stakeholder, and all other stakeholders' interests depend solely on stock owners' interests. If this is not explicitly indicated in the mission statement, it is so in practice. For example, some managers, being pressured to achieve a certain percentage

on the profit to sales ratio at the end of the quarter, are “obliged” to make decisions against the long term interests of the company. They start ridiculous cost-reduction programmes, fire people that will be required again next quarter, generate invoices not supported by sales, delay payments to suppliers, change to cheaper raw materials, send defective lots to the market, ignore customers’ complaints, do not respect guarantees, etc. The more interesting point here is that they can not be accused of acting dishonestly, they are taking care of their position within the company, they are taking care of their own interests. An important statement that will be considered throughout this thesis, based in the collectivism characteristic of the Mexican society mentioned in Chapter 1, is that every person puts first their own family’s interests and then attends to other groups’ interests. This explains why Mexican managers act according to the way their performance is being measured without consideration of the long-term consequences of their short-term decisions.

2.- Mission is usually not well disseminated throughout the organisation. This explains why not only top executives, but as well employees from lower levels, do not always behave and make decisions in congruency with the long-term interests of their organisation. This problem, added to the incorrect and incomplete definition of the mission statement (explained in Point 1), makes it almost impossible for an organisation to have a clear direction. There could be many reasons affecting the correct dissemination of a company’s mission. One of the most important is the lack of strategic guidelines and quality policies to steer the behaviour of the people involved in the operation. Another one is related to the high power distance prevailing in our culture that provokes the appearance of many power centres at all levels. This power distance is observed not only between top executives and the rest of the personnel, but also among employees of the same organisational level. Informal authority emerges in the middle of the organisation, usually in conflict with formal centres of authority (supervision), and the struggle for power impedes the collaboration required to direct the company towards the fulfilment of its mission. This condition is permanent and misdirects the elaboration and accomplishment of appropriate working methods and administrative procedures, and even the design of products and services for customers’ satisfaction. For example, Aeromexico was before 1986 a company mainly oriented to satisfy the needs of pilots

and employees. Customer needs were not important and its on-time rate was one of the worst in the world. Therefore, after the breakage of the most harmful power centres within the company (which constituted a hard political decision), and the implementation of a programme oriented to customer satisfaction, the company was “resuscitated” as one of the world leading airlines in punctuality rates.

3.- Most industrial organisations in Mexico do not have a very effective and productive operation to offer the quality needed in today's competitive markets. This point was widely discussed in Chapter 1, and although some optimistic situations are presented there, they are not representative of the whole industrial sector. It is a reality that the exchange rate is still the most important factor to encourage exports. Mexican industrial companies are not yet at a point at which international markets recognise the quality of their products by paying higher prices for them. The auto industry is perhaps the exception, but most of the others can only locate their products in international markets if they offer a combination of low price and a relatively good standard of quality. Excellence is not yet a word associated to Mexican products. On the other hand, most industrial companies are always in a weak financial position and their performance is dramatically altered by the constant changes experienced in the economical environment. This situation is not only due to internal aspects of organisations, one important cause of their permanent financial weakness is the relatively high interest rates prevailing in Mexico. Since the early 1980's, the country has been forced by macro-economical pressures to offer high interest rates to attract foreign investment, because it has not been able to accomplish the required growth in GDP with internal savings. However, high interest rates make it very expensive to finance new investment in Mexico, which depresses domestic markets, discourages economic growth and reduces the possibility of increasing the savings level. This vicious loop can only be reverted with productivity and competitive products offered in international markets.

4.- Usually, the mission statement in Mexican organisations does not embody explicitly the expectations of all of their stakeholders. It is common to speak about success in the field of business, but it is important to analyse the meaning of the word from the point of view of all groups involved and related to the organisation, the stakeholders. For shareholders, success means an attractive return on investment; for employees, a secure job with a salary large enough to satisfy their actual and future economic needs. For society, a successful organisation is one that shows respect for their values, provides jobs to its members, and sponsors activities of their interest such as sports, entertainment, etc. For the government, a company is meeting its expectations if it complies with the regulations it imposes (environmental, hygiene, labour, social security, etc.), and pays the corresponding taxes. Suppliers measure the success of their customers in relation to the fulfilment of contractual agreements and the feasibility of establishing a long-term alliance. Customers are satisfied if suppliers meet their expectations in terms of quality and price. If a mission statement does not guide the organisation to a position in which the fulfilment of the expectations of all stakeholders is balanced, it is useless. For example, some mission statements seem to be afraid to mention their need to make profits, or to describe a balanced distribution of the benefits obtained from the operation of the company among all stakeholders, or to include one or several of them.

5.- The emphasis on control of traditional business administration is an important obstacle for total quality management implementation. The main problem of traditional business administration theory is to be centred in the control of every single process through the measurement and analysis of the financial performance. This strong emphasis on financial control represents an obstacle for TQM implementation because it puts pressure on short-term achievements whilst quality management seeks the improvement and preservation of a competitive position in the long-term. Mexican industrial organisations grew in an environment in which it was relatively easy to achieve an outstanding financial performance without any sacrifice of the future. Suddenly financial margins went down with the entrance of more competitors into the domestic market. Shareholders are still having big problems to understand the current conditions of strong competition and want to continue getting the same margins just by

putting pressure on the organisation to do so. Although it is important to recognise that the Board of Directors of almost all industrial organisations are supporting the implementation of a quality improvement programme, they have not realised that this sole activity is not sufficient in a management system based on short-term financial controls; both are not compatible. It is important to understand that a good financial performance is only sustainable if the organisation is flexible enough to adapt to current highly changing conditions. All these arguments are not suggesting the elimination of financial techniques, but the reconsideration of the way they are being used for management purposes. Financial statements and ratios should be used, in addition to other performance measurements, as information to feedback into the management system. Control should be replaced by a self-control culture in which every process has the flexibility to attend quickly to the needs of its internal or external customer.

6.- The knowledge required to achieve the cultural change implicit in a TQM programme is not available in Mexico. As mentioned in the introduction, not only quality management theory, but all management theory used by Mexican organisations is developed outside. In quality management literature, it is frequently mentioned that the implementation of a TQM programme requires a cultural change. This change, or perhaps adaptation, not only includes cultural aspects at the corporate level, it should reach the external characteristics of society's culture. It is clear that the direct implementation, with no adaptation, of a management concept developed for other circumstances is condemned to failure. It is imperative to support more management research activities that provide the knowledge required to be competitive.

7.- Compensation systems benefit more the higher positions, independently of their contribution to the mission's fulfilment. This means that the higher in the organisational chart, the better compensation a person gets. This kind of system is easy to design and to manage since always the bosses get more money than any of their subordinates. The system is preserved because each boss assesses the performance of his or her subordinates, making sure that he or she gets the larger slice. A direct effect of this policy, which is in operation in practically every industrial organisation, is that top management are always more interested in the company's wealth and future than

employees from lower levels. The huge higher/lower salary ratio, which is more than 100 in some cases, encourages a race for the top positions among all employees, and not an interest to search for excellence in what is actually being done. This race for the top promotes the development of a political environment in which the battle for the most valuable posts predominates. This struggle distracts the energy of people who instead of using it to move the company towards its mission fulfilment, use it to move themselves from their actual position to a better one in terms of money. Another by-product of the race for the top is that those interested in moving upwards faster concentrate their efforts in satisfying their boss, and not necessarily their customers. Ideally, the perfect compensation system is one in which a person gets paid in proportion to his or her contribution to the benefits achieved by the company. However, this system is only an utopia and some other compensation systems should be designed and put in practice. A feasible compensation system congruent with quality management principles, is actually being used by some Mexican companies. In this system, the compensation a person gets depends on the opinion of four entities: internal customer, external customer, work-team partners and the work-team leader (in some sense equivalent to the boss in traditional systems). In this way, a person that takes care of teamwork and customer satisfaction is compensated better than those that do not.

8.- Universities and technical schools are not providing adequate and sufficient knowledge on quality concepts to their students. People who manage companies actually in Mexico were educated to succeed in an environment free of competition. That explains why their education did not include total quality concepts; and although this situation is changing, Mexican companies are still not being supplied by schools with people highly prepared in total quality matters. It was not until recently that some universities decided to include at least a very basic training on quality in their engineering programmes, but all other courses rarely include quality related subjects in their programmes. In technical schools the situation is even worst, only those technical programmes closely related to production management include training on statistical process control, but other programmes include nothing. Not all production positions are occupied by persons formally prepared in a technical school, most of them developed their skills in an empirical way when they were obliged to drop-out due to economical

reasons from the primary, the secondary or the preparatory school. At these levels they do not teach any of the basic quality concepts, so the responsibility for teaching workers the fundamentals of total quality has been taken by the companies interested in having people trained on quality concepts. Companies without enough resources to train their own people are at a clear disadvantage to adopt a quality management programme and to improve their competitiveness. The cultural aspects of total quality should be learned from the beginning in primary school, and the educational system at all levels should be committed to achieve this goal. However, we should consider that any way there would be a lag time before young people assume leading positions in Mexican companies.

9.- People in industry are generally reluctant to learn new concepts, that is why they are not so competent in coping and adapting quickly to changes. This time of highly competitive markets requires people always willing to learn and to develop new abilities that allow them to respond and adapt quickly to constant changes. In Mexico, some people who experience the period of no competition have not realised yet that those years are gone. Definitively, to work in an environment of no competition is more comfortable than the present conditions, but those not conscious of the need to change, soon will find themselves out of the market place. New conditions demand the ability to acquire new skills much more frequently than before. A study made by the Research Centre for Competitiveness at ITESM, showed that on average a person graduated from that institution moves to a completely new position every two years during the first 10 years of his or her professional career. So clearly they must be able to learn new concepts as quick as possible to continue being competitive in the new position. Additionally, the rapid development of technology and the interaction with new markets are pushing the need to acquire other abilities not required before. Now, it is imperative to be able to communicate (in written and orally) at least in English, but soon this ability will not be enough and the knowledge of other languages will be demanded. A competitive person must be capable to prepare a well-composed report and to sell his or her ideas to superiors or customers. A competitive person should know how to search for new information. Due to the extraordinary development of technology to save and retrieve information electronically, there is an enormous amount of information available, and those capable of locating it faster will be in a better competitive position.

Actually, those not knowing how to take advantage of the potential of a computer are obsolescent and out of the competition for the best positions. The global characteristics of current markets require the knowledge of other countries' cultures, customs, history, social problems, political conflicts and future prospective. Finally, it is extremely useful for a competitive person to develop a culture of quality. This culture of quality will allow him or her to perform effectively in teamwork activities with a service attitude, and to put in practice techniques for quality improvement. A culture of quality must be supported by congruent moral values and habits to enable a person to contribute to his or her organisation to overcome successfully the problems faced in search of its mission fulfilment. It is unquestionable that a company integrated by people with this characteristics will succeed in highly competitive markets.

10.- Top executives frequently repeat the same operational and strategic errors because they do not have the ability to learn from previous experience. This lack of learning capacity among top executives can be also explained similarly to Point 9; however, the frequent commitment of the same operational and strategic errors deserves a special consideration. Only around 35% of top executives in Mexico are people over 50 years of age (Expansion 1997). These people learned to manage their organisations on a period of incredible economical stability (before the mid 1970's). It seems reasonable they that are having a very tough time now, and they find it difficult to learn how to manage their company under the new circumstances. However, the remaining 65% of Mexico's top managers are people under 50 years of age. Most of them entered the labour market during the years of constant turbulence and change. It is unjustifiable that they should not have developed the ability to learn from previous experiences. Perhaps it is because only in very rare conditions a given situation appears again; the strategies that would have worked in the past are useless in the present, and ridiculous for the future. Perhaps it is because they were not well prepared at school for a business environment of constant changes. Perhaps it is because their subordinates also do not have the learning capacity required to assimilate the strategies they propose. Perhaps there are many reasons that can explain why this is happening, but the reality is that top managers should have the capacity to learn fast from past experience, from the

immediate previous experience, to adjust constantly and effectively the direction of their organisations.

11.- Traditional management systems restrain the flexibility required by an organisation to face actual changing conditions. As mentioned before, traditional management systems are sustained by strong control exercised on every process of the organisation. The hierarchical organisation required for this purpose constitutes an extremely rigid structure that limits the flexibility of the decision making process. In a hierarchical organisation every person needs the authorisation of his or her superior to do something not contemplated by the policies and procedures already approved. The velocity of change in today's world makes it difficult to design adequate policies and procedures to cover all the potential situations that could occur during the normal operation of the business. Customer needs are these days so heterogeneous that every single customer may ask for a different requirement in the same product. A rigid decision making structure is not appropriate to accomplish customer satisfaction under these circumstances. Perhaps because of the high power distance observed in Mexican culture, industrial organisations in this country are not transforming their decision making processes to more flexible ones when they implement a quality management programme. They are trying to introduce a quality management programme into a rigid structure designed for control. What they need to do is to change their management structure to a more flexible one. This will enable every member of the organisation to make decisions outside the original boundaries, if it favours the accomplishment of customer satisfaction. This management structure should support teamwork activities and reward the achievement of customer satisfaction.

12.- In traditional management, every position within the company is a “monopoly”, which constitutes the worst environment for quality. Another consequence of the rigidity of traditional management systems is that it discourages the quality of internal processes. The reason is that in a hierarchical and inflexible structure, a given process is performed uniquely by the person occupying the position associated to that process. This person is paid and promoted not because of the quality of his or her job, but according to the boss's opinion. That position acts as a monopoly, and the only

concern of the person occupying it is to convince his or her boss, not the customer, that the work done is of good quality. Adding to this situation the high cost to fire a person in Mexico, even if she or he is non-productive, and the paternalism found in most Mexican companies, the problem is even worse. Labour law in Mexico protects the rights of workers in such a way that a work contract for an undefined term means for them a high degree of security. This fact reinforces the feeling of ownership of the job position. Labour law uses the principle: "equal job, equal pay". This means that a worker can ask for a similar salary to his or her partner's salary, independently of the difference in the performance of both. Although it is possible to find the way to cope with this rule, since labour authorities are not rigid in their enforcement, they represent a potential source of conflict that could affect the relationship between workers and managers, and the reinforcement of the lack of obligation to look after customer satisfaction. If every process could choose its suppliers (internal or external) and could influence the decision of how much to pay them, the competitiveness of internal suppliers would necessarily improve. This proposal is not easy to attain, but it could be the idea supporting a more feasible system. The important factor is to have a flexible management system that procures customer satisfaction over any other consideration, under highly unstable conditions.

13.- Top management attitude inhibits unintentionally the communication of problems occurring at the lower levels. Sometimes, top managers want (unconsciously) to be informed only on achievements, on good things. They even assess people's performance using this screened information, which reinforces the custom of hiding the true if it is related to bad news. This unwillingness to hear problems is perhaps for top people a good means of feeling more relaxed, or an answer to the urgency of getting the achievements required to keep their top position. On the other hand, this reluctance to know the truth may be caused by their subordinates as an unconscious intention to reinforce the power distance. In Mexican culture, power distance is not induced only by those who already have the power, but also by those who want to avoid it, as a way to ensure that somebody else will be always willing to assume their responsibility. This characteristic is known as "presidentialism" in the political environment, in which the system gives full power to the president in turn, and

since the president has the power to influence completely the professional future of his subordinates, he is only informed on good things. The phenomenon repeats at all levels in Mexican society. Top managers need to go “downstairs” to know in full detail what is happening at the operational level, to see how their strategies and decisions are working, to feel the internal problems, to understand customer needs, to sense their employees’ degree of satisfaction or dissatisfaction, etc. Unfortunately, due to cultural reasons, top managers can not rely completely on the information provided by their subordinates. They have to be careful not to encourage the flow of useless information.

14.- Quality control circles and all other techniques dedicated to employees’ involvement are not appropriately managed. Again this symptom can be explained because of the cultural characteristics of Mexicans. Supervisory style is very autocratic due the high power distance, and it is difficult for a supervisor to let his or her subordinates express an opinion on things about which he or she is supposed to know more. In Mexican industrial organisations, it is common to select a supervisor because of his or her outstanding performance as worker. This promotion is the way to recognise the good behaviour of a person, and to give him or her a better salary (remember the equal job - equal salary rule). This selection process reinforces the power distance, and does not guarantee to have the best supervisor, because the skills required to be a supervisor are not the same as the skills needed to perform a production work. Another obstacle for employees’ involvement is the already discussed workers' lack of desire for knowledge. To get an effective involvement, people need to learn new skills for the rational analysis of quality problems. Mexican people like to solve problems just by discussing the potential solutions without a previous analysis of the causes. Most of the time, the solution proposed by the group leader prevails. For a rational analysis of problems, workers need to learn at least the 7 tools for quality improvement proposed by Ishikawa. Although these tools are relatively simple, the low educational level prevailing in Mexico is an obstacle for this purpose. Organisations implementing quality improvement programmes in Mexico think that a short seminar on the 7 tools and some basic quality management ideas is enough to prepare their workers for teamwork. This is not true and they have to be very patient because the learning process for an effective involvement takes time. Finally, in Mexican industry, a culture predominates which is

not oriented to the satisfaction of the needs of internal customers. Perhaps this is because internal customers do not participate in assessing the performance of their internal suppliers, or because of the existence of power centres with interests not aligned in the same direction, or due to the very limited service attitude characteristic of Mexican culture. In Mexico, the meaning of service is misunderstood by some people; it is confused with being a servant not a server.

15.- Usually, reward and recognition programmes are utilised to support the achievement of tangible goals. Recognition must be used to promote and reinforce the social and work corporate values needed in a total quality organisation. However, because of the low income obtained by most workers, recognition procedures are not as effective as rewards. People with fundamental needs unsatisfied prefer a tangible reward to an intangible recognition; diplomas, medals, hugs, applause are not good to feed his or her family. It is not recommended to compensate a low salary with a reward conditioned to the achievement of quality or productivity goals. Mexican organisations need to review carefully their compensation systems to make sure they are satisfying the basic needs and the security level (in Maslow's pyramid of needs) of their employees. Once this is done, the recognition programme can concentrate in promoting the behaviour necessary to achieve a successful incorporation of quality management concepts into the management system.

16.- Quality improvement achievements are not adequately promoted, internally and externally. If done, this promotion constitutes an effective way to reinforce people's motivation, pride and sense of ownership. To work in a successful organisation constitutes a factor that strengthens everybody's self-esteem. Some companies take care of their external image promoting extensively their achievements in quality, which is good, but they should not forget to spread them also inside the organisation. Mexicans are some times afraid of making too much noise on what they achieve. To do it is not arrogance, but an effective form of improving the company's image. An image of quality and customer orientation favour how the quality is perceived by the customer. For example, a customer is more willing (perhaps unconsciously) to accept a defective product coming from a company with good reputation, than one coming from a

company with bad or unknown reputation. The same phenomenon occurs at all levels; customers are more strict with products manufactured in a country with a bad reputation or with a service provided by a person with whom they or someone else had a bad previous experience. The promotion of quality achievements has many benefits at the personal, organisational and country level. It is extremely important for the whole Mexican society to make public any accomplishment in quality (small or large) obtained.

17.- There is a general misunderstanding of the role of total quality management. Most managers in Mexican industry consider TQM a tool for quality improvement. This situation is limiting the development of the cultural change required to be competitive in today's world economy. Quality management is not only a tool to achieve customer satisfaction, it is more than that. Quality management is a concept that influences on individuals' behaviour. The search for excellence calls for a revolution within the organisational culture. Quality management can not work isolated as an independent set of techniques applied to other elements of the management system. A quality culture must be spread along the whole organisational system. What is needed to be a world-class organisation is a systemic approach in which quality management ideas are integrated into the whole management system. This systemic approach will allow the management system to handle the effect of external factors in favour of the company's interests. Mexican industrial organisations, and the economy as a whole, would benefit with the promotion of a culture of quality and the implementation of management systems supported by it.

2.3.1 Relationship analysis of the symptoms

By classifying the facts just presented, 12 categories are found. The numbers in () correspond to those given in the previous list.

- a. Society's culture. (2,6,12,13,14,15,16,17)
- b. Influence of top executives in quality management. (1,2,3,7,10,11,13)
- c. Company's mission and vision (1,2,4)

- d. Conditions for quality management implementation. (3)
- e. Participation and role of stakeholders. (4)
- f. Change in administrative procedures. (5,11,12,13,17)
- g. Organisational culture. (6,13,14,17)
- h. Reward and recognition programmes. (7,11,13,15)
- i. Education / social influences on individuals' culture. (8)
- j. Development of the ability of learning. (8,9,10,14)
- k. Decision making through teamwork (14)
- l. Promotion of quality accomplishments. (16)

Since this list of symptoms does not answer the starting question yet, in the next step each factor will be related to each other in a relationship matrix. This analysis will be made by the use of the 7 QC administrative tools (Mizuno 1988), and will serve to derive a format that presents the key elements for quality management implementation. The relationship between each pair of factors is found by answering the following question: If factor X is included in a an ideal management system, is it possible then to conclude something on factor Y? The outcome of this procedure is shown in figure 2.3

Figure 2.3 Relationship matrix of factors affecting the management of an organisation

| | a | b | c | d | e | f | g | h | i | j | k | l | Effect | Cause |
|---|---|---|---|---|---|---|---|---|---|---|---|---|--------|-------|
| a | | ↑ | ↑ | ↑ | ↑ | ← | ← | ↑ | ↑ | ↑ | ↑ | ↑ | 2 | 9 |
| b | ← | | ← | ← | ← | ↑ | ← | ← | ← | ← | ↑ | ← | 9 | 2 |
| c | ← | ↑ | | ↑ | ← | ↑ | ← | ↑ | ← | ↑ | ↑ | ↑ | 4 | 7 |
| d | ← | ↑ | ← | | ← | ↑ | ← | ↑ | ← | ↑ | ← | ← | 7 | 4 |
| e | ← | ↑ | ↑ | ↑ | | ↑ | ← | ↑ | ← | ← | ↑ | ↑ | 4 | 7 |
| f | ↑ | ← | ← | ← | ← | | ← | ↑ | ← | ↑ | ↑ | ← | 7 | 4 |
| g | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ | | ↑ | ↑ | ↑ | ↑ | ↑ | 0 | 11 |
| h | ← | ↑ | ← | ← | ← | ← | ← | | ↑ | ↑ | ← | ← | 8 | 3 |
| i | ← | ↑ | ↑ | ↑ | ↑ | ↑ | ← | ← | | ← | ← | ↑ | 5 | 6 |
| j | ← | ↑ | ← | ← | ↑ | ← | ← | ← | ↑ | | ← | ← | 8 | 3 |
| k | ← | ← | ← | ↑ | ← | ← | ← | ↑ | ↑ | ↑ | | ↑ | 6 | 5 |
| l | ← | ↑ | ← | ↑ | ← | ↑ | ← | ↑ | ← | ↑ | ← | | 6 | 5 |

The conclusion of this relationship matrix is that the cause factors are g, a, c, e, i and k, and the effect factors are b, h, l, j, d, and f.

This conclusion is not sufficient to define the research hypothesis, so the next step is to relate causes with causes and effects with effects. The results are shown in Figures 2.4 and 2.5

Figure 2.4 Relationship of causes

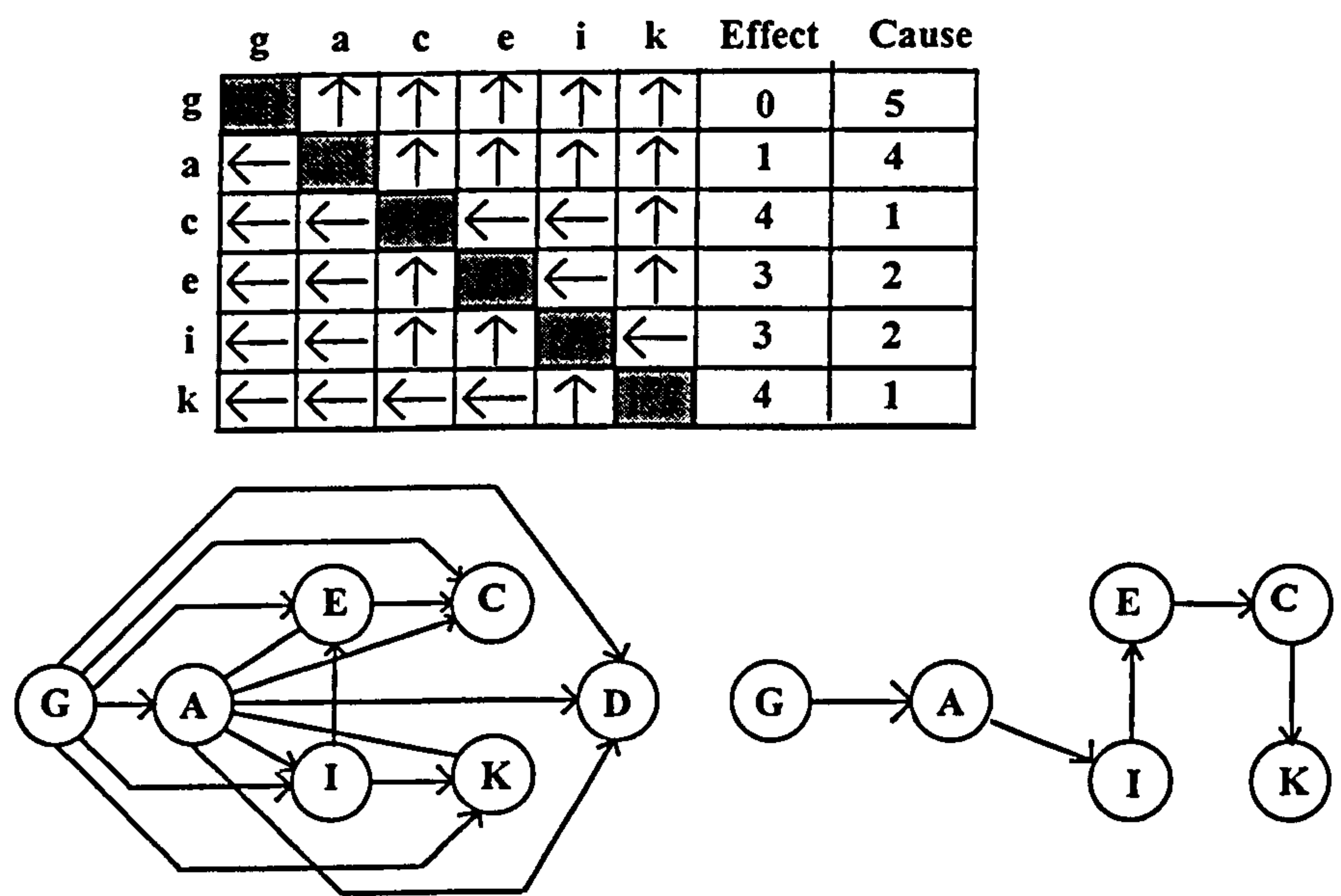
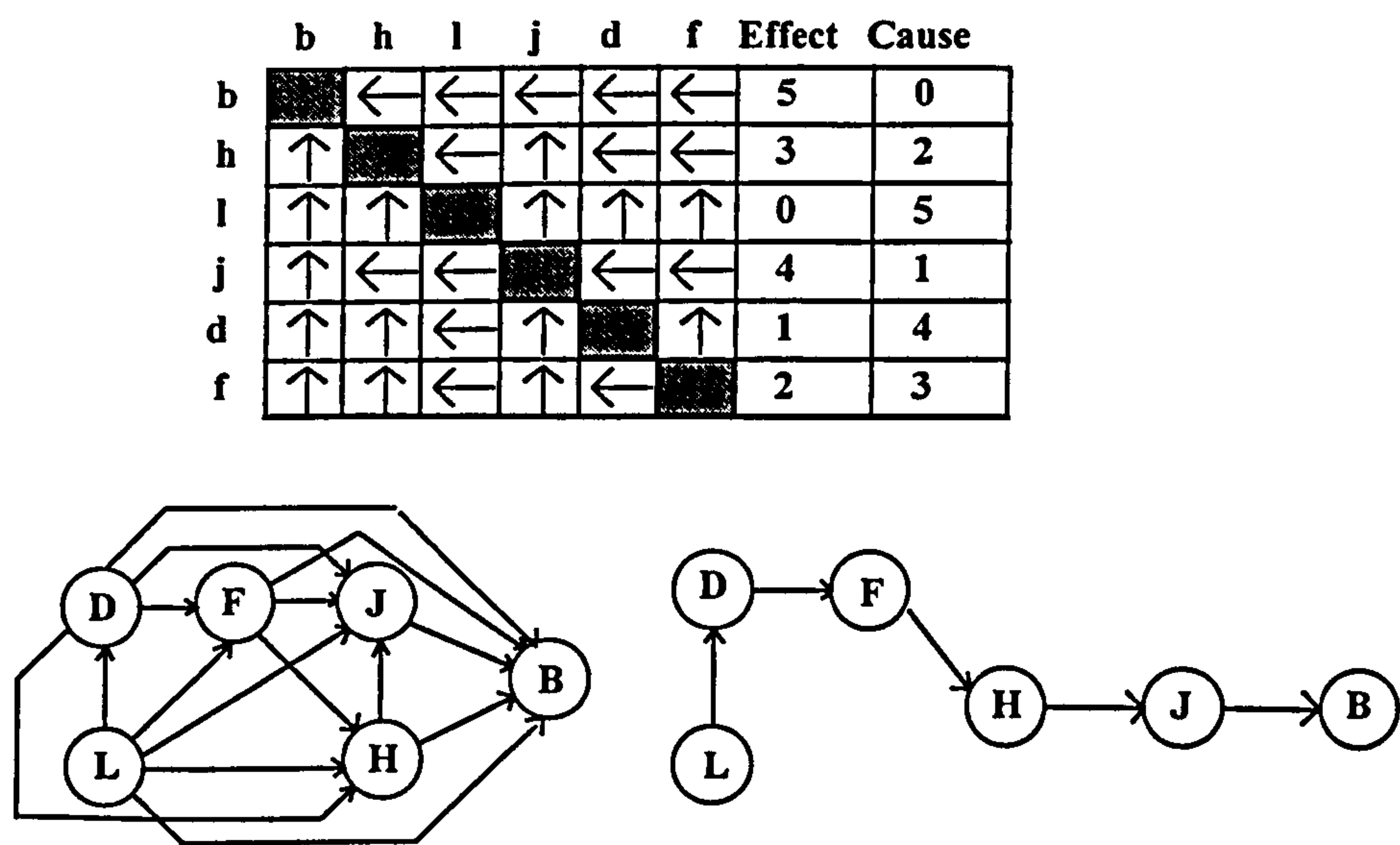


Figure 2.5 Relationship of effects



In the relationship diagrams shown on the right, the elimination of redundant arrows gave an order of importance for effects and causes. This sequence is in ascending/reducing order of importance, for effects as well as for causes.

Causes: g - a - i - e - c - k

- g. Organisational Culture
- a. Society's culture
- i. Education and social influences on individuals' culture
- e. Participation and role of stakeholders
- c. Company's mission and vision
- k. Decision making through teamwork

Effects: l - d - f - h - j - b

- l. Promotion of quality accomplishments
- d. Conditions for TQM implementation
- f. Change in administrative procedures
- h. Reward and recognition programmes
- j. Development of the ability of learning
- b. Influence of top executives in quality management

2.3.2 The research hypothesis

This logical order is used now to develop an answer for the starting question, which will be considered the research hypothesis.

Mexican industrial organisations need to change their management system. Compatibility should be maintained between the organisational culture and the prevailing culture at individuals' level. Educational and other social influences in the Mexican environment should be accommodated. In this way, it will be possible to have a balanced participation of stakeholders in mission and vision development, and decisions at all levels become more democratic. By adopting this policy, quality concepts will be promoted throughout the organisation, creating adequate conditions in which to incorporate total quality ideas into the management system, and to change administrative procedures, as well as their rewards and recognition programme. These changes will help to develop the learning abilities required by executives to manage the continuous improvement process more effectively.

CHAPTER 3

LITERATURE REVIEW ON TQM

3.1 General concepts of total quality management

Quality is a concept really hard to define, mainly because it has been in constant evolution. Every definition of quality has to be understood in the context of its age. To know this evolution process allows us to understand the different definitions encountered in the literature of quality. Some of the most common terms presented in the literature come from quality, quality control, statistical quality control, total quality control, quality assurance, company-wide quality control, total quality management, etc. A brief analysis of the evolution of quality is presented next.

In a broad perspective, the word quality is associated with the whole set of qualities that a product or service offers to its users. A given product is a quality product if its characteristics, tangibles and intangibles, satisfy the needs of its users. Among the quality characteristics of products are: 1) operational (speed, capability, etc.), 2) total price and the economy of usage, 3) durability, 4) safety, 5) fitness for use, 6) manufacturability, 7) maintainability, and 8) disposability. These characteristics together provide in a product what is known as **consumer quality**. However, quality is also defined in terms of its planning, control and improvement. **Quality of conformance** is used to measure the degree of conformance to design specifications, of a product during its manufacturing process. **Quality of design** focuses on the characteristics of a product in terms of the satisfaction of the requirements of its potential users.

The standard **JIS Z 8101** defines quality control as “a system that contributes to provide a product or service with the characteristics needed to satisfy customers’ requirements in an economical way”. The standard **ANSI Z1.7 1971** says that quality control includes “operational techniques and activities oriented to sustain the characteristics of a product or service to satisfy certain requirements”. The **ISO 9000** standards define **quality** as “the integration of the characteristics that determine the degree in which a product

satisfies the needs of its customers”; **quality assurance** as “the set of activities formally planned to assure the required quality level in the outcome of the manufacturing process”; and **quality control** as “as the set of activities and techniques performed with the intention of creating a specific characteristic of quality”.

From its origin, people are worried about quality. At the beginning, quality activities were oriented to provide food and dress. The appearance of human communities eventually brought as a consequence the appearance of markets. In primitive markets, producer and user easily met face to face; there were not formal specifications or guarantee policies and users protected their interests through a close contact with producers. Quality of design and quality of conformance were easily achieved; customer satisfaction was not a major concern. As commercial and economical systems evolved the distance between the producer and the user became larger. Small shops appeared everywhere and commerce started to play an important role in the interaction between producers and users. With the introduction of commerce, the need for specifications became more evident to communicate users and producers.

The industrial revolution made possible the expansion of manufacturing processes and the variety of products. This growth in industrial activity introduced important technical problems to the organisational systems of those days. The need to solve these problems constituted the start of the “age of quality” we are living today. According to Bounds *et al* 1994), quality has evolved through four eras: **inspection** (19th Century), characterised for defects detection and methods to solve the problems created by the lack of uniformity in products; **statistical process control** (1930s), which brought the appearance of statistical methods for process control and the reduction of inspection through sampling; **quality assurance** (1950s), when it is recognised the need to involve every department of the organisation in the planning and execution of quality policies to assure the conformance to specifications of products; and the age of **strategic total quality management** (1990s), when organisations realised that quality is a market-driven concept and the total satisfaction of customers’ needs as a strategy is the most important element in their efforts to be competitive and succeed.

The evolution of quality through these four eras is closely linked to the evolution of management. The era of inspection is the outcome of the initial elements of the theory of management provided by Frederick W. Taylor and Henri Fayol. Taylor, a mechanical engineer, is known as the father of “scientific management”. Fayol, an engineer specialised in mines, was the president of an important mining company. Taylor supported his theory in the principle of the division of labour proposed by Adam Smith in his book “The Wealth of Nations” in 1771. Taylor affirmed that if workers were not performing with the expected productivity and quality, it was management’s fault because its lack of ability or interest in providing appropriate methods, training, equipment and incentives. He proposed to design highly simplified manufacturing operations, provide training, measure workers’ productivity, and reward them in proportion to their performance. Taylor (1911) suggested that workers should concentrate in production, leaving the planning, control and improvement of their processes to managers. Managers stimulated productivity and quality of workers by given them economic incentives according to their performance.

Fayol (1949) was the first person in considering management as an area of knowledge that should be scientifically studied. He suggested the adoption of three principles: 1) unit of command (every employee should receive orders only from one source), 2) unit of direction (there should be only one action plan), and 3) centralisation of authority.

Both theories suggested the division of planning, control and improvement from the execution of an operation. This situation helps to understand why inspection, used as a control device for defects’ detection, was the most important characteristic of the quality systems of that era. It is important to understand the validity of Taylor and Fayol’s thoughts under the circumstances in which they appeared. However, under current circumstances they could not be totally applicable.

In the 1930s, searching for methods to reduce the cost of inspection, new statistical sampling techniques were proposed. These methods were based on an optimum cost criteria; the cost of inspection is lower, but there is a cost involved in the risk of accepting a bad product. But the focus of the quality system remained unchanged;

errors' detection. Around those days another statistician, Walter Shewhart (1930) developed a techniques called by himself **statistical process control**. The most important idea behind SPC was **prevention** for the “economical control of the quality of manufactured products”. Quality entered its second era, and Shewhart defined **control** in this way:

“a phenomena is controlled when, through the use of past experiences, we can predict, at least under certain limits, the variations on behaviour of that phenomena in the future”

Shewhart's SPC is supported in three postulates, all of them around the idea that systems, even natural systems, do not behave according to an exact pattern, but to a *probable* one. These postulates are:

1. The causes that influence on the behaviour of a system are variable, so they can not be used to predict the future exactly.
2. Constant systems exist only in nature, but not in the environment of industrial production, where the causes of variation are always present in the quality of raw materials, equipment, etc.
3. Causes of variations can be detected and eliminated.

Shewhart helped to understand quality as a problem of variations that can be controlled and prevented by the opportune elimination of the causes that provoke it. The control charts are the materialisation of this concept.

Deming (1986), the most important supporter of Shewhart's ideas, defined quality control as “the utilisation of statistical principles and techniques in all production stages to get an economical manufacturing process, providing a useful product to the consumer”.

In the first eras of quality, the focus had been totally oriented to the manufacturing process. There was no concern for the quality of services, internal or external. It is until the beginning of the 1950s when Juran (1952) pushed the idea of “quality assurance”.

Under this concept, a manufacturing process can be controlled if the quality of the internal services that support it is also controlled. Additionally, Juran defined quality in a very simple and understandable way: “fitness for use”. This definition introduced a key concept in today’s quality theory; the consumer, not the producer, assesses the quality of a product.

At that time, came out the idea of measuring the costs directly associated to quality (or the lack of it). The costs of quality are classified in two types: avoidable and unavoidable. Avoidable costs are the economical measure of the errors committed during the production process. Avoidable costs are also classified in two categories: internal and external. The internal costs of quality are the economical loss due to manufacturing errors from the initial to the final stages of production. The external costs of quality are the economic loss of problems occurred or encountered the delivery of the product to the consumer. The unavoidable costs of quality are those required to maintain in an optimum level the avoidable costs. There are two categories of unavoidable costs of quality: evaluation and prevention. The costs of evaluation are the economical value of every activity performed to detect the errors occurred during the manufacturing process, avoiding its transfer to the consumers. Prevention costs are associated to every investment in quality improvement. They have a permanent, long-term effect on the quality of the production process.

The costs-of-quality idea was the first attempt to analyse from an economic perspective the problems associated to the lack of quality in the manufacturing process. This concept is not a common practice today because it opposes in many ways to the continuous improvement idea and it is not compatible with systems thinking. However, it encouraged people in those days to invest in quality as a strategy to reduce costs and improve profits.

Another consequence of the analysis of the costs of quality was the discovery of the need to extend the concept of quality to the rest of the organisation. The cost of a mistake in production is only a symptom of a previous error in a previous process, not necessarily a manufacturing one. On the other hand, profit is not reduced (or improved)

only because of manufacturing decisions and actions. It can be influenced by any inside or outside element in the system.

In those days, Systems Science was emerging as a consequence of the interdisciplinary groups formed to analyse complex problems during the Second World War. This explains why Armand Feigenbaum (1956) developed the concept of **Total Quality Control**, based on the total system approach. Under Feigenbaum's view, quality is not possible if the manufacturing process is intended to be controlled in an isolated way. These ideas reinforced Juran's thoughts regarding the responsibility of the administration and service areas to support product's quality. In this way, quality theoreticians started to analyse the impact of every administrative activity in the quality of the manufacturing process. Areas such as finance, sales, marketing, purchasing, etc., started to be considered responsible as well for product's quality.

Feigenbaum's proposal was based on four processes: 1) new designs control, 2) control of incoming materials, 3) product control, and 4) special studies of the process. His definition of Total Quality Control was "an effective system to integrate the efforts of development, maintenance and improvement done by different groups within the organisation to assure the economical manufacturing of a product or service satisfying customers' needs".

Almost in parallel, additional engineering concepts were developed in relation to products' design. **Reliability** appeared as a technique oriented to ensure the correct performance of a product during a given period of time and under certain circumstances. Another term within reliability theory is **availability**, that measures the probability of having a product available for use when required. Some techniques for reliability are FMEA (failure mode and effect analysis), life estimate of product's components, use of redundancy and failure analysis. It is important to notice that most of the elements just mentioned, which represent the core of the era of **quality assurance**, are now the base of the ISO 9000 standards.

At the beginning of the 1960s, two significant events occur almost in parallel in Japan and the United States of America. Philip Crosby developed perhaps the first quality programme with a human approach, and the Japanese created the **quality control circles**, another strategy for quality control and improvement with a human orientation. Crosby's programme, called **zero defects**, had the purpose of creating a quality conscious and motivation among workers to do things routinely *right the first time*. The promotion of Japanese's quality control circles was a strategy choose by them to change their previous bad quality reputation. However, the quality principles developed by them are deeper than the simplicity of quality control circles. Ishikawa, perhaps the most important Japanese in the field of quality, defined quality control as the "development, design, elaboration and maintenance of a quality product which is the most economical, useful and satisfactory for the customer".

The Japanese quality control was heavily supported in Juran and Deming's thoughts. From Juran they took the administrative approach to quality, and from Deming the concept of prevention which he explained them with the control circle of plan-do-check-action (Deming's circle). In fact, the PDCA cycle is used to manage every process in Japanese organisations. The most important characteristics of the Japanese quality control are:

1. Companies should do what their customers demand from them.
2. Quality control activities should bring economic benefits to the company.
3. Quality control starts and ends with education.
4. The implementation of total quality control requires a continuous educational programme at all levels, from the president to production workers.
5. Quality control allows everybody to give his or her best.
6. Human relations improve when a quality control programme is implemented.

Additionally, Ishikawa's vision on quality control was to consider it a revolutionary factor in business' direction. He argued that if CEOs follow the following principles, their companies would be highly competitive. The principles mentioned by him are: 1) Give quality a much higher priority than to short-term profits, 2) focus the organisation

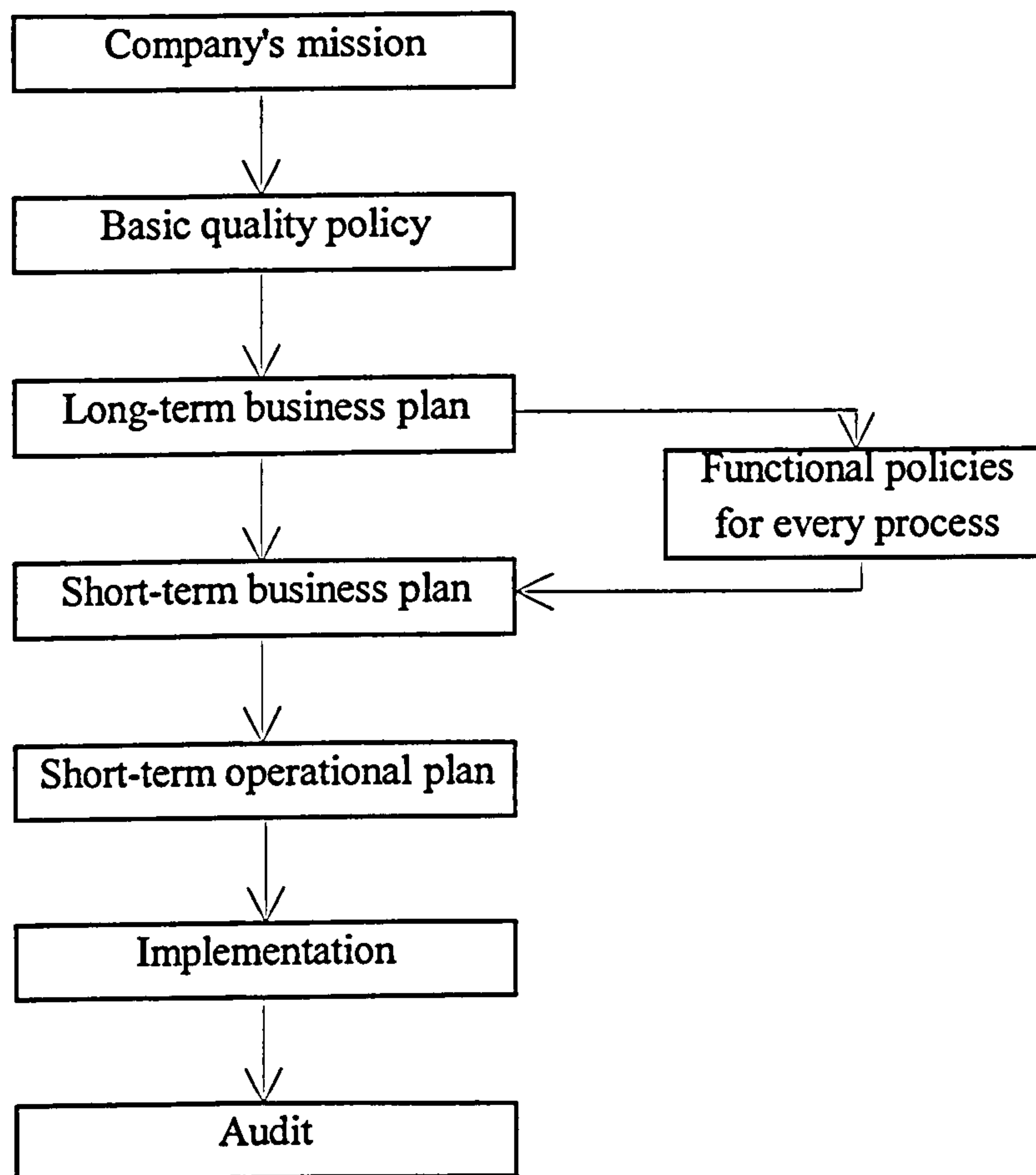
totally to customer satisfaction, 3) structure the organisation in such a way that every internal process considers as its customer the next process, 4) support every decision on facts and data, and 5) show respect humanity.

Ishikawa strongly believed that the improvement of the manufacturing operations can come from workers' experience and knowledge. Highly trained workers, using appropriate procedures and techniques for problem solving through teamwork, can be the most important contributors to process quality and productivity improvement. On the basis of this concept, the Japanese developed the quality control circles, the 7 basic tools and a procedure for problem solving.

On the other hand, the contributions of Mizuno (1988) and Masaaki Imai (1983) complemented Ishikawa's. Imai developed a quality control theory named *Kaizen* that means "improvement in all aspects of life". Mizuno proposed the constant and permanent use of the control circle (PDCA) for quality improvement in every activity throughout the organisation. The generalised use of the control circle with and orientation to customers' satisfaction (internal and external), constitute the **company wide quality control (CWQC)**.

CWQC is complemented with a **quality policy deployment** process, that consists in the definition of goals and objectives in congruency with the quality strategies, for every process within the organisation. This process is shown in Figure 3.1

Figure 3.1 Management process for quality policy deployment



In addition to quality policy deployment, the Japanese created the 7 management tools (7 M's) that help in the development and deployment of strategies for quality, and in the management of the projects associated to the fulfilment of the objectives derived from them.

Finally, the fourth era of quality started at the end of the 1980s and the beginning of the 1990s. During the last 10 years, quality has become a strategic pillar for competitiveness. Many concepts, techniques and procedures have been developed, given a strategic orientation to quality. Among the most important are world-class manufacturing, just-in-time, quality function deployment, benchmarking, business process reengineering, quality of life, service quality, self-managed teams, the value added chain, and strategic business direction on the basis of a vision and a mission supported on quality. In the era of strategic quality management, there is tendency to

integrate all the concepts and techniques developed in the field of total quality. This integration is done considering the PDCA circles for the performance of the macro and the micro processes of the organisation. Under this approach, top executives have to be sure stakeholders' expectations are known because their understanding is the base for the definition of company's mission, vision and corporate values. Provided this framework, top management should create the quality policy from which appropriate strategies for competitiveness can be developed. To accomplish the strategic guidelines, major processes within the organisation should establish their own goals and objectives. This means the organisation have to define goals and objectives for manufacturing, administration, product or service design, procurement, human resources management, marketing, etc. The development of a culture of quality among all employees will assure their commitment to achieve the goals and objectives associated to their responsibilities. The promotion of a culture of quality is performed by teamwork in quality and productivity improvement projects, and reinforced through two important programmes: reward-recognition and education. On the other hand, the manufacturing operation is controlled by a statistical process control system, or by the use of operations' management techniques.

The planning, control and improvement of every organisational process are the result of the integration of the concepts developed throughout the four eras of quality. In recent literature, this integration is being grouped under one generic term known as **total quality management (TQM)**. This term is not at all defined yet, and many definitions are found in the literature. Some of them are presented next.

3.1.1 Definitions of Total Quality Management

Literature on quality presents various definitions for Total Quality Management, commonly referred to as Total Quality Control (TQC) and Company-Wide Quality Control (CWQC). Although the definitions may be slightly different, essentially they intend to describe the same concept. No definition of TQM is universally accepted, they vary from organisation to organisation and from individual to individual. A definition of TQM, is usually internalised by each specific organisation and individual (Saylor 1992).

The American Supplier Institute, on its TQM Executive Briefing (1990), includes the following definitions:

1. For the Federal Quality Institute, *TQM is a strategic, integrated management system for achieving customer satisfaction which involves all managers and employees and uses quantitative methods to continuously improve an organisation's processes.*
2. The US Department of Defence's defines TQM on its TQM Implementation Guide (DoD 5000.51-G): Total Quality Management (TQM) is both a *philosophy* and a *set of guiding principles* that represent the foundation of a *continuously improving organisation*. TQM is the application of *quantitative methods* and *human resources* to improve the material and services to an organisation, all the processes within an organisation, and the degree to which the *needs of the customer* are met, now and in the future. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach focused on *continuous improvement*.
3. Kubal (1994) argues that total quality management (TQM) is a management process of continuous internal improvements throughout an organisation that ultimately results in improvements in the finished product. While TQM is presented in various theoretical forms by several experts including Crosby, Deming, and Juran, it is basically the conformance of the finished product to customer expectations. It is a program based on preventing errors during the process of manufacturing, which prevents defects in the finished product itself. TQM programs are specifically designed for the industry within which they are being implemented. Typically, they are classified as service or manufacturing-based programs. Manufacturing industries produce a specific product that quality programs are intended to improve (e.g., television sets). Service organisations provide standard services that they strive to improve (e.g., accounting services).

4. For Sashkin & Kiser (1993), TQM means to define the organisation's culture required to support a constant attainment of customer satisfaction through an integrated system of tools, techniques, and training. This involves the continuous improvement of organisational processes, resulting in high quality products and services.

5. It is a philosophy of management that strives to make the best use of all available resources and opportunities by constant improvement. Total Quality Management is the key business improvement strategy and the key management issue of the future because it is essential for efficiency and competitiveness (Hakes & Hall 1991).

6. The following definition of TQM is from the Union of Japanese Scientists and Engineers (JUSE): A system of means whereby the qualities of products or services are produced economically to meet the requirements of the purchaser. "Quality Control" is some times called "QC" for short. In addition, since modern quality control adopts statistical techniques, it is some times especially called "Statistical Quality Control", or "SQC". In order to perform quality control effectively, throughout all phases of the enterprise activities such as market survey, research and development, planning of product, design, production readiness, procurement and subcontract, manufacture, inspection, sales and after sales servicing as well as finance, personnel affairs and indoctrination, the entire personnel of the organisation from the executives down to the managers, foremen and workers are required to participate and collaborate. The quality control activities conducted in such a way is called "Company-Wide Quality Control" or "CWQC" for short, or "Total Quality Control", or "TQC" for short (Sheridan 1993).

7. A collaborative form of operating an organisation in a way that relies on the talents of both labour and management to continually improve quality and productivity using teams and facts in decision making (Schmidt & Finnigam 1993).

8. TQM is composed of management and control activities based on the leadership of top management and on the involvement of all employees and all departments from planning and development to sales and service. These management and control activities focus on quality assurance by which those qualities which satisfy the customer are built

into products and services during the above processes and then offered to consumers (JSQC-Internet 1997).

9. It is a managerial approach to integrate and encompass human-capital-financial resources, strategic planning and operations together into a collective and focused team effort to achieve high productivity of quality products and services (Tenner & DeToro, 1992).

10. Tobin (1990) defines TQM as the totally integrated effort for gaining competitive advantage by continuously improving every facet of organisational culture.

11. For Witcher (1990) defines TQM as: Total, because every person in the firm is involved (and where possible its customers and suppliers); Quality, customer requirements are met exactly; and Management, senior executives are fully committed.

12. Feigenbaum (1991) defines TQM as the total quality control's organisation-wide impact.

13. Saylor (1992) provided what he called "The Basic Principles of TQM", to guarantee a successful implementation of TQM. They can be classified into ten major headings: leadership, commitment, total customer satisfaction, continuous improvement, total involvement, training and education, ownership, reward and recognition, error prevention, and co-operation and teamwork.

14. According to Kogut (1984), TQM is "based on the idea that those feeling the impact of the decision should be involved in making it".

15. For Hirshfield (1984), "the circle is a method of tapping the hidden resources of the work force by directly involving teams of co-operating workers and managers in the process of planning and problem solving; the concept is designed to give workers a real voice in deciding how their work is to be done, on the premise that people who have genuine input and control will be better motivated to achieve excellence".

16. Coate (1990) exposes a ten-step problem-solving process that encompasses the four generic steps and “begins with the customer, focuses on the root causes/barriers to improvement, and ensures that decisions and actions are based on real data”. The ten steps are:

- a) identify and select the most important opportunities for improvement; start with critical processes, especially those that support divisional goals, objectives, and breakthrough items; select team members and empower them to make improvements.
- b) determine the key customers of the highlighted processes or services; survey the customers, using a standard format, and analyse survey data using check lists and Pareto diagrams.
- c) select the most important issue and write a clear issue statement.
- d) identify and flowchart the key process or processes; this enables the team to clearly recognise opportunities for improvement.
- e) agree on which aspects of your performance you want to be measured and, with your customers set goals for continuous improvement in meeting or exceeding their expectations; to do this the teams must realistically evaluate current performance and set obtainable goals for improvement.
- f) begin to explore probable causes of the problems and barriers to improvement.
- g) gather data on the probable causes; the information collected gives the team a benchmark against which to measure its future progress.
- h) evaluate the data and show it in “pictures”; communicate any relevant information in charts and graphs.
- i) brainstorm and develop permanent solutions; implement solutions; monitor their performance; adopt them if they work.
- j) if the problem is solved, standardise the solutions as normal operating procedures.

In summary, TQM has several key attributes: it asks customers what they want and satisfies their requirements; attacks processes, not employees; promotes teamwork and creates an atmosphere for innovation and continuous quality improvement; empowers people; strives for continuous organisation-wide improvement.

17. As stated by Scholtes (1988), “because many of the elements of TQM have appeared separately in fads that have swept through business schools and organisations, people fail to recognise how the total package differs from anything seen before; TQM is a new way of doing business”

18. “Simply stated: TQM is an interlocking arrangement of procedures and practices that ensures that all employees in every department are adequately trained and directed to continuously implement aligned improvements in quality, service, and total cost such that customer expectations are met or exceeded” (Bellefeuille 1993)

19. A study group of the 1992 Total Quality Forum defined TQM as a people-focused management system that aims at continual increase in customer satisfaction at continually lower real cost. It is a total system approach (not a separate area or program), and an integral part of high-level strategy. It works horizontally across functions and departments, involving all employees, top to bottom, and extends backwards and forwards to include the supply chain and the customer chain (Patterson 1995).

20. Total Quality Management resists a simple definition for a number of reasons. It is an elusive process rather than a tangible product. It reflects an organisation's unique mission, history, and culture, and, therefore, is different for each organisation--what works for one organisation may fail miserably at another. It involves changing the organisational culture to a long term, never-ending commitment--a race without a finish line--to process improvement (Schmidt & Finnegan 1992).

3.2 Classical TQM literature

The following is a list of the most significant ideas provided by the so called “quality gurus” on total quality. In this section this information will be named as “classical TQM literature”. It is not intended to present an extensive discussion on gurus’ proposals, but just to list them as a way to support a synthesis introduced later in this chapter. This

research work does not necessarily agree with the validity of these ideas for the actual, or even the past, Mexican industrial scene. These thoughts were published more than 20 years ago, and in association with other circumstances different to those prevailing in Mexico. However, these fundamentals on quality management are a convenient departure point for the development of the conceptual model to be presented in Chapter 4. Numbers in () before each concept, will be used later as a reference to support the synthesis of this information.

- **Philip B. Crosby**

Crosby proposed a 14 step programme for quality improvement (Crosby 1979). The programme's recommendations are: (C1) assure management commitment to participate on the programme and to encourage everyone's contribution to quality improvement; (C2) form a quality improvement team with representatives from each department; (C3) establish quality indices for each activity throughout the company, measuring actual and potential quality problems; (C4) measure the cost of quality to provide an indication on where corrective action will be profitable for the company; (C5) promote quality awareness and concern among all employees; (C6) take formal actions to correct problems identified through previous steps; (C7) set up a committee in charge of the implementation of the Zero Defects programme; (C8) train supervisors and employees to carry out their responsibility on the quality improvement programme; (C9) conduct a Zero Defects day letting all employees realise that there has been a change in the company regarding quality issues; (C10) encourage everybody throughout the organisation to define improvement goals for themselves and their groups, usually on a 30 to 90 day basis; (C11) be sure to remove the causes of error after the identification of the problems; (C12) give recognition for those who met quality goals through participation in the quality improvement programme; (C13) form quality councils composed of quality professionals and teams leaders, and hold regular meetings to improve communication to determine actions needed to improve quality; and (C14) do it all over again emphasising that the quality improvement programme should never end.

In another of his books, Crosby's proposes what he calls a "prescription for corporate health" (Crosby 1988). The fundamental rules of this so called prescription are: (C15) make sure people do things right routinely; (C16) plan the operation of your business to assure a profitable and steady growth; (C17) anticipate customers needs; (C18) plan and manage change; and (C19) create a working environment in which people are proud of what they do.

Finally, it is necessary to include in this section Crosby's Quality Vaccine (Crosby 1984). Quality Vaccine is an idea to represent the need of any organisation for non-conformance prevention. "Vaccine" preparation should have the following ingredients: (C20) Integrity: everyone must be dedicated to meet customer requirements; (C21) Systems: quality management, quality education, company-wide emphasis on defect prevention; (C22) Communication: have a continuous supply of information to help the identification/elimination of error and waste, and to run a recognition programme; (C23) Operations: provide education and training as a routine task, as well as formal procedures to identify opportunities for improvement; and (C24) Policies: define clear and unambiguous quality policies.

- **Edwards W. Deming**

Deming's contribution is easily summarised by his famous 14 points to management for productivity and competitive position (Deming 1982). They are: (D1) establish a continuous improvement effort for every process, product and service, with a plan to become competitive to stay in business, determining whom at the top of the organisation is responsible for it; (D2) adopt the new philosophy needed in this new economic age, because we can not longer live with commonly accepted levels of delays, mistakes, defective materials, and defective workmanship; (D3) cease dependence on mass inspection, requesting instead, statistical evidence that quality is built in, eliminating in this form the need for inspection on a mass basis; (D4) end the practice of selecting suppliers on the basis of price, instead of depending on meaningful measures of quality, along with price, eliminating suppliers that can not qualify with statistical evidence of quality; (D5) it is management's job to work continually on the operational system

(design, incoming materials, composition of material, maintenance, improvement of machines, training, supervision, retraining) to find any actual or potential problem; (D6) institute modern methods of training on the job, assuring to have people with the skills needed for every position; (D7) institute modern methods of supervision for production workers, in which the responsibility of foremen change from sheer numbers to quality, alerting management to take immediate action on problems concerning barriers to productivity and quality; (D8) drive out fear, so that everyone may work effectively for the company; (D9) breakdown barriers between departments to assure that people in research, sales, design and production work as a team to foresee problems on the operation that may be encountered; (D10) eliminate the use of numerical goals and slogans to stimulate the work force, asking for new levels of productivity without providing adequate methods and resources to accomplish it; (D11) eliminate any standard prescribing a numerical quota, because they permit the occurrence of a certain level of error; (D12) remove emotional barriers standing between operational workers and their right to be proud of their workmanship; (D13) institute a vigorous programme dedicated to provide continuous education and retraining to all employees; and (D14) create a structure at the top of the organisation to push every day on the above 13 points.

Another interesting topic to include in relation to Deming is the structure of the Deming Prize (Imai 1983) which makes the following recommendation: (D15) define company's quality policy; (D16) implement a cross-functional organisation with a clear understanding of everybody's responsibility toward quality; (D17) Put in operation an effective and extensive educational programme; (D18) design and implement the following sub-systems: profit management, cost control, purchasing and inventory control, production process control, facilities management, personnel management, educational programmes, new products development, research management, communication channels for customer complaints, management of suppliers, customers' feedback in relation to quality, service and satisfaction; (D19) evaluate quality achievements; (D20) establish a long-term planning in relation to quality and customers' satisfaction; (D21) assess the tangible effects as a consequence of the quality programme; and (D22) appraise intangible effects related to the quality programme.

- **Joseph M. Juran**

Juran on Leadership for Quality (Juran 1989) is one of this author's most recent books. In it, he summarises his proposals in the area of quality management. Juran recommends to following strategies, used by the Japanese, to be quality world leader: (J1) upper managers should personally take charge of leading the quality revolution; (J2) all levels and functions undergo training in managing for quality; (J3) quality improvement should be undertaken at a continuing, revolutionary pace; (J4) the workforce ought to be enlisted in quality improvement through quality circles; and (J5) quality goals must be considered in the business plan.

Juran's approach to quality management is explained in what he calls the Juran Trilogy. He divides quality management in the following processes: quality planning, quality control, and quality improvement.

Quality planning indicates that despite the type of organisation, product or process, the quality planning process can be generalised into one universal series of input-output steps called the "quality planning road map". The steps are: (J6) identify who are the customers; (J7) determine the needs of those customers; (J8) translate those needs into your own technical language; (J9) develop product features that can optimally respond to those needs; (J10) develop a process optimally capable to produce the product features; and (J11) transfer the process to the operation.

On quality control, upper managers should use a general process for controlling operations. The control activities of this universal process are: (J12) establish an information feedback loop at all levels and for all processes; (J13) make sure that every employee is in a state of self-control; (J14) establish quality goals and a unit of measurement for them; (J15) managers should provide operating forces with means for adjusting the process to bring it into conformance with goals; (J16) transfer to the operating forces the responsibility for controlling their own processes to maintain them at their planned level of capability; (J17) evaluate process performance and product

conformance by means of a statistical analysis; and (J18) make corrective actions to restore a state of conformance with quality goals.

Quality improvement rests on the following fundamental concepts: (J19) all improvements should take place on a project by project basis; (J20) top managers should form and be part of a quality council (or quality steering committee) whose basic responsibility is to launch, co-ordinate, and institutionalise the annual quality improvement programme; (J21) define a project selection process consisting of this steps: project nomination, project selection, project mission statements, and publication; (J22) for each selected project, designate a team (six to eight persons) with the responsibility to complete it; (J23) give public recognition and awards to acknowledge successes related to quality improvement; (J24) increase the weight given to the quality parameter in the overall job performance evaluation at all organisational levels; (J25) upper managers should personally participate in the progress review on quality improvement; and (J26) establish an extensive training for the entire management team in quality improvement and its techniques.

- **Armand V. Feigenbaum**

Feigenbaum is the one that proposed the phrase “Total Quality Control”. His idea is that quality is a way of corporate life, a way of managing. TQC is an organisation-wide concept, and involves the implementation of customer oriented activities. Feigenbaum's main thoughts are: (F1) quality must be completely planned with an excellence-driven approach instead of the traditional failure-driven approach; (F2) all members of the organisation must be responsible for the quality of their products or services; (F3) total quality requires an organisational commitment to provide continuous encouragement and specific training; (F4) TQC is defined as an effective system for integrating the quality design, maintenance, and improvement efforts of the various groups within an organisation, to enable it to manufacture its products and offer its service at the most economical level for full customers’ satisfaction; (F5) in the phrase “quality control”, the word control is associated with a management tool of 4 steps: setting standards, appraising conformance to these standards, acting when the standards are exceeded, and

planning for improvement in the standards; (F6) quality control claim for the integration of frequently uncoordinated activities into a framework; (F7) TQC programmes are highly profitable, because tangible (reduction of operating costs, reduction of the costs of poor quality, etc.) and intangible benefits (improved employee morale and levels of customer satisfaction, etc.) easily exceed its implementation and operation costs; (F8) the most important quality improvements come from the actions undertaken by operational employees; (F9) total quality requires a total life-cycle approach; (F10) there are four fundamental processes to control the operation: new design control, incoming materials control, product control, and special processes control; (F11) a total quality system is defined as a company-wide work structure, documented effectively, and integrated by technical and managerial procedures for the co-ordination of people's actions, the manufacturing process and the information system in the best and most practical way, to assure customers' satisfaction and an economic operation; (F12) TQC applies to all products and services; (F13) every organisational component has a quality-related responsibility that should be explicitly documented; (F14) the traditional quality control department should change its basic function to become a facilitator in the quality process, and not a quality enforcer through inspection; (F15) a TQC programme needs the continuous commitment of top managers; (F16) statistical tools should be used to control and improve the finished product and the manufacturing process; (F17) automation is not the solution for all quality problems, human oriented activities are the foundation of any TQC programme; (F18) every person in the organisation must be capable to control his or her own process to assume complete responsibility for quality.

- **Kaoru Ishikawa**

Ishikawa was the first author that highlighted the social differences between Japan and the West, as well as their effect on management styles. His main hypothesis was that different cultural characteristics in both societies was the root of Japanese success in quality. Ishikawa's most important thoughts are exposed in his book "What is Total Quality Control: the Japanese Way" (Ishikawa 1985). His proposal on quality management is contained in the following statements: (I1) quality control means to do what is to be done to meet customers' requirements; (I2) a quality control programme

not showing results is not a good one, because if a company engages in QC and does not make much money, it must not be controlling processes well; (I3) QC begins with education and ends with education; (I4) the implementation of a QC programme needs to carry out a continuous education programme for every one, from the president down to line workers; (I5) QC brings out the best in everyone; because when QC is implemented, falsehood disappears from the company; (I6) quality control circles (QCC), as part of a TQC programme, must be formed to encourage the study of quality related topics among workers and supervisors; (I7) because of Japan's unique social and cultural background, this country has some advantages over US and Western Europe in relation to the conduction of QC activities; for example, western's professional specialisation versus Japanese's understanding of other business processes; Japan has a very rigid social structure which reduces the social pressures within the organisation; labour unions are more collaborative to the company's interests; Taylor's approach to management, widely used in western countries, is the consequence of the high absenteeism and turnover rates observed there; Japan does not have the elitism associated with education; the pay system is not focused on rewarding organisational hierarchy but effectiveness and permanence in the company; Japan's companies have a hiring policy that almost assures lifetime employment; the relationship with suppliers is better because of the high degree of vertical integration; the government observes a no-interference policy; the writing system favours the improvement of intellectual skills among Japanese people; Japan's society is more racially homogeneous; the education system is better; and religion confers more morale value to work; (I8) the first step in QC is to know the requirements of consumers and what and how they will buy; (I9) anticipate potential defects and complaints; (I10) after the identification of a quality problem, take immediate action to solve it, QC not accompanied by action is useless; (I11) an ideal state of quality control is where control no longer calls for checking (inspection); (I12) quality must be built into each product design and process, it cannot be created through inspection; (I13) the basic notion behind control is the prevention of recurrence of errors; (I14) the very essence of TQC is in the quality control and quality assurance of new product development; (I15) remove the cause, the basic cause, and not the symptoms of a problem, making sure not to confuse the objectives with the means to attain them; (I16) quality control is the responsibility of all workers throughout the

organisation; (I17) TQC is a group activity and cannot be done by individuals; it calls for teamwork; TQC will succeed if all members contribute, from president down to line workers and sales personnel; (I18) if TQC is implemented company-wide, it can contribute to the improvement of a company's corporate health; (I19) QC must be one of the major objectives of the company and its new management philosophy, setting management decisions on long-term profits and putting quality first; (I20) TQC is a managerial concept with these fundamentals: elimination of sectionalism, management by facts, and management based on respect for humanity; (I21) QC is a discipline that combines knowledge with action; (I22) if there is no leadership from the top, stop promoting TQC; (I23) QC cannot progress if the quality policy is not clear, because the organisation needs a clarified responsibility and authority; (I24) QC cannot progress without getting the approval and collaboration of middle management; (I25) establish a system of cross-functional management; (I26) only when foremen and line workers assume responsibility for process, can QC become successful; (I27) QC circle activities that are consistent with human nature can succeed anywhere in the world; (I28) make sure to have basic policies for subcontracting and purchasing; (I29) the responsibility for quality assurance rests with the seller-producer, because in principle, purchasing is to be done without inspection; (I30) marketing is the entrance and exit of QC and the marketing department must perform key roles in TQC; (I31) perform audits of the quality system and its implementation, giving appropriate diagnosis and showing the way to correct its shortcomings; this audit can be done by outsiders (Deming Prize and Japan Quality Control Medal, or by consultants); (I32) statistical methods are the best techniques to improve and control the operation.

- **Shigeru Mizuno**

Being also one of the Japanese involved in quality management by his participation in the Union of Japanese Scientists and Engineers (JUSE), Mizuno's thoughts on total quality are very similar to those of Ishikawa. However, some different ideas were introduced in his book "Company-wide Total Quality Control" (Mizuno 1988). The following thoughts were extracted from it: (M1) management's job in promoting quality must be performed through policy management, which consist in the establishment of

quality policies and the monitoring of their implementation; (M2) cross-functional management is the type of management required by total quality; (M3) the implementation of total quality needs to be planned with a clear definition of the top and middle management responsibilities, and the implementation of a quality control committee as a promotion centre;

Mizuno's total quality programme includes the following elements and recommendations: (M4) define methods for product design and control, and the courses of action in case of product liability; (M5) put in operation a quality control educational programme for every job type; (M6) implement QC circles to make employees more conscious in the importance of quality; (M7) measure the quality costs and their consequences; (M8) use statistical methods for control and improvement of products and the manufacturing process; and (M9) establish a quality control audit policy, and the procedures to perform it.

- **John S. Oakland**

In his book TQM: “The route to improving performance” (Oakland 1993), this author presents a practical model of total quality management used in many European organisations. The most important elements of this model are: (O1) assure top management leadership and long-term commitment, TQM must be organisation-wide and should start at the top; (O2) the establishment of a sound quality policy, in addition to the organisational structure to put it into effect, is fundamental for TQM implementation; (O3) any organisation needs a vision framework that includes its guiding philosophy, core values and beliefs, and a purpose combined in a mission statement; (O4) develop clear and effective strategies besides plans to achieve the mission and its objectives; (O5) identify the critical success factors and processes for quality management implementation; (O6) review the management structure, including the instrumentation of quality improvement teams throughout the company; (O7) empower employees to encourage their participation in quality improvement and customer satisfaction; (O8) adopt the philosophy of zero defects/errors and change to a culture of doing things right the first time; (O9) train people to understand the internal

customer-suppliers relationships; (O10) do not acquire raw materials and services on price alone -look at the total cost; (O11) recognise that the improvement of the system needs to be managed; (O12) adopt modern methods of supervision and training - eliminate fear; (O13) eliminate barriers between departments by managing more effectively the process -improve communications and teamwork; (O14) eliminate the following: arbitrary goals without methods, all standards based only in numbers, and barriers to pride of workmanship -get facts by using the correct tools; (O15) constantly educate and retrain everybody; (O16) develop a systematic approach to management for the implementation of TQM; (O17) establish a good measurement system for product quality and every internal process, measure and analyse the costs of poor quality; (O18) designate a TQM director, manager or co-ordinator and appoint a quality management adviser; (O19) perform the culture change through teamwork for quality improvement; (O20) the essence of developing attitudes to quality is in gaining acceptance for the need to change, and for this to happen it is essential to provide relevant information, convey good practices, and generate interest, ideas and awareness through an excellent communication processes.

- **Peters & Waterman**

Although these authors are not really considered as quality gurus, their publication “In search of excellence” (Peters & Waterman 1982) is an important contribution to the field of quality management. This book reports a survey conducted on successful American organisations. The objective of this study was to contribute to management theory with practical evidence on the way these companies manage their operation to be successful. Other companies could adopt the principles that emerged from this study to succeed. Peters and Waterman discovered that successful organisations have 8 common characteristics: (P1) a huge capacity to analyse problematic situations by empowering their employees, which is possible thanks to a organisational structure supported by an effective information system; (P2) through intense efforts for staying near to customers’ needs and expectations, successful organisations develop an obsession for quality which encourage product innovation; (P3) a toleration of failure as part of the learning process required for continuous improvement; (P4) a belief in people, showing respect for them

and giving the autonomy necessary to respond to the challenges associated to quality and competitiveness; (P5) a set of convictions integrated in a system of corporate values; (P6) a clear knowledge of their core competence, concentrating their efforts in the continuous improvement of what is ordered by the corporate mission and the strategies to accomplish it; (P7) a simple organisational structure that assures that each person understands his or her responsibility and receives adequate information to decide correctly; (P8) a balance between a totally centralised management style and the total autonomy of employees' performance.

Additionally, in the book "Liberation Management", Peters (1993) proposes some other recommendations: (P9) de-organise organisations, discomposing them into independent profit centres operated by teams with very simple administration staffs; (P10) spread the knowledge developed in each team so other teams can accelerate their learning process; (P11) avoid waste of time in getting closer to customer needs, redefining the organisation (re-engineering) as required for this purpose; (P12) use the most advanced information technology to develop within the organisation a "learning based society"; (P13) most of the value added of products and services comes from the knowledge developed in the work place; (P14) the organisational structure should be horizontal and interrelated to form a management system based on business processes and not a functional one; (P15) middle management should be eliminated because it usually does not add value to the product, implement instead "project teams"; (P16) teamwork in improvement projects should have the following characteristics: absolute trust among all team members, allow the free flow of members' talent, no time limit for completion, members could be from different business processes, and capable to receive immediate feedback; (P17) in teamwork, who is the boss and who are the subordinates is irrelevant; (P18) individuals' performance assessment should be based on his or her accomplishment within the team, the management of external aspects, the ability to apply the learning acquired through experience, and the willingness to teach other team members; (P19) teamwork should be as dynamic as possible, adapting its structure to new customer needs, and rewarding generously organisational learning; and (P20) promote closeness to customer needs for product innovation.

- **Shigeo Shingo**

This author is probably more recognised for his innovations in the field of production optimisation. However, the central argument of his philosophy is that quality problems are the most important obstacle for the optimisation of the production process. His method SMED (speed method for the exchange of dies) works efficiently only in a “zero-defects” environment. For this purpose he proposes the implementation of “*poka-yoke*” (fool-proof) systems. These are the core arguments of his philosophy: (S1) a *poka-yoke* system consists of a set of elements designed to detect immediately the presence of production defects; (S2) it is complemented with *source inspection* methods to detect errors on time preventing the occurrence of defects; (S3) business management is an integral concept in which the actions of individuals are co-ordinated through clear policies; (S4) zero-defects will be achieved only if an error-prevention system is implemented, not through intensive inspection; (S5) because it is inevitable for a human being to make eventually a mistake, *poka-yokes* must alert him or her when an error is made; (S6) a *successive monitoring* system, instead of the traditional inspection made by a person dedicated for this purpose, is more effective to achieve zero-defects; in this systems the next in the production process inspects the incoming product before performing an operation on it; (S7) there are many social and cultural differences between Japan and the West, the most important are: employment and salary systems, syndicalism, teamwork, communication policies within the organisations, management and understanding of inventories, and the methods of production management; (S8) a total quality control system requires the involvement of all employees in error prevention through quality circles and source inspection; (S9) industrial engineering techniques should be used for the optimisation of the production process.

- **Genichi Taguchi**

Finally, Taguchi who is another Japanese author, provides an economic approach to quality combined with the use of a statistical technique (derived from the design of experiments technique) developed by him. His contribution is better understood by the following ideas: (T1) customers want products that perform to satisfy their needs; (T2)

products offered to the market should be: better in quality and price, with minimum variability and robust enough to perform well even in the presence of external factors, than those offered by competitors; (T3) quality should be defined by the “loss function”, in which the greater the variability of a process in relation to the product’s specification tolerance, the greater the monetary loss transferred to the consumer; (T4) the continuous improvement of the production process is the key for competitiveness in today’s world; (T5) the continuous improvement of the production process is intimately linked to variability reduction; (T6) the variability in the product’s performance causes a monetary loss to its user, which can be measured as the square of the difference between real and ideal performance; (T7) a product’s quality and life-cycle cost are determined during its design stage; (T8) to reduce the variability from the design stage, a product should be designed on the basis of the non-linear part of its performance; and (T9) variability can be reduced through experimental design, by selecting the optimum performance levels for each product’s attribute.

Additionally, Taguchi developed a technique called “quality engineering”, which is divided in on-line and off-line activities. (T10) on-line activities are associated with the management of the manufacturing process and its preventive maintenance system; they use techniques such as quality control charts; (T11) off-line activities are those responsible for the optimisation on product and process’ design; the technique used for this purpose is design of experiments.

3.3 A synthesis of the quality management classical theory

It is easy to observe that there are many commonalties among the ideas just presented in the last section. For this reason, all these concepts can be classified. A relationship analysis performed for this purpose come out with 26 categories in which quality management classical theory can be classified. From here onwards these categories will be referred as the “TQM postulates”. Table 3.1 shows the classification of classical quality management theory.

Table 3.1 Classification of the concepts found on classical quality management theory

| TQM postulate | Concepts associated to postulates in classical theory |
|--|--|
| 1. Top management leadership | C1, D14, J1, F15, I22, M1, O1, O11 |
| 2. Teamwork for quality improvement | C13, J4, J22, I6, I17, I27, M6, O6, P15, P16, P19, S9 |
| 3. Measurement of quality problems | C3, C4, D19, J15, I2, M7, O17 |
| 4. Quality problems solving | C6, D5, J18, J19, F5, I10, I15, I21 |
| 5. Quality steering committee | C2, C7, J20, M10, O18 |
| 6. Training and education | C8, C23, D6, D13, D17, J2, J26, F3, I3, I4, M5, O9, O15 |
| 7. Improvement goals | C10, D10, D11, J5, O14 |
| 8. Defects prevention | C11, J14, I1, I19, I13, S1, S5 |
| 9. Recognition for quality improvements | C12, J23, J24, P18 |
| 10. Procedures for implementation of total quality | C14, D18, J3, J21, O16, S8 |
| 11. Profitable growth in the long-term | C16, F7, I18, I19 |
| 12. Satisfaction of customer needs | C17, C20, J6, J7, J8, I8, I30, P2, P11, P20, T1, T2, T3 |
| 13. Incorporation of TQ into the Strategic Plan | C18, D20, F1, M3, O4, P9 |
| 14. Develop of a culture of total quality | C5, C15, C19, D2, D8, D12, J13, F2, F8, F17, F18, I5, I7, I20, O7, O8, O19, P3, P4, P8, S7 |
| 15. Use of the total system approach | C21, F4, F11, F12, F13, I16 |
| 16. Information system of quality performance | C9, C22, D18, O20, P10, P12 |
| 17. Quality policies deployment | C24, D15, I23, M1, O2 |
| 18. Plan to improve and maintain competitiveness | D1, F3, P1 |
| 19. Collaborative management methods | D7, F9, F14, I24, I26, O12, P17 |
| 20. Change management from functional to process | D9, D16, J12, F6, I25, M2, O13, P7, P14, S3 |
| 21. Production process planning | J10, J11, F10, I12, O5 |
| 22. Quality assurance of inputs | D3, D4, I28, I29, O10 |
| 23. Audits to the quality system | D21, D22, J25, I31, M9 |
| 24. Product and service design | J9, I14, M4, P13, T6, T7, T8 |
| 25. Mission and vision statements | O3, P5, P6 |
| 26. Techniques for process control | C3, J16, J17, F16, I11, I32, M8, S2, S4, S6, T4, T5, T9 |

On the basis of the information provided by classical quality management concepts, and on the classification presented in this table, each TQM postulate can defined as follows.

1. Ensure leadership and commitment of top management.- Obtain the continuous long-term commitment of top managers by creating a structure that assures the ongoing participation and the collaboration of all employees, their continuing attention to total quality, and the provision of continuous motivation and specific training where necessary. The upper managers should personally take charge of leading the quality revolution, and participate in the review of progress on quality improvement. If there is no leadership from the top, stop promoting TQ. TQM must be organisation-wide and start at the top.

2. Establish teamwork for quality improvement.- The change in the cultural pattern required to make employees more conscious about quality, is encouraged by the study

of quality related topics among workers and supervisors through teamwork. The management structure should be modified for the establishment of quality improvement teams (quality control circles) throughout the company. QC circle activities that are consistent with human nature can succeed anywhere. Quality improvement is undertaken at a continuing, evolutionary pace. All improvements take place project by project. Improvement projects should be selected through these steps: project nomination, project selection, project analysis/solution, and publication. A team should be designated (six to eight persons) with the responsibility to complete the project. TQ is a group activity and cannot be done by individuals. It calls for teamwork.

3. Measurement of actual and potential quality problems.- The measurement of actual and potential quality problems, tangible and intangible, by the establishment of quality indicators and statistical analysis, should be performed on each activity and process throughout the company. The cost of quality provides an indication on where corrective action is profitable for the company. The weight given to the quality parameter in the overall job performance assessment should be increased at all organisational levels.

4. Correct quality problems as soon as they appear.- Management should take formal action to find and correct problems identified throughout the whole operation of the organisation. The purpose of this is to restore a state of conformance with quality goals. Management must be sure to remove the cause, the basic cause not the symptoms, and not to confuse objectives with the means to attain them. QC is a discipline that combines knowledge with action.

5. Form and operate a quality steering committee.- The implementation of total quality needs to be planned with a clear definition of top and middle management responsibilities. The integration of a quality improvement team (or quality steering committee) composed of representatives from each major operational process helps on this purpose. This committee should hold regular meetings to launch, communicate, co-ordinate, and institutionalise the quality improvement process, determining the actions

required to improve the quality programme. A TQM director, manager or co-ordinator should be assigned, and a quality management adviser appointed.

6. Provide training and education permanently.- The essence of changing attitudes to quality is in the acceptance of the necessity to change. It is essential to provide a continuous, effective and extensive educational programme combined with good practices, to achieve this change. Additionally, the establishment of a quality improvement process requires the practice of extensive modern methods of training for the entire management team and for employees at all levels and functions. Education, training, and re-training are never ending processes.

7. Define improvement goals and perform periodical reviews on them.- Quality goals must be part of the business plan. Individuals and departments should establish congruent improvement goals and a unit of measurement for them. However, numerical goals and slogans for the work force asking for new levels of productivity should be eliminated if methods to accomplish them are not provided. All standards based only in numbers are an obstacle to improve the pride of workmanship.

8. Prevent the occurrence of defects.- Potential defects and complaints should be anticipated. Error cause removal should follow the identification of problems that prevent error-free work from being done. Dependence on mass inspection should cease. Instead, statistical evidence should be required that quality is built in. The basic notion behind control is prevention of recurrence of errors.

9. Give recognition for quality improvement.- Recognition should be awarded for those meeting quality goals through participation in the quality improvement programme. Recognition should be public and to honour accomplishments related to quality improvement.

10. Establish appropriate procedures for the implementation of total quality.- A systematic approach is needed to manage the implementation of TQM. The implementation of the quality program is a never ending process.

11. Total quality supports a profitable growth in the long-term.- Emphasis on short-term profits, and short-term thinking should be avoided. TQM programmes are highly profitable and will support a steady growth. Tangible benefits such as the reduction of operating costs, reduction of the costs of poor quality, elimination of liability costs, etc., and intangible benefits such as improved employee morale and in customer satisfaction, etc., can easily exceed their implementation and operation costs. A quality programme which cannot show results, is not a quality programme. TQ must be one of the major objectives of the company, a new management philosophy producing long-term profits.

12. Always satisfy customer needs and expectations.- The first step in TQ is to understand customers' requirements and their buying patterns. Everyone should anticipate customers' needs, and meet their requirements. Those needs should be translated into company's internal language to develop product and process features that can optimally respond to those needs. Marketing is the entrance and exit of a quality management programme.

13. Incorporate total quality in the strategic plan.- Change must be planned and managed. Clear and effective strategies and plans to achieve mission and objectives should be developed, in addition to the identification of critical success factors and critical processes.

14. Develop and maintain a quality culture throughout the organisation.- In this new economic era, it is imperative to adopt a total quality philosophy. Commonly accepted levels of delays, mistakes, defective materials, and defective workmanship can no longer be tolerated. The greatest quality improvements come from human improvements to the processes. TQM is a managerial concept founded on the elimination of sectionalism and in a management based on facts. Human oriented activities are the foundation of any TQM program. It is necessary to establish quality awareness and personal concern of all employees, to make sure people do things correctly routinely, to create a working environment in which people are proud to work, and to drive out fear so that everyone may work effectively for the company. Every

employee should be in a state of self-control. When TQ is implemented, every employee is empowered and encourage to participate in quality improvements. The philosophy of continuous improvement is adopted to change the culture.

15. Drive the quality fundamentals on a systemic approach.- A total quality management system should be a company-wide work structure, documented effectively and integrated by technical and managerial procedures, and oriented to co-ordinate the actions of people, machines, and information within the company in the best and most practical ways to assure customer quality satisfaction and economical costs of quality. A quality management system supports the integration of the quality development, quality maintenance and quality improvement efforts of the various groups in an organisation so they can deliver a product or service at the most economical levels for full-customer satisfaction. It is sustained in quality management, quality education and company-wide emphasis on defect prevention. The system requires the implementation of the following sub-systems: profit management, cost control, purchasing and inventory control, production process control, facilities management, personnel management, educational programmes, new products development, research management, communication channels for customer complaints, vendor relations, incorporation of customer feedback in relation to quality, customer service, and customer relations. Quality is a total life-cycle consideration, and all members of the organisation must be responsible for the quality of their products and services. Every organisational component has a quality-related responsibility that should be explicitly documented. If the quality system is implemented company-wide, it can contribute to the improvement of a company's corporate health.

16. Establish an information system to assure the communication and identification of quality related problems.- A continuous supply of information is needed to help error and waste identification and elimination, and use visible information only for management; if information is relevant to the work, it should be communicated.

17. Define and deploy quality policies.- Clear and unambiguous quality policies should be defined. TQ cannot progress if policy does not clarify responsibility and authority. Management should promote quality through policy management by the establishment of policies and the regular check to make sure that these policies are being implemented. A sound quality policy, together with the structure and facilities to put it into effect, is fundamental for TQM implementation.

18. Constantly Plan for Competitiveness.- Constancy of purpose is required toward improvement of product and service, with a long term plan in relation to total quality, to become competitive and to stay in business. Quality must be completely planned with an excellence-driven approach. Quality must be built into each design and each process. It cannot be created through inspection.

19. Establish management methods to support the collaborative focus of Total Quality.- It is important to establish methods of supervision and co-ordination of production workers congruent with the collaborative and teamwork focus of Total Quality. The responsibility of foremen must be changed from pushing for output quantity to output quality through the collaboration of team members. TQ cannot progress without taking care of middle management. Only empowered foremen and line workers with responsibility and authority over the process can make TQ successful.

20. Change the organisational structure from functional to process management.- Interdepartmental barriers should be dismantled by managing and improving communication and teamwork. A system of cross-functional management could be established in which people from different functional areas work together in a process team with a clear understanding of their responsibility in meeting internal and external customer needs and expectations.

21. Plan the Production Process with capacity to meet product specifications.- A process that is optimally able to produce the product features should be developed and transferred to the operating forces, so they are responsible for maintaining the process at its planned level of capability.

22. Define procedures for suppliers control and assurance of inputs quality.- The responsibility for quality assurance rests with the seller-producer. Basic policies are required for subcontracting and purchasing. In principle, purchasing is to be done without inspection. The practice of awarding business on the basis of price alone must cease. The total cost and meaningful measures of quality must be assessed. Suppliers that cannot qualify with statistical evidence of quality should be eliminated.

23. Conduct audits to the quality system.- A quality audit policy should be implemented with procedures to review the TQM system, giving an appropriate diagnosis and showing the way to correct its shortcomings. This audit can be done by outsiders (Deming Prize, Malcolm Baldrige Award, Mexico's National Quality Award, or by consultants).

24. Design the product or service in accordance with customers needs and expectations.- The essence of TQM is in the quality control and assurance of new product development. Methods for product design and control are required, as well as the definition of courses of action in case of product liability.

25. Develop mission and vision statements.- Any organisation needs a vision framework that includes its guiding philosophy, core values and beliefs and a purpose, combined in a mission statement.

26. Implement techniques for process control.- The control activities are based on the establishment of a feedback loop at all levels and for all processes; productive and administrative. Managers should provide to every process team the means for adjusting their process, and to bring it into conformance with goals. TQM should include statistical methods for improvement and control of the product and the production process. Process control involves four elements: control of new designs, control of incoming materials, product control, and special process control. Managers should provide the operating forces with means for adjusting the process to bring it into conformance with goals. TQC should include statistical methods for improvement and

control of the product and the production process. The traditional quality control department should change its basic function to become a facilitator in the quality process, and not a police force of quality inspectors; however, every person in the organisation must be able to control his or her own process to be completely responsible for the quality. An ideal state of quality control is where control no longer calls for inspection.

The ideas provided by the quality “gurus”, summarised in the 26 postulates just presented, should be complemented with additional theory on related topics before the proposal of a conceptual model. Gurus’ ideas started a revolution on the field of management, and new theory was developed to support the competitiveness of all types of organisations. To complete the literature research, Chapter 4 presents the most important concepts needed to propose a sound conceptual framework in the form of a business management system supported on TQM theory.

CHAPTER 4

LITERATURE REVIEW ON TOPICS RELATED TO TQM

4.1 The evolution of management and teamwork

4.1.1 Management and decision making

To work effectively, TQM needs management science to evolve from an authoritative style to one based on consensus. In traditional management, the way workers and managers interact with each other commonly opposes teamwork. Communication at all levels of the organisation is not promoted, and employees are never involved in decision making. Teamwork is not considered to be the best way to improve the quality of processes, products and services in the organisation.

In Mexican organisations, traditional management is a common practice. Although this situation has been changing, change is not happening at the pace required. If workers and managers do not realise that their relationship should evolve from competition to collaboration, company's mission will never be achieved. If people within an organisation do not collaborate in teamwork to satisfy customers' requirements, they will not be capable to sustain an improvement in their own welfare.

Miller (1991) mentioned some changes that the administration must observe to evolve to a collaborative style of management. For him, management has to be moved from a controlled direction to leadership by commitment; from decisions by mandate to decisions by consensus; from individual work to teamwork; from specialisation to jobs oriented to the process and the customer; from a planning, control and improvement imposed by the administration to a system in which everybody be involved in the whole control circle; from a control exercised by intimidation to one positively reinforced; from a strict vertical structure to one flatter and more flexible; from an unclear and informal mission statement to shared values, vision and mission by all in the organisation; and from correction to prevention and continuous improvement.

According to Miller, there are 4 styles of decision-making: by mandate, consultation, consensus and delegation. The administration has to understand that to be competitive they have to change their style of decisions making. They should accept to provide autonomy to teams, and involve themselves in improving the process, assuring the success of the projects performed for this purpose. This does not mean to lose control, because employees learn to respond to their responsibilities in teamwork, to achieve team goals, not the individual ones. The administration must keep its responsibility and authority on the definition of goals and objectives, especially at the strategic level. Managers should define the role, responsibilities and limits of each team.

Consensus is defined as “the collective opinion of a group obtained through a process of open communication in which all its members participate”. In this process, all members have to accept the decision of the group in a process in which everybody had a chance to give an opinion. (Katzan 1989).

4.1.2 Organisations based on teamwork

Managers in every modern organisation have good reasons to support its operation by teamwork. Teamwork is an activity that receives greater attention nowadays. Some definitions to describe it, commonly found in the literature, are presented next. The central characteristic of teamwork is face to face interaction and mutual influence. Homans (1950) affirmed that a team has to be as small as possible to assure face to face work. Shaw (1981) suggested the formation of groups of 2 or more persons working for a certain amount of time, to assure the influence between each other. Katzenbach (1993) defines teamwork as a small group of people with complementary skills, committed through mutual collaboration to a common cause and goals.

The most complete definition of teamwork is provided by Johnson & Johnson (1987): “a team is a group of two or more persons interacting and influencing each other, each member with specific roles and performing under common norms, and perceiving themselves as a unit with common goals, oriented to satisfy their individual needs and aspirations”. Every one in a team does his or her best possible, because of their commitment to others, and because the success, as well the failure is, shared.

Shuster (1990) suggests that group's interests do not exist, just the individual ones. Group's interest is a balanced mixture of individual interests. The more coherent the individual's interests, the more unified and lasting the group will be. The most important characteristics of quality systems are their orientation to the customer, obsession for quality, a constant search for failures, empowerment of people, education and continuous training, and teamwork.

Teamwork presents many advantages compared to individual work. Collective knowledge and commitment are much greater than the individual ones. More complex problems can be solved through teamwork, there are more ideas to solve it, and the group develops a feeling of ownership. On the other hand, some disadvantages of teamwork are: it takes longer to get a solution to a problem, it is more complicated to manage a group than an individual, a group normally takes more risks than those usually taken by any of its individuals and sometimes sophisticated human conflicts occur during its operation. People's participation assumes the organisation is composed of intelligent and collaborative individuals, that with a certain degree of autonomy will perform toward customers' satisfaction (Townsend & Gebhardt 1992).

Communication is essential in every process for quality improvement. The constant flow of small ideas is the central concept behind quality improvement. Teamwork should be considered as a process aimed to influence permanently the organisational culture. The key to success in every organisation is to take advantage of individuals' talent in a cultural environment of teamwork.

Teamwork is the outcome of the fusion of two sciences, management and human behaviour, with quality control. More than 30 years ago, Argyris (1964) identified the need to establish a mechanism of collaboration between the employees and the administration for organisational improvement. Before that, McGregor's Y Theory recognised the need to use the intellectual ability and the creativity of employees. The Z Theory of Ouchi is another example of the autonomy and self-management that an employee can develop if the administration trust him/her. The motivational theory of Herzberg emphasises as well the benefits of a management system based on the participation of employees. Maslow's pyramid of human needs justifies the social need

of a person of belonging to a group. There many studies and evidence supporting the advantages of teamwork; however, if teams are formed without any effect on the organisational culture, the most important contributions suddenly disappear.

Dyer (1987) suggests that teams should be formed when some of the following symptoms are present in an organisation: there are important quality and productivity problems, the interpersonal relations are in a very poor state, nobody seems to accept his or her responsibility, there is a high dependency of employees on the administration for making even the most simple decisions, customers' complaints are increasing at a fast rate, etc. Aubrey & Felkins (1988) say that in the future, organisation's competence will tend to settle on the lower levels, decentralising the decision making, and increasing the importance given to the quality of service.

From another perspective, Tjosvold (1991) says that teamwork focuses to two interrelated areas: continuous short-term small incremental improvements, and innovation for long-term radical improvements.

Regarding the authority and power transferred to teams, they can be classified in "teams for participation", limited to make suggestions to the administration but not involved in decision making; "empowered teams", with authority for decision making in the process they are responsible for managing; and "self-managed teams", authorised to participate in the whole management process of their own operations. These type of teams make plans, assign priorities, co-ordinate with other teams, make adjustments to the process, and solve their own problems. "Autonomous teams" are a kind of self-managed teams, derived from the socio-technical approach used for change management.

Quality control circles (QCC) are a special type of team for quality improvement. They were conceptualised in Japan in the 1960s as part of its National quality improvement programme. Their main purposes are to identify, analyse, and solve problems related to members' job in search of a quality and productivity improvement. QCC are small (3 to 8 members) and nobody is forced to participate. QCC are integrated by members having a common goal. They use simple statistical tools and procedures to solve their problems. They are formed on a continuous permanent basis, and meet after work. Additionally,

the QCC intend to contribute to the intellectual and human development of the people involved in this activity.

An organisation wishing to establish teamwork as a work culture evolves from a situation of absence of teams, to the appearance of teams for participation, empowered teams, and finally self-managed teams (Stahl 1995). Before teams become an effective and efficient structure for problem solving, they pass through several evolutionary stages. At the beginning, team's members start to know each other as a group with a common objective. In this stage, members are not very communicative, their collaboration level is poor and the decision making process is performed by mandate. In the next phase, team's members feel more comfortable in their activity as a group, and learn to accept others' opinion, which is the first symptom of communication. Learning to communicate usually takes a long time; however, once the team members know how to do it, their performance improves sharply and they get the capacity to select and solve problems.

Certain social abilities are required for teamwork: sensibility, knowledge on how to take ideas from others without causing conflict, responsibility, a participation attitude, commitment, etc. Discipline is a basic element in creating an adequate environment for teamwork (Katzenbach 1993). It is recommended to identify the informal "heroes" as well as the formal leaders in the organisation, considering the cultural characteristics of group.

It is important to make sure the administration is contributing to provide the skills required for teamwork, which according to Hirschhorn (1991) can be classified in four categories:

- 1.- The natural abilities of a person (writing, selling, designing, etc.).
- 2.- His or her ability to work without supervision, just following general instructions provided by the administration.
- 3.- The ability of a person to perform leadership roles.
- 4.- The capacity of a person to accept the role of "follower" (not leader) under certain circumstances.

In every human activity, conflicts are always present. It is administration's responsibility to solve any conflict and exercise on-time and adequate corrections. For teamwork to impulse the organisational change process, it is required to have a critical mass of people involved in the participation process (Beckhard & Harris 1987).

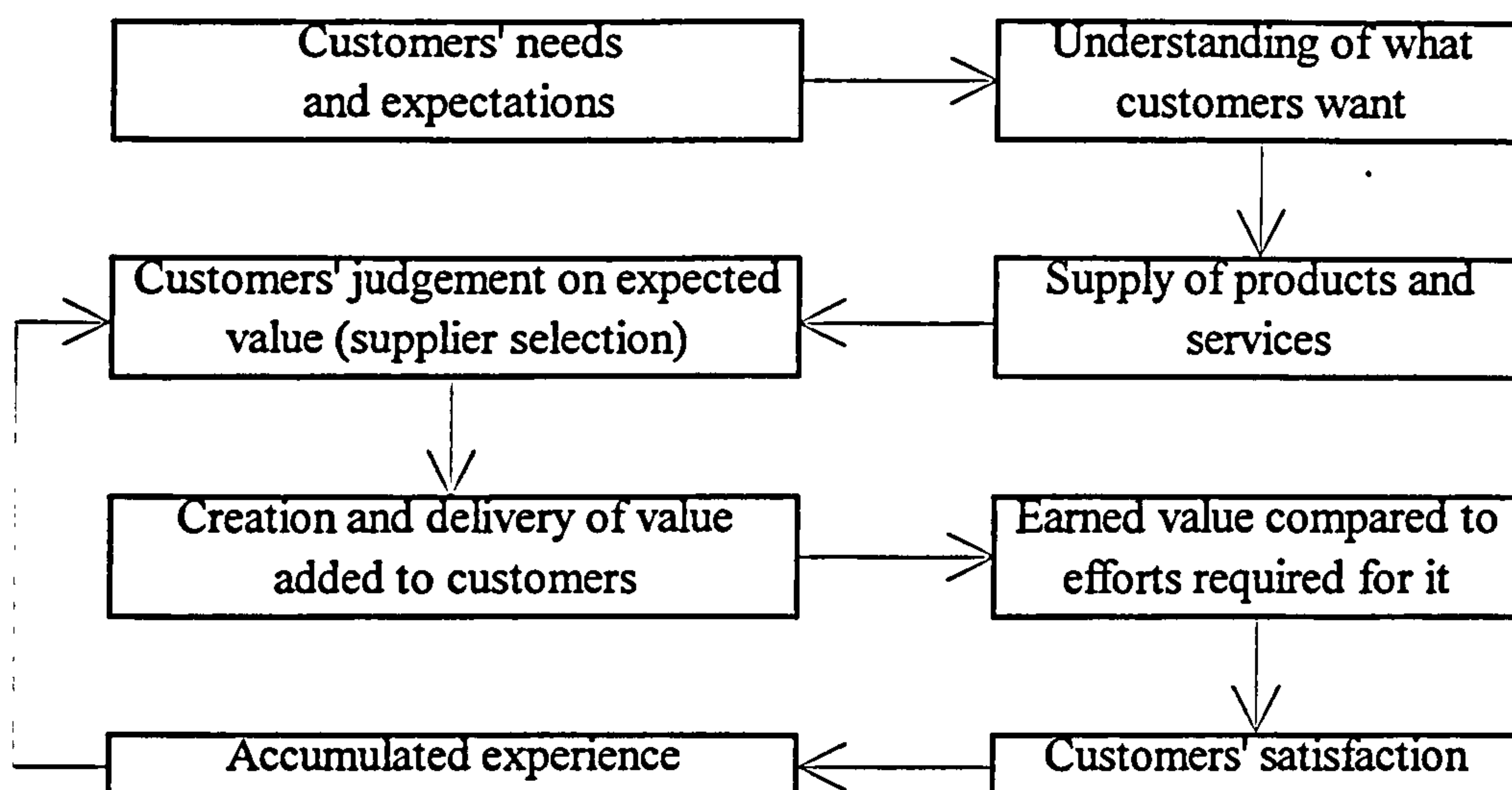
4.2 Customer value

An essential virtue in quality people and organisations, is to reflect an attitude of service, understanding what customers want, need and expect. Customer value is not only to deliver the set of characteristics of functionality of a product (price, delivering time, treatment and post sales guarantees), but also in the satisfaction of every detail the customer expects and even in giving him or her something unexpected but satisfactory (Albrecht 1994).

In the era of strategic quality management, the value customers expect is the foundation used to define the processes required in the organisation to create it (Harris 1991). This is the concept behind the value chain. In this era, customers identify their requirements to the market. Customers will select their suppliers, looking for organisations that guarantee the total satisfaction of those requirements (Escover 1994).

Customers have increased their purchase power since the opening of the world's international markets. This new economic order obligates companies to structure their operative and administrative processes as a value chain. Figure 4.1 presents a flow diagram of the process of value creation for customer satisfaction.

Figure 4.1 Process of value creation for customer satisfaction



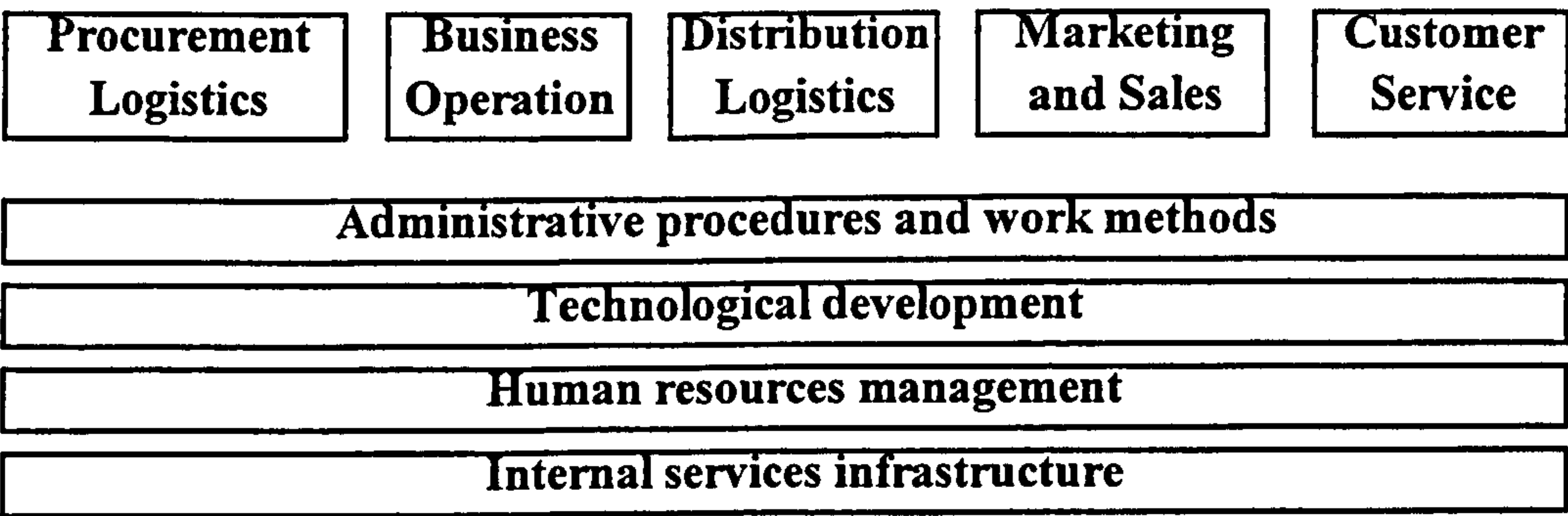
4.2.1 The value chain

The value-added of a product could not be perceived, or perceived erroneously by the customers, if the organisation does not deliver it on time and with a service attitude during this process. In AT&T customer value is defined as a mathematical equation in which the value perceived by the customers on their own products is divided by the value perceived by them in competitors' products. (Rubel 1995). The value chain is a symbolic representation of the linkage required by the major organisational processes (chain-links) to supply the market with quality products and services. The last link in the chain is the market, that "pulls" the rest of the processes for the satisfaction of its needs and expectations. The value created by the whole chain is much larger than the sum of values individually created (Rouland 1995). In general, the major processes of the value chain are the market, marketing and distribution channels, manufacturing, and procurement (Davis & Dillard 1993).

The conceptualisation of an organisation as a value chain is a systemic approach that integrates its operation to the operation of other organisations and social systems with which it interacts. Porter (1986) conceives the value chain as a group of linked processes, just as mentioned before, but receiving the support of secondary processes: administrative procedures and work methods, technological development, management

of human resources and the internal services infrastructure. Figure 4.2 is the graphical representation of Porter’s value chain concept.

Figure 4.2 Porter’s value chain



The most important “assets” of any company are perhaps the profitable and loyal customers (Valdez 1995). However, these two desirable characteristics of customers have to be created by the organisation. Loyalty is not an inherent element in customers. It is created and reinforced by satisfying them with quality products and services. On the other hand, profitability is obtained by a productive operation “doing the right things, right the first time”.

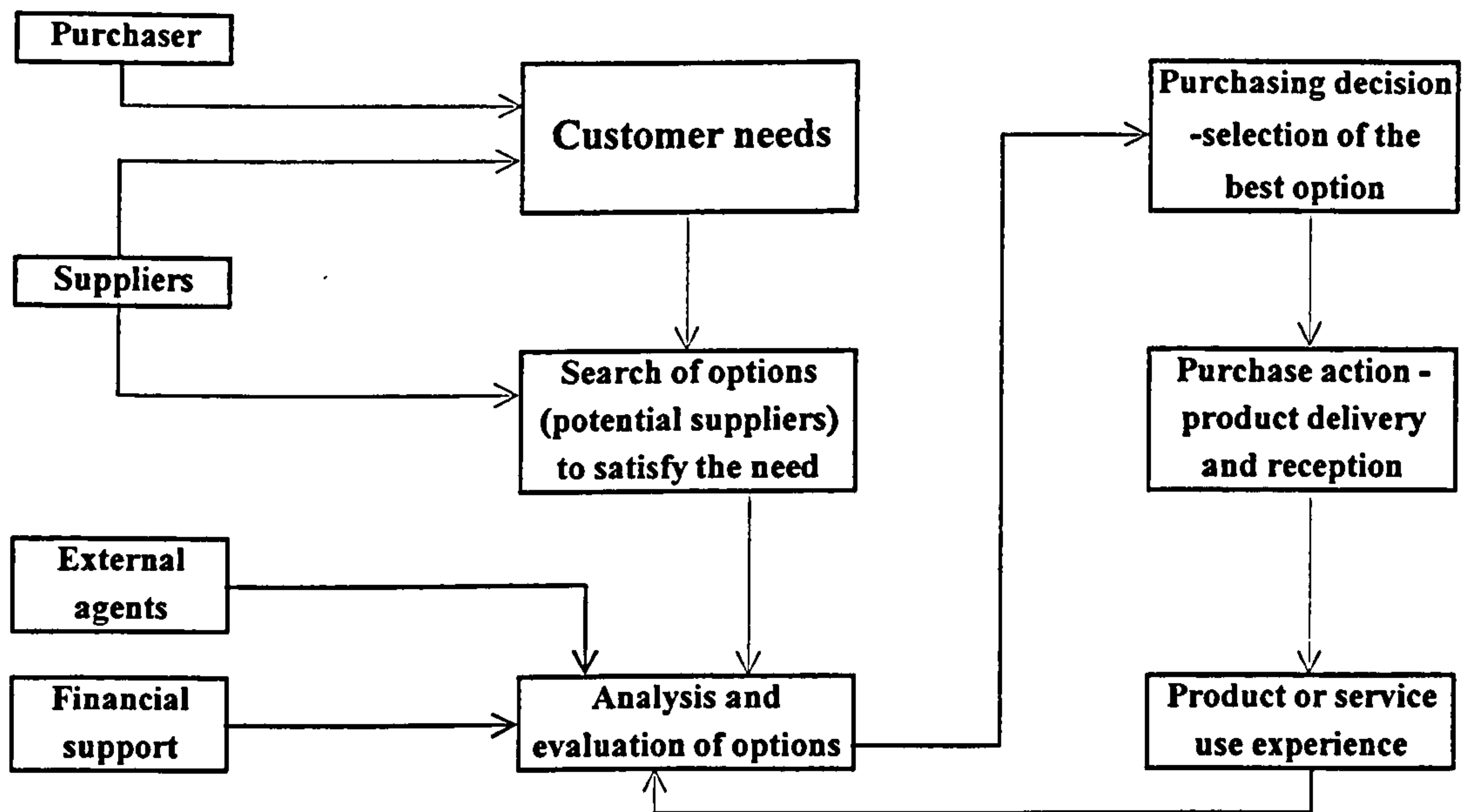
4.2.2 Understanding customers’ needs and expectations

It is important that every employee understands the value of a customer for the organisation, no matter how small he or she is at present. Small customers now can be very important ones in the future. To keep them satisfied from the beginning is fundamental to develop in them a permanent interest in buying products and services from the company. This relation of mutual interest between the company and its customers provides the support required to assure a long-term competitiveness. Deming used to say that *“a repetitive customer provides ten times more financial benefits to the company than one customer convinced by advertising to buy”*. Two recommendations are usually found in the literature to have repetitive customers, one is explained by the phrase “a satisfied employee is equal to customer satisfaction” (Band 1991), the other one is to avoid the creation of expectations that the company is not capable to satisfy (Wood 1995).

A **customer** is everyone who receives a benefit, directly or indirectly, from the services provided by a supplier. A logical first step for customer satisfaction is a clear identification of who is the customer in the different market segment in which the company intends to participate. To be sure that the value chain will supply a product or service with the characteristics required for customers' satisfaction, it is necessary to understand what they need and expect from the company. Customers' needs and expectations are then decomposed to identify how each within the organisation contributes to create value for the customer.

The understanding of customers' needs and expectations includes the analysis of the different roles adopted by customers in each market segment. In this analysis, it is important to realise that the decision to buy or not a product, does not always correspond to its end-consumer. Other agents participate in this process. The roles adopted by these agents are a consequence of a mixture of the physiological and psychological needs of the consumer, in the context of a cultural environment. Some of the agents that can participate in a buying decision are, in addition to the consumer, the purchaser, the one responsible for the final decision, the person supporting financially the purchase, and external elements that influence in different ways the opinion of the internal ones (advertising, ecology groups, policies, etc.). In any case, this process is executed through a sequence of activities as shown in Figure 4.3

Figure 4.3 Typical process for buying decisions



A clear understanding of this process in every market segment will help the organisation to set-up a process chain that certainly delivers value to the customer.

In most cases, value added is hard to conceptualise as a tangible element. Many of the customers' expectations are related to how they are treated during the sale-buy process, and the quality offered on this activity. Even financial services, in which the value added is expressed in monetary terms, should consider this aspect of service quality (Spelman 1995).

After the identification of customers and the roles associated with the buying process, a market segmentation should be performed. Regarding quality, market segmentation is done by grouping customers' needs by similarities. Garvin (1988) suggests the use of the following criteria for market segmentation: a) basic operational functions of the product or service, b) additional characteristics or special services associated with the product, c) product's reliability (rate of failure), d) conformance to standards, e) durability or total product life, f) quality of service, g) product's image and reputation, and h) the product's aesthetic appearance.

Actually, organisations tend to be structured as a cross-functional management system (Kurogane 1993) according to the processes needed to satisfy customers' needs and expectations, and not by function as in traditional management. The organisational macro-processes created should focus to customers' satisfaction. The linkage of these macro-processes is what finally structure the value chain. Macro-processes are then decomposed in micro-processes (Juran 1988), which are the basic operational processes executed by individuals or through teamwork. Each micro-process is planned according to the objectives stipulated in its associated macro-process. The PDCA cycle is performed on each micro-process as part of the quality control programme. In this way, the continuous improvement process spreads throughout the entire organisation, and totally aligned to customers' satisfaction.

4.2.3 Customer value strategies

The value anticipated by a customer to receive from a product is what finally persuades him/her to buy it. For this reason, to structure and manage an organisation as a customer value chain is considered, with no exemption, a *corporate strategy for competitiveness*. Companies have to be sure to add value to their products and services as a key element of their corporate strategy (Graham 1994).

Mintzberg (1978) defines "strategy" as the pattern followed by a group of linked decisions. Strategies can be planned or emerge from the bottom of the organisation. Regarding customer value, the strategy has to be planned on the basis of the needs and expectations identified in the market. Stahl (1995) suggest three phases for strategic planning: a) formulation, b) implementation, and c) evaluation and control of results. The inputs of this process are customers' needs and expectations, and the outcome customer value.

The strategic planning process is focused from four basic questions: who are we? where are we? where do we want to be? and what should we do to move there? Strategies provide direction to the organisation, but it is important to state clearly a **Mission statement** to answer the first question. The composition of a **Mission statement** has to include explicitly the following points:

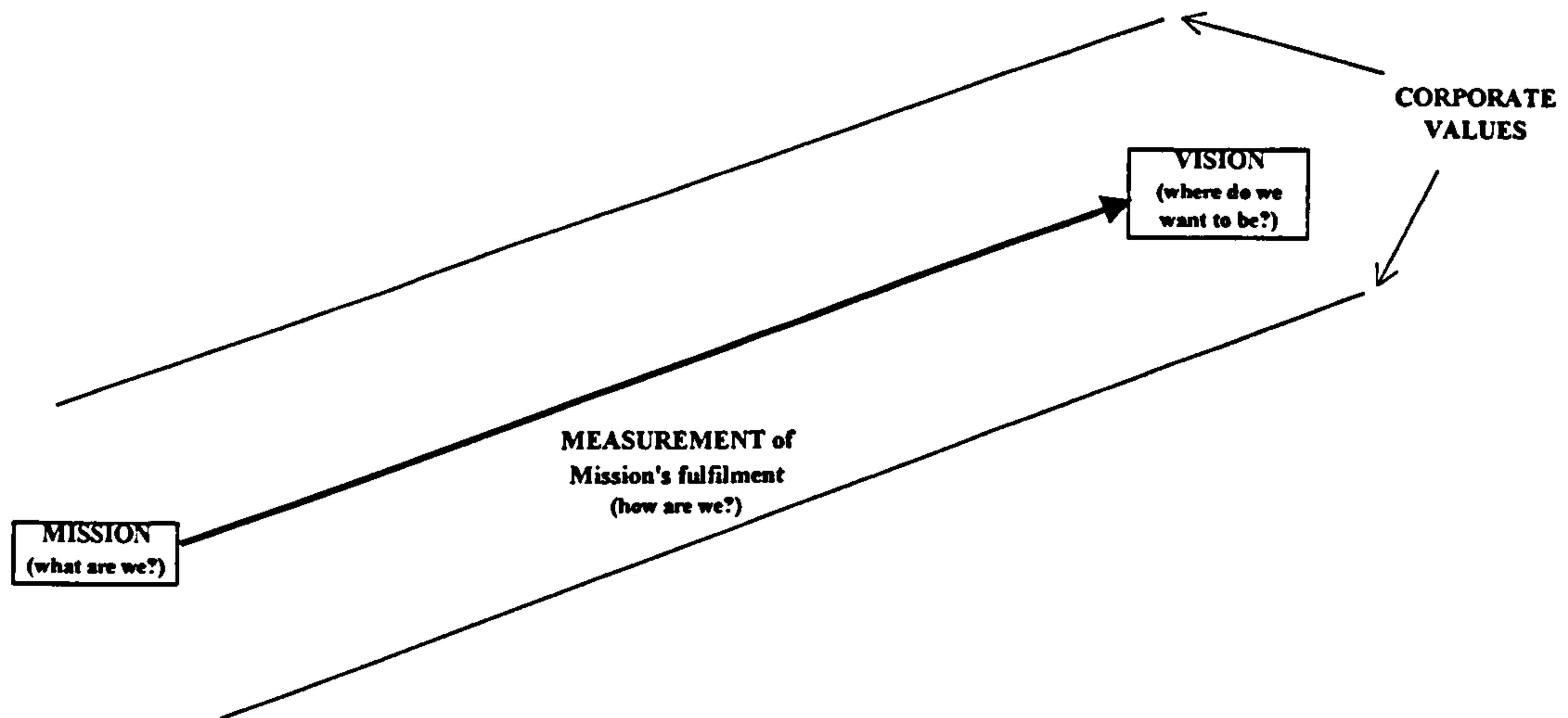
1. The needs satisfied by the products or services offered in every market segment attended by the organisation.
2. A generic description of technology used for that purpose.
3. How the company is dedicated to fulfil the expectations of its stakeholders (Anderson 1982).

An element of the mission statement, but generally presented apart, is the **quality policy**, which defines the approach used to satisfy customers' needs and expectations.

The answer to the second question is provided by customers and stakeholders. An internal answer to "where are we?" is meaningless. "Where do we want to be?" is defined in the **Vision Statement** by the top leaders of the organisation, who are responsible for providing direction to the company. A vision statement allows the organisation to foresee its possible future, and should be congruent with the business dynamics present in the market.

In addition to direction, top leaders should provide the organisation with the morale and ethic "limits" in which it can operate. The social and cultural corporate values represent the values shared by every person within the organisation. They should describe the basic beliefs and the characteristics of the cultural pattern desired to fulfil the company's mission. Figure 4.4 is a graphical representation of how to get a strategic positioning through the mission, vision and corporate values.

Figure 4.4 Strategic position through the mission, vision and corporate values



4.3 Quality planning and control

4.3.1 Product development

Once an organisation determines the segment market it wants to cover, and knows customers' needs and expectations, their satisfaction should be the "trigger" of every quality effort. Customer satisfaction is attained through product's qualities (tangible and intangible). However, customers' language is commonly different to the technical language used within the organisation. It is necessary to translate product's characteristics from customers' words to technical specifications. The "Quality Function Deployment" or QFD is a technique used for this purpose (Guinta & Praizler 1993).

QFD's main objective is to contribute to a better understanding of customers' expectations during the product's design phase. It was first used in Mitsubishi Heavy Industries from Japan, at the end of the 1960s. Other companies such as Toyota, General Motors, Xerox, Kodak, Procter & Gamble adopted immediately this technique. For product and process planning it helps to reduce, or even to eliminate, the re-design needed in other techniques used for the same purpose. In this way, it is less necessary to need to use customers' feedback by testing the product in the market before its design is finished. Nowadays, it is not possible to afford these market tests because of the risk of

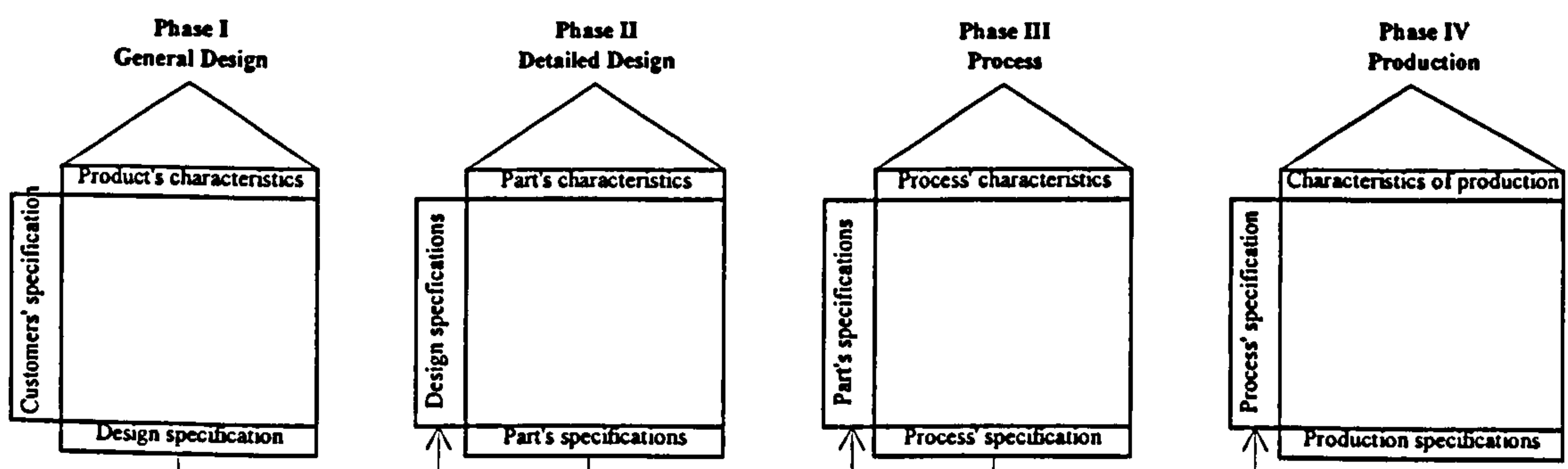
loosing customers, who are exposed to more options than ever before. They simply change to a competitor's product. On the other hand, QFD promotes a better communication and teamwork among the employees involved in the whole process, from design to distribution.

The term "deployment", which is a translation from the Japanese word "*ten kai*", whose meaning could be expansion, development or evolution, refers to the idea of taking customers' needs and expectations expressed in their own language (customers' voice), to everybody within the organisation.

A QFD analysis starts with the definition of the objectives of the study. From these objectives, the analysis identifies the product's attributes required by the customer and technical characteristics, which are then related in a matrix. The next step is to perform a competitive evaluation of the product; its technical characteristics are related; and finally, the analysis determines which design requirements or technical characteristics should be expanded to the production process.

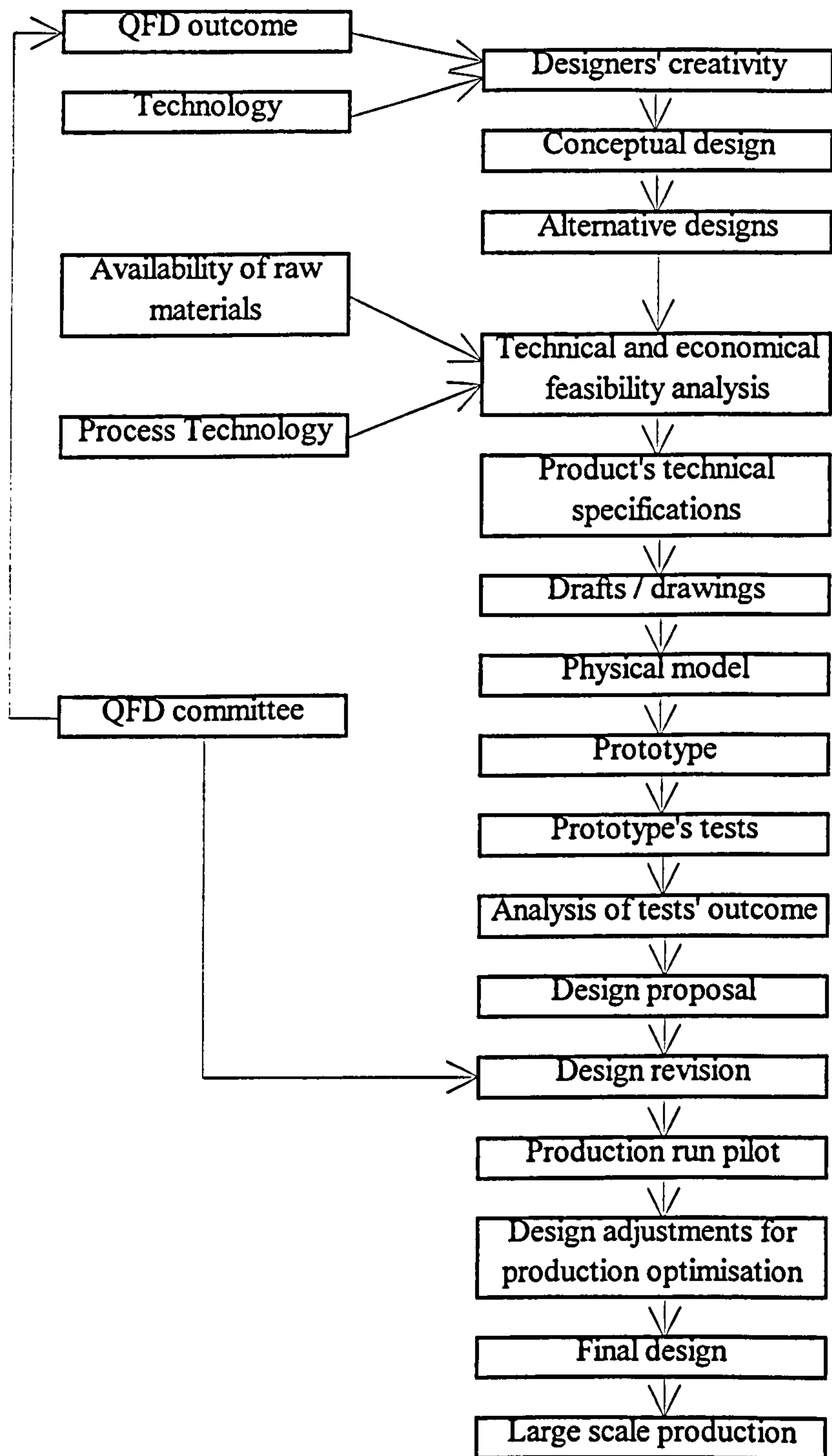
A complete QFD analysis includes four phases: 1) product's characteristics according to customers' requirements (general design), 2) definition of product's technical characteristics in terms of its individual parts (detailed design), 3) determination of the technical requirements of the production process, and 4) a detailed definition of the production control items. The whole sequence of a QFD analysis is shown in Figure 4.5

Figure 4.5 Sequence of analysis used in QFD



According to Schroeder (1993) there are 3 forms in which a new design can be introduced: pulled by the market, pushed by the technology, or a combination of both. In any of these three cases, the design of a new product follows the procedure shown in Figure 4.6, in which it is possible to see the role of QFD.

Figure 4.6 Procedure for the design of a new product



There is another technique known as “value engineering” or “value analysis” that sometimes is used as an alternate or complementary procedure for product design. The objective of value engineering is to assess the design of a product assuring the inclusion

of every operational function required to provide value to the customer at an optimal cost (Juran & Gryna 1988).

It is important to mention today's companies have to produce new designs faster than before. Competition is mostly based on the introduction of new products to the market. For this reason, competitive organisations have procedures to perform in parallel activities such as product development, production and sales, not in sequence as it was before. The continuous (re)design of products throughout its life cycle is known as "concurrent or simultaneous engineering". In this technique, the stages of a product's life cycle (development, production, distribution, use, disposal and recycling) are considered simultaneously during the conceptualisation of a new design (Kusiak 1993).

Concurrent engineering is a technique that considers, from the very beginning of the design stage, the value transferred by the product to its user during the whole life cycle. The design of a product using concurrent engineering requires the support of other techniques such as production automation, structural and dimensional analysis, computer-aided design, design for manufacturability, quality planning and improvement, reliability engineering, maintainability, etc. The most important advantage of simultaneous engineering is the reduction of the time needed to develop a product from its conceptualisation until its introduction to the market. It contributes to anticipate potential problems that could occur to the production during its manufacturing, distribution or sale.

4.3.2 Quality assurance of inputs

During the manufacturing stage, the conformance to specifications is greatly influenced by the quality of raw materials. Juran & Gryna (1993) recommend the implementation of the following activities in the relation with suppliers:

- 1) the definition and establishment of the quality programme that should be requested for the certification of suppliers that meet the requirements.
- 2) the selection of the supplier that demonstrates the potential capacity to supply quality raw materials,
- 3) a periodical evaluation of the performance of each supplier according to the previous criteria, and

- 4) to contribute with suppliers in the implementation of their quality planning and improvement programmes.

It is not a sufficient condition to establish agreements with suppliers capable of meeting the specifications requested. It is also important to know their capacity to maintain a uniform quality through keeping their processes under control. Uniformity of quality is important because of its direct impact on productivity, and therefore on product's production cost and competitiveness. The "process capability index" or C_{pk} constitutes an element used to make an objective comparison on which supplier is more capable to produce uniform quality. The C_{pk} measures how many times the specified tolerance is greater than 6 times the process variability (C_p). The greater the C_{pk} , the more probable the process will meet the specifications, even if it is out of control for a short period of time.

On the other hand, Deming's 4th point recommends the elimination of the practice of buying incoming materials on the basis of price. Weber (1991) claims that not only Deming, but many other authors have been making the same recommendation since the 1950s. It is important to choose suppliers that demonstrate statistical evidence of having their manufacturing process under control, in addition to offer a quality service during the sale and post-sale activities.

The suppliers' potential capacity is evaluated by an audit performed on their quality system. This audit requires the establishment of a committee integrated by people from engineering, purchasing, production and quality. This committee assesses the operational condition of the following administrative procedures: new products development, manufacturing, suppliers control, quality assurance, quality tests and laboratories, information management, training programmes and achievements on quality.

4.3.3 Process (re)design through "Benchmarking"

To support the stage of development of the internal processes (administrative and for manufacturing) of an organisation, it is important to make an analysis of the best processes used by competitors and related companies. This analysis is known as

“benchmarking”, and was used first by Xerox. It was created when they were trying to incorporate the processes used by Fuji Xerox into the operation of Xerox USA. A benchmarking analysis can be used for any of these purposes (Camp 1989):

- 1) To know the characteristics of competitors’ products and services that have a greater impact on the consumers’ preference,
- 2) To identify the best processes that can be incorporated into the company’s operation to improve its competitiveness (this information is usually the input of a re-engineering study), and
- 3) To establish performance-indices, by defining of competitive goals and objectives for every process within the organisation.

The same author, Camp (1995) suggests a ten-step procedure to perform a benchmarking analysis.

1. Detect the most important processes for the company’s mission fulfilment, and select them for improvement through a benchmarking analysis.
2. Identify the organisations having the best processes in relation to the process to improve.
3. Plan the investigation approach, determining which data are required for the analysis, and who should integrate the team to be in charge of observing the best processes in other organisations.
4. Determine the difference between own processes and those considered the best ones.
5. Make a realistic consideration on the basis of the actual differences to determine the actions to take to move the process under study to the performance level of the best.
6. Communicate the benchmarking investigation outcome to all those who will be involved in the change required to improve the process, looking for a minimisation of the natural change resistance.

7. Review actual goals of the process under study to convert the outcome of the benchmarking analysis to actions describing the new goals to achieve by the incorporation of the best practices identified outside.
8. Develop an implementation plan for the actions defined in the previous step.
9. Implement the new practices and monitor their progress.
10. Make sure to review continuously the performance of other organisations (not only competitors), searching for the best processes or actions.

Benchmarking has allowed many organisations to improve their competitiveness. For companies not capable to support innovation (from a financial perspective), the adaptation of others' process can accelerate the process to become a world-class organisation.

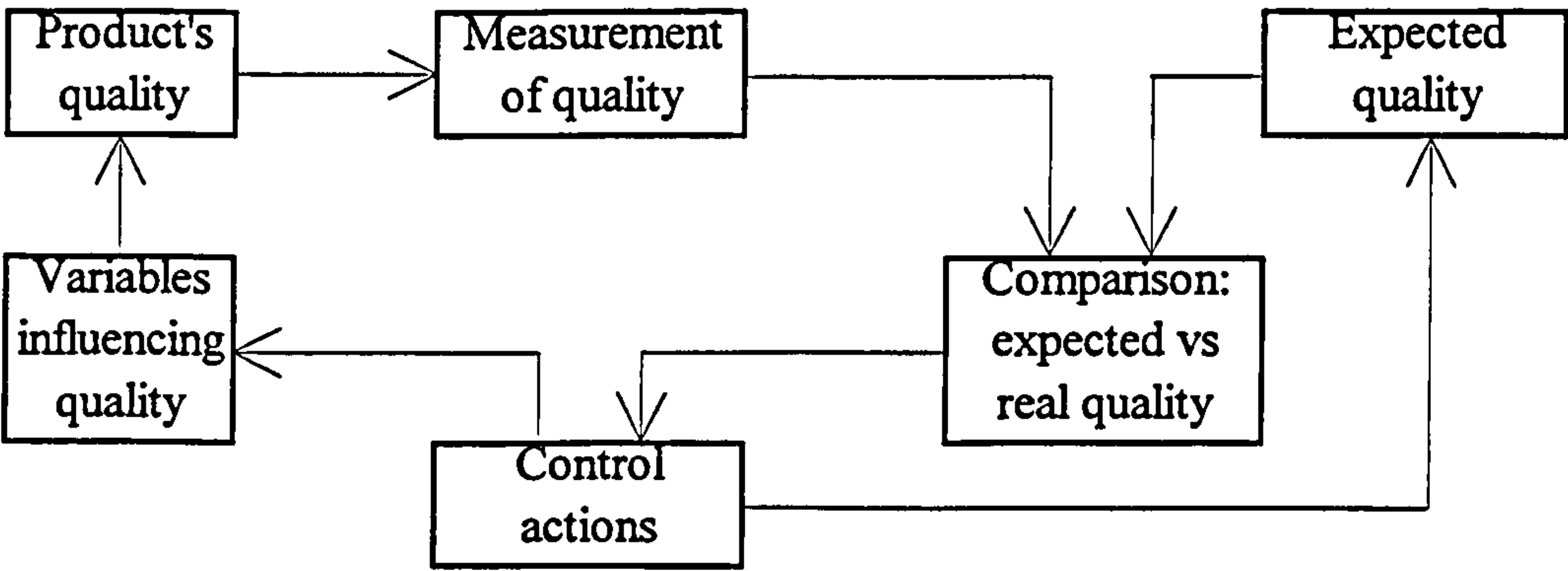
4.3.4 Process control

In every process (administrative or manufacturing), there are many variables affecting its capacity to work within the expected standard. This variability can be due to “common” or to “special” causes of variation (Deming 1982). Common causes are inherent to the process and for this reason, associated with its capability to meet a quality standard. On the other hand, special causes of variation are external factors. Its presence causes an out-of-control situation that diminishes the process capability. To keep a process under control needs the implementation of a control device that allows the early identification of a special cause of variation. Walter Shewhart proposed a statistical method for process control in the 1920s in his book “*Economic Control of the Quality of a Manufactured Product*” (re-edited by ASQC press in 1980). The “control chart” is the central element in Shewhart’s statistical process control (SPC) theory. For manufacturing, Shewhart’s SPC is an indispensable tool to keep the process under control, meeting quality standards.

On the other hand, a good planning of the manufacturing process is needed before its control. Manufacturing planning provides the assurance that the equipment and machinery will have capacity to meet the quality standards. Manufacturing plans should provide as well the information and procedures required for this purpose. Juran & Gryna (1993) suggest the consideration of the “dominant system” of the manufacturing process for planning. A dominant system is the manufacturing element that has the greatest influence on quality. There are five possible dominant systems: process set-up, machinery, workers, raw materials and information. In any case, process control requires to be operated by workers in a state of self-control. Such a state is reached when the workers know what they should do, they receive feedback on their performance, and have the skills to make the necessary adjustments to correct an undesired situation.

In general, quality control is exercised in the manufacturing process as shown in Figure 4.7

Figure 4.7 Quality control in the manufacturing process



Usually, statistical tools are used for control and optimisation of manufacturing processes. The most common tools are: control charts (variables and attributes), sampling, operational characteristic curves, sampling tables (Dodge-Romig, Military standards), and techniques for special studies (reliability, design of experiments, Taguchi method and regression analysis).

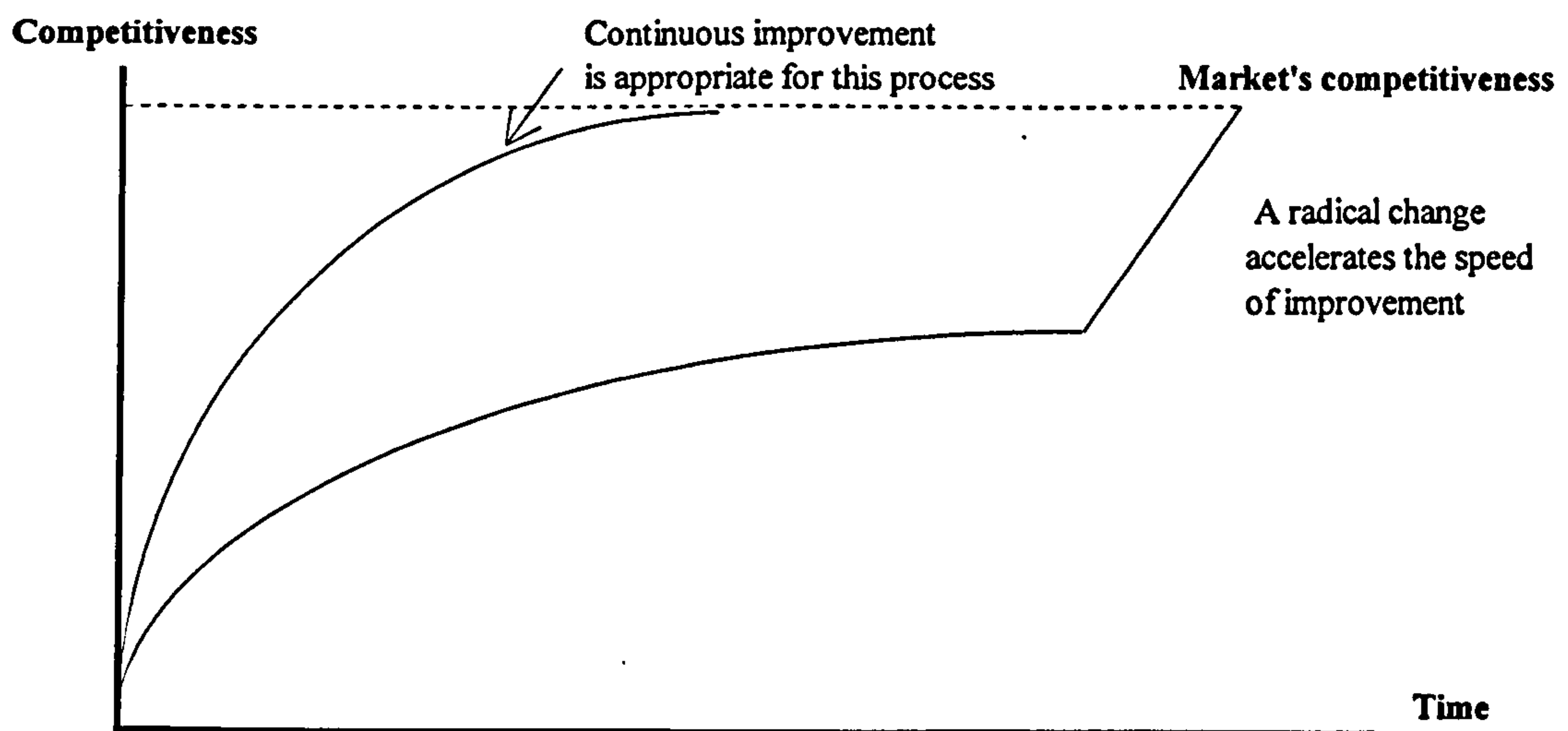
A product designed considering completely the “consumer’s voice” and produced by processes appropriately controlled, at the end, may not be perceived as a quality

product. This situation occurs when post-production activities are not well planned to prevent quality problems. The activities in which quality planning should focus are: 1) finished product certification, 2) warehousing conditions, 3) handling and delivery, 4) product's distribution and sale, product's installation, 5) usage of product by consumers, 6) warranty certificate, and 7) product's disposal and recycling.

4.4 Quality improvement

Quality improvement for products and processes is a key element in total quality management theory. There are two types of improvement: continuous or radical. In both cases, the improvement is required to achieve the appropriate level of competitiveness to succeed. Figure 4.8 is a graphical representation of the conditions under which each type of improvement is more appropriate.

Figure 4.8 Continuous versus radical improvement



4.4.1 Continuous Improvement

Continuous improvement is a fundamental pillar in the evolution of total quality. This idea was originally conceived by Shewhart who defined it as the continuous reduction of variability. Later, it was reinforced by Deming, Taguchi and all those who have used and statistical approach to quality control. Juran proposed in the 1950s what he called

the “universal sequence of improvement”, based on the “improvement project by project” approach. On the other hand, the Japanese consolidated the continuous improvement concept through the introduction of their *kaizen* programmes (Imai1989). *Kaizen* means continuous improvement in Japanese. *Kaizen* is a group of concepts, procedures and techniques used by Japanese organisations searching for the continuous improvement on every process. Some of the Japanese’s techniques for continuous improvement are: 1) total quality control, 2) quality circles, 3) suggestions systems, 4) automation, 5) the 5 S’s (recommendations for the improvement of the working environment), 6) total productive maintenance, 7) *kamban* systems, 8) just-in-time, 9) *poka-yoke* systems (quality control in the source), 10) activity in small groups, etc.

The continuous improvement is achieved through the management of the daily routine work. The speed of improvement is a consequence of the number of small improvement achieved day by day. For this reason, the continuous improvement should be an idea totally internalised in the behaviour of everybody within the organisation, becoming a philosophy of work and life. However, improvement is not only a matter of willingness and attitude. The organisation should have standardised processes and provide the required training so people can learn how to identify, analyse and improve them.

Any improvement effort should collaborate with the fulfilment of the organisation’s mission. Usually, the mission’s fulfilment is measured through four types of indices: economical-financial performance, processes’ productivity, customers’ satisfaction and stakeholders’ satisfaction.

4.4.2 Techniques used for process continuous improvement

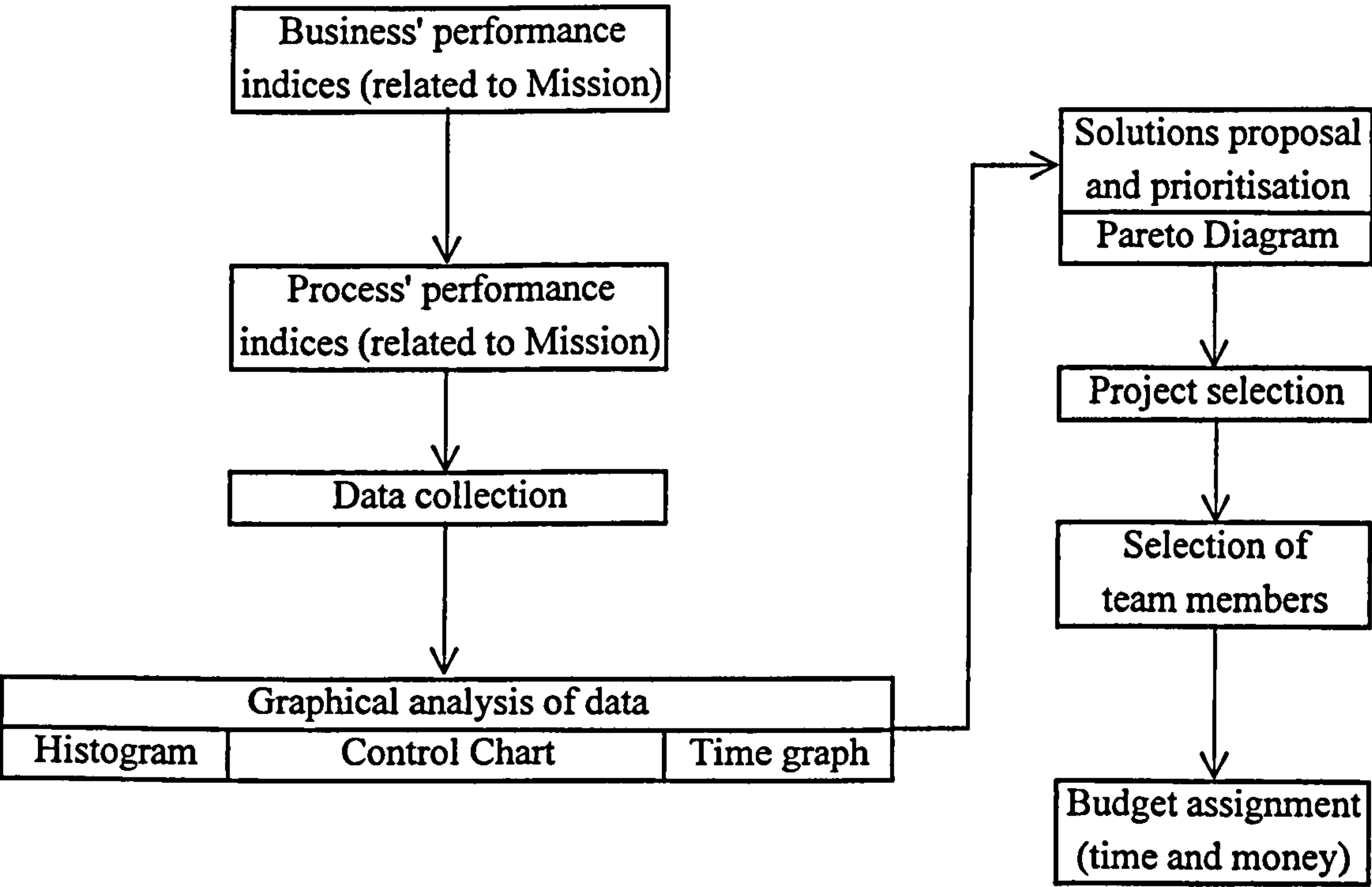
The seven basic tools, proposed by Kaoru Ishikawa in 1968 (Ishikawa 1976), were created to support the Japanese’s quality control circles. The combination of these tools, provide a clear and simple procedure for the analysis and improvement of any type of organisational processes. In fact, Ishikawa assured that at least 95% of the common industrial problems can be solved with these tools. The seven basic tools for quality control are: histogram, Pareto’s diagram, cause and effect diagram (Ishikawa’s diagram), check lists, control charts, scatter diagrams, and stratification.

The seven tools are combined in a procedure that follows the PDCA cycle to solve problems in a methodological way. Before describing this procedure, it is important to have a clear understanding of the word “problem”. Kepner and Tregoe (1965), define a problem as *the deviation between what is expected to happen and what is really happening, being that difference sufficiently important to decide to correct it.*

The procedure presented next follows the Deming’s cycle or PDCA cycle.

The “Plan” phase intends to assure that the solution of the selected project for analysis is oriented to contribute to improve the business’ key performance indices. Figure 4.9 shows the procedure followed during this phase.

Figure 4.9 Planning phase of the PDCA cycle



The team integrated in the previous phase is responsible for the “Do” phase. This team should analyse the potential causes of the problem under study, and to propose some alternative solutions. It is recommended to do it using a decision making process by consensus. The team starts looking for the hypothetical causes of the problem using a “brainstorm” process. Brainstorming is a technique originally proposed by Alex Osborn

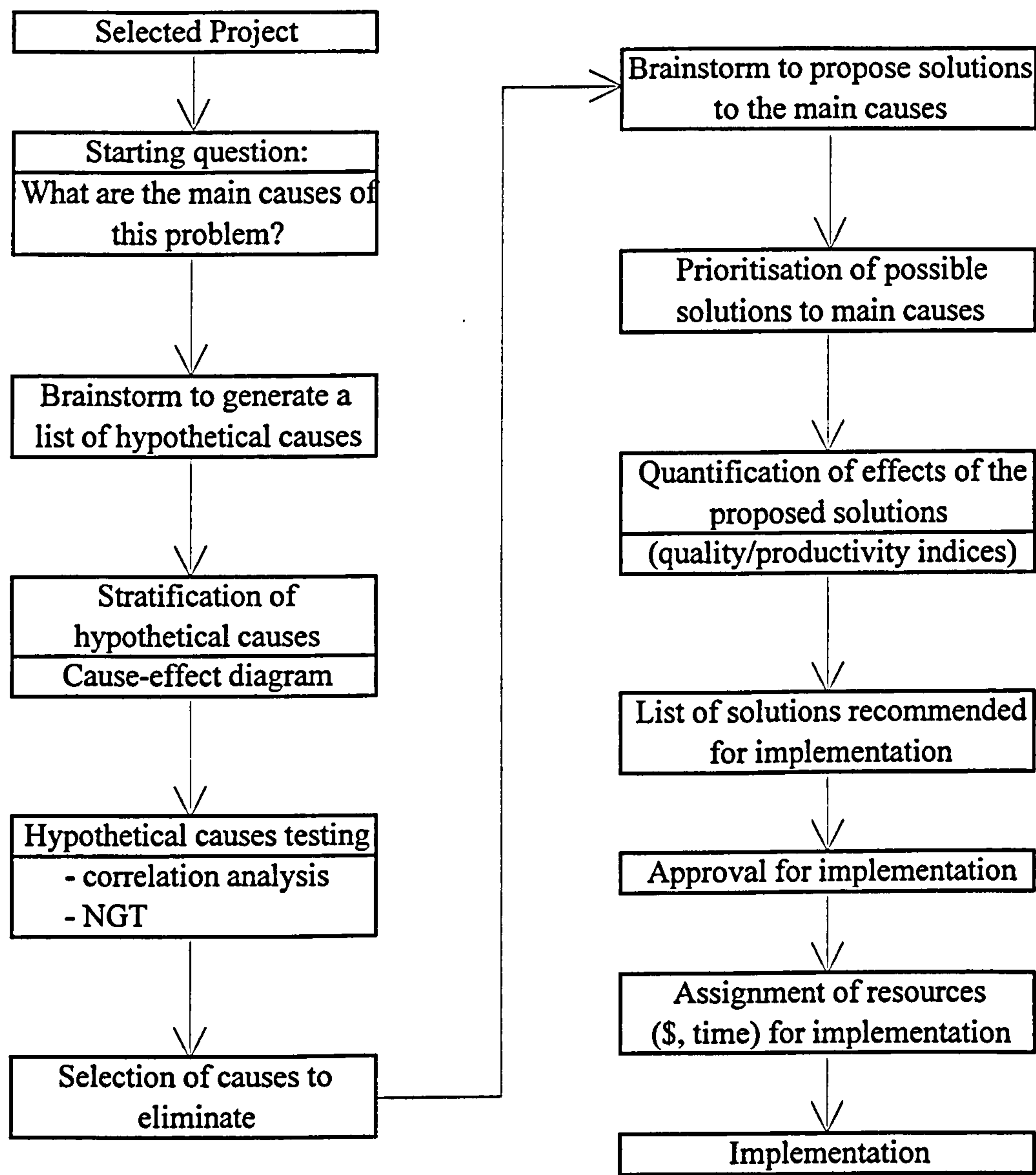
(1963). By its use, the team generates a list of ideas around a given topic (the problem being analysed). The next step is to categorise the hypothetical causes, which is represented in an Ishikawa's (cause-effect) diagram. The list of hypothetical causes reflects the group's perception about the problem. However, before going into the proposal of solutions, it is necessary to probe their validity. Statistical techniques such as correlation analyses are recommended for this process, but in some cases there are no data available. If this is the situation, the hypothetical causes can be probed by using the experience of team members. The technique recommended for this purpose is called "Nominal Group Technique" or NGT. Finally, the group have to generate (by brainstorming) a list of potential solutions that eliminate the real causes of the problem. Finally, potential solutions are prioritised before implementation because normally it is not feasible to put all of them in practice at a time. The procedure just described is presented in Figure 4.10

The same techniques used during the phase of planning can be utilised on this phase to evaluate and detect opportunities for improvement. The same graphs used then should show the improvement achieved after the implementation of the solutions approved in the previous phase.

Finally, during the "Act" phase, it is necessary to incorporate the adjustments required into the next cycle of planning. The continuous improvement process materialises when everybody in the organisation is dedicated to solve one problem after another. In this step, it is important to notice that the experience acquired by the people involved in the analysis of problems, becomes part of the new culture of total quality.

Some problems are so complex to be solved by using the 7 basic tools. These problems, usually of an intangible nature, present many interrelations between the different factors involved. For these situations, there are other additional techniques: the 7 management tools. These tools are used normally for the analysis of problems encountered in the management and direction of the organisation. The seven management tools are: Affinity diagram (KJ method), Relations diagram, Tree diagram, Matrix diagrams, Data analysis matrix, Process decision programming chart, and the Arrows diagram. An ample description of these tools is presented in Mizuno's book "*Management for quality improvement: The 7 new quality control tools*".

Figure 4.10 Brain-storming for problem solving



4.4.3 Radical improvement: Business Process Reengineering

The term “*Business Process Reengineering*” has become a popular one in the last few years. Many companies have found in this concept the best and fastest way for a radical improvement of processes that deteriorate their competitiveness. Especially in situation in which continuous improvement is a slow option. Reengineering means, in simple words, to “re-design from scratch”. Reengineering is a procedure for the re-invention of the company’s operative systems, in search for competitiveness. Champy (1994) recommends four aspects to consider in any reengineering study:

1. A constant questioning on the purpose of every organisational process.
2. Modify the cultural environment in preparation for change.
3. Develop new procedures, norms and standards that will conduct the organisation to an improved performance.
4. Determine the people's competencies required for the new processes.

Hammer & Champy (1993) define reengineering as *“the fundamental review and the radical redesign of organisational processes to achieve an outstanding improvement in key performance indices such as quality, cost, service, and on-time delivery”*. For Lowenthal (1994), *“reengineering is a fundamental redesign of key organisational processes, focused to achieve an improvement in company's competitiveness”*. Finally, Kelada (1996) argues that reengineering means *“a radical change in the way of think and act of an organisation, involving the change of organisational processes and structures, leadership styles, reward and recognition systems, and the relation with stakeholders”*.

Lowenthal proposed a 13 steps procedure for a reengineering study, divided in 4 phases.

I.- Preparation for change. Top management should understand the need for change. This phase is basic for the future of the organisation.

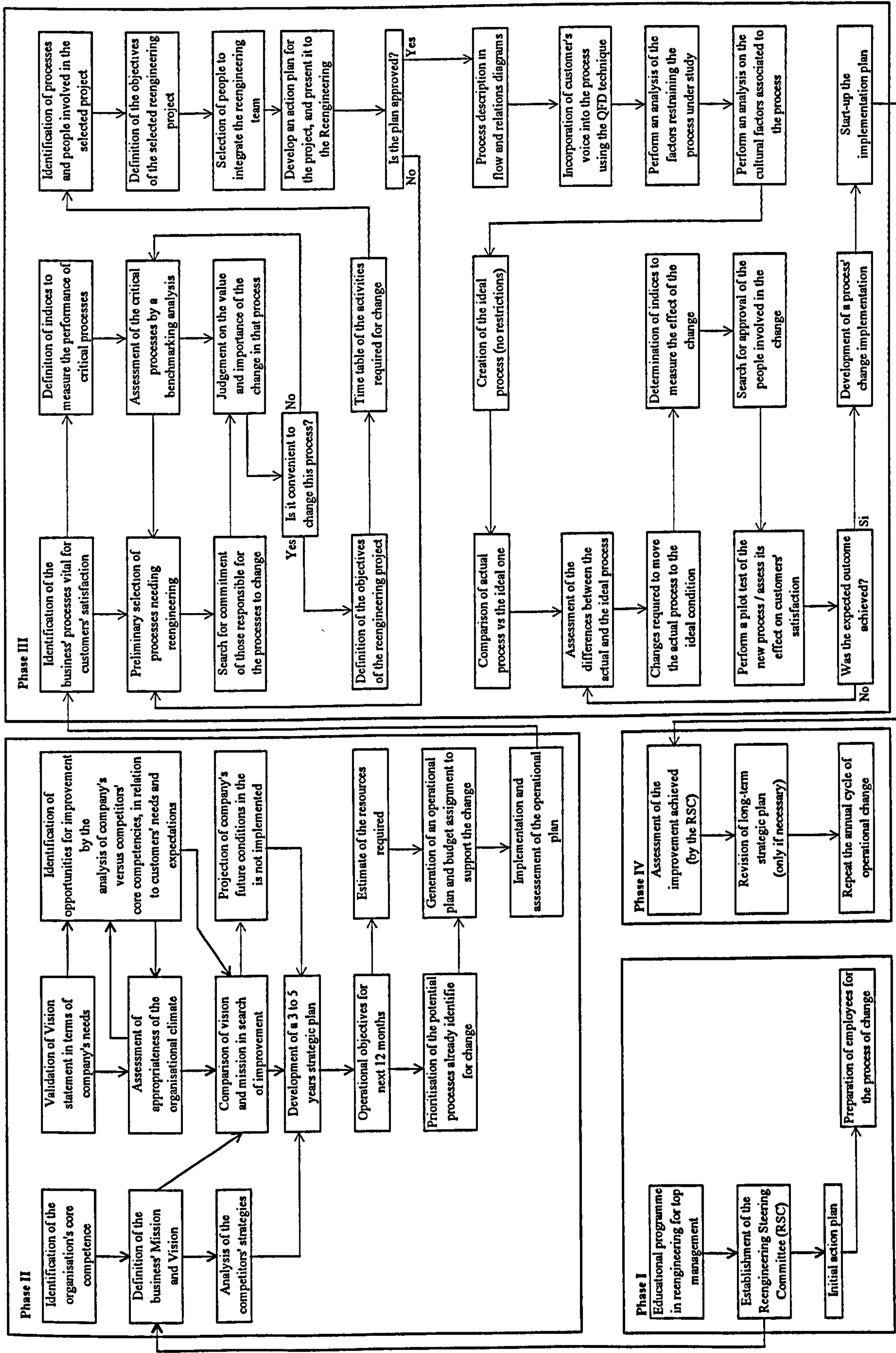
II.- Planning for change. A reengineering study works under the assumption of constant changes in the economical environment, in customers' needs and expectations, and in the strength of competitors. In this phase, top management establish company's vision for the future.

III.- Change design. Business processes are identify, evaluated and redesigned.

IV.- Evaluation of Change. After some time, (usually one year), the improvement is evaluated, defining priorities for change in the next years.

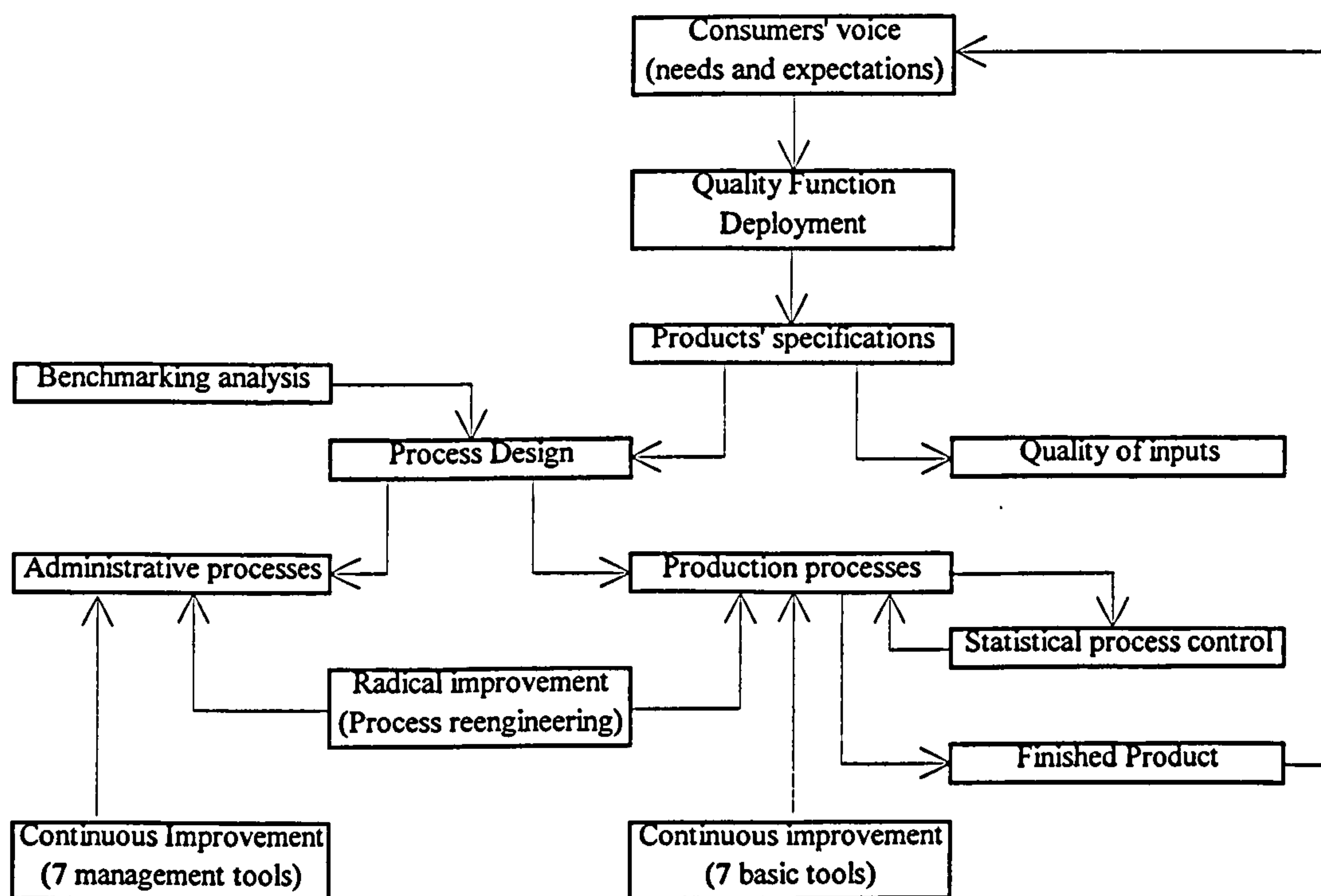
Figure 4.11 shows in more detail Lowenthal's model.

Figure 4.11 Lowenthal's model for BPR



Finally, it is important to mention that both continuous and radical improvements are useful depending upon the specific need of the organisation. It is not continuous improvement versus reengineering. The diagram presented in Figure 4.12 shows how both philosophies contribute in the organisation to move customers' satisfaction to a competitive level.

Figure 4.12 The contribution of continuous and radical improvement for customers' satisfaction.



4.5 Systematic approaches to quality management: ISO9000 and quality awards

The quality management systematic approaches are another important source of information on this area. The most significant are the ISO9000 standards and the “official” quality awards, established, in most cases, by private institutions with support from the government. This section includes a brief description of the ISO9000 standards, in addition to the National Quality Award (Mexico), the Malcolm Baldrige Award (USA) and the European Quality Award (EU).

4.5.1 The ISO-9000 standards

The ISO-9000 standards focus on the standardisation of the processes involved in a quality system. They are not associated with any specific product or economic sector, but with the processes from which products are created. To be able to work as a generic norm, the ISO-9000 standards enforce the utilisation of specific methods, techniques and procedures. They focus on the fulfilment of goals and objectives in relation to customers' satisfaction. The assumption involved in an ISO-9000 Certification is that a company accredited by the standard is sufficiently reliable to manufacture products that meet their specifications.

A company should have documented its processes (administrative and manufacturing) to get an ISO-9000 certification. Additionally, it is expected the processes are performed according to the PDCA cycle. Every process having a direct influence on product's quality, should have a clear definition of who is responsible for it, and what are the goals expected to be achieved. On the other hand, the organisation should establish control items that contribute to defects' prevention, and procedures for problems solving. Finally, each process has to be documented to ensure that everybody associated to it knows its objectives and how to interact with other processes.

Many countries have standards similar to ISO-9000. Those standards pursue basically the same objectives. For example, in the United Kingdom the standard is called BS5750, in Canada CSAZ299, IS10201 in India, etc.

The main body of the ISO9000 standards describes the elements of standard quality system, classifying them in three areas. 1) Requirements of a quality standard, 2) recommendations for the implementation and operation of the quality system, and 3) guidelines to select and use the elements contained in the norms. The standards are complemented with the norm ISO8402 named, "*International Vocabulary of Quality Standards*".

The documents ISO9001, ISO9002 and ISO9003 contain the main body of the norm, and the standard ISO9004, ISO9004-2 and ISO9004-3 present a set of administrative guidelines. However, a certification process is performed using the first three norms. An

important element of the norm is the continuous search for evidence about the performance of the quality system in relation to its requirements. For this purpose, the ISO10011 standard presents the procedure to follow to perform an audit on the quality system.

Finally, although ISO9000 standards do not specify how to monitor the processes' critical characteristics to assure customers' satisfaction, they define some requirements to ensure the effectiveness of the teams and processes created for its measurement. The general requirements of ISO9000 are included in each of the elements presented in Table 4.1 (Johnson 1993).

Table 4.1 General requirements of ISO 9000

| Elements of the norm | Document / Section | | | |
|--|--------------------|---------|---------|---------|
| | ISO9001 | ISO9002 | ISO9003 | ISO9004 |
| 1. Development and management of the quality system | | | | |
| Management's responsibilities | 4.1 | 4.1 | 4.1 | 4 |
| Quality system | 4.2 | 4.2 | 4.2 | 5 |
| Internal quality audits | 4.17 | 4.16 | | |
| Training of employees | 4.18 | 4.17 | 4.11 | 18 |
| Quality costs | | | | 6 |
| 2. Documentation of the quality system | | | | |
| Documentation of the quality system | | | | 17 |
| Documents control | 4.5 | 4.4 | 4.3 | 17 |
| Quality information registration | 4.16 | 4.15 | 4.1 | 17 |
| 3. Suppliers relations | | | | |
| Purchasing procedures | 4.6 | 4.5 | | |
| Quality of inputs | 4.7 | 4.6 | | 9 |
| 4. Customers relations | | | | |
| Contracts revision | 4.3 | 4.3 | | |
| Quality in marketing | | | | 7 |
| Service | 4.19 | | | |
| 5. Design and production | | | | |
| Control of new designs | 4.4 | | | 8 |
| Process control | 4.9 | 4.8 | | |
| Production control | | | | 10, 11 |
| 6. Quality assurance of the finished product | | | | |
| Inspection and tests | 4.10 | 4.9 | 4.5 | 12 |
| Inspection, measurement and test equipment | 4.11 | 4.10 | 4.6 | 13 |
| Inspection and tests' results | 4.12 | 4.11 | 4.8 | |
| Statistical techniques | 4.20 | 4.18 | 4.12 | 20 |
| Safety in the use of the equipment | | | | 19 |
| Product's identification and traceability | 4.8 | 4.7 | 4.4 | |
| Handling, storage, packaging and delivery | 4.15 | 4.14 | 4.9 | 16 |
| 7. Product's control and improvement | | | | |
| Non-conformance product control | 4.13 | 4.12 | 4.8 | 14 |
| Corrective actions | 4.14 | 4.13 | | 15 |

4.5.2 The Deming Prize (Japan)

The Deming Prize was the first of its kind. It was established to recognise the performance of individuals and organisations that have demonstrated a sustained high level in the practice of total quality control. The prize is presented in three categories: to individuals, to any type of organisations, and to manufacturing organisations. The Deming Prize assesses 6 areas, and covers the whole quality system (Imai 1989).

- 1. Company's quality policy.** The congruency between company's policies and the principles of total quality control is analysed. This section focuses on how policies are deployed throughout the organisation, and the goals used to plan, design, manufacture and sell the products.
- 2. Organisational structure and management.** It analyses the organisational structure used to plan and manage the statistical quality control procedures; the forms of responsibilities' delegation; the management of the inter-functional relations between departments; and how teams are managed.
- 3. Education.** It covers the educational programmes offered systematically to employees; analyses their effectiveness, how they are extended to external suppliers, and how they operate the suggestions' systems.
- 4. Implementation of the programme on Total Quality Control.** This section assesses the activities implemented to assure the quality of key processes in relation to research and development, products' design, procurement, manufacturing and marketing. Such procedures should focus to costs control, purchasing, inventory management, production processes, personnel management, training and educational programmes, development of new products, suppliers' relations, systems to attend customers' complaints, use of market information, customer service, etc. Additionally, this area analyses the information systems for the management of quality data, methods used for analysis and solution of critical problems, processes' standardisation, the

establishment of control items, and systems for quality assurance on the finished product.

5. Impact of Total Quality Control. It evaluates the organisational impact had since the implementation of the total quality control programme. This analysis is performed in relation to service to customers, costs and profits, internal and external safety, and some other intangible benefits.

6. Future plans. Its purpose is to determine if the organisation knows its current strengths and weaknesses. On the basis of this knowledge, the company should have developed appropriate plans to continue with the TQC programme.

Because of the success on quality control achieved by Japanese companies, the Deming Prize has been the inspiration for the development of similar awards world-wide. Next, three of these awards are presented in addition to an analysis on their differences and similarities.

4.5.3 The Mexican National Quality Award (MNQA)

The “Mexican National Quality Award” was created by the Federal Government and the private sector. Its objective is to promote a higher level of competitiveness in Mexican organisations, and to recognise their effort for the implementation of total quality systems. It is conferred by the President of the Republic to outstanding organisations.

The most important objectives of this award are:

1) To design, analyse, propose, and stimulate the implementation of continuous improvement programmes in manufacturing and service organisations, according to the “Mexico’s System for Quality Improvement”.

2) To contribute to increase the productivity in Mexico, and to propose appropriate procedures for this purpose.

3) To promote the export of Mexican products through the improvement of the competitiveness and prestige of Mexican organisations in international markets.

The MNQA is structured in 6 categories: industry and commerce or service, all sub-divided in large, medium, and small organisations. A maximum of ten awards are conferred each year, but no more than two in each category.

The elements of the National Quality Award are:

- 1. Quality oriented to transfer a higher value added to customers.** The organisation should have implemented formal procedures to assure the delivery of a product that exceeds, now and in the future, customers' expectations. This element is sub-divided in 3 topics: the total knowledge of customers' needs, systems to improve the quality of service, and systems to estimate future customers' needs.
- 2. Leadership.** It evaluates the role and participation of top managers in the implementation of the TQM system, through their own dedication and commitment to ensure the fulfilment of the organisation's mission and vision. It is sub-divided in two sections: leadership by example and practice, and the congruency between company's mission, vision and values with its quality policy.
- 3. Employees' development under a quality approach.** This element assesses the establishment of procedures for the development, stimulation, and optimisation of employees' intellectual potential. These procedures should motivate people to participate in the total quality programme, through the recognition of their real contributions to process and quality improvement for customers' satisfaction. This section is sub-divided in four areas: employees' formal participation in quality improvement and prevention programmes, educational programmes, measurement of individuals' and teams' performance, and the quality of life in the working area.
- 4. Information and analysis.** This section focuses on the information used to determine company's quality strategies, and the effectiveness of the decision making processes in relation to quality. It is sub-divided in two areas: procedures and technology used to

assure the reliability of the information, and how the information is analysed for decision making.

5. Planning. It assesses how company's mission and vision support the achievement of strategic objectives. It also includes a realistic diagnosis on the factors that favour (or dis-favour) the continuous improvement process, and on the way customers, suppliers and employees are involved in the planning process. This element covers two areas: strategic planning, and operational planning.

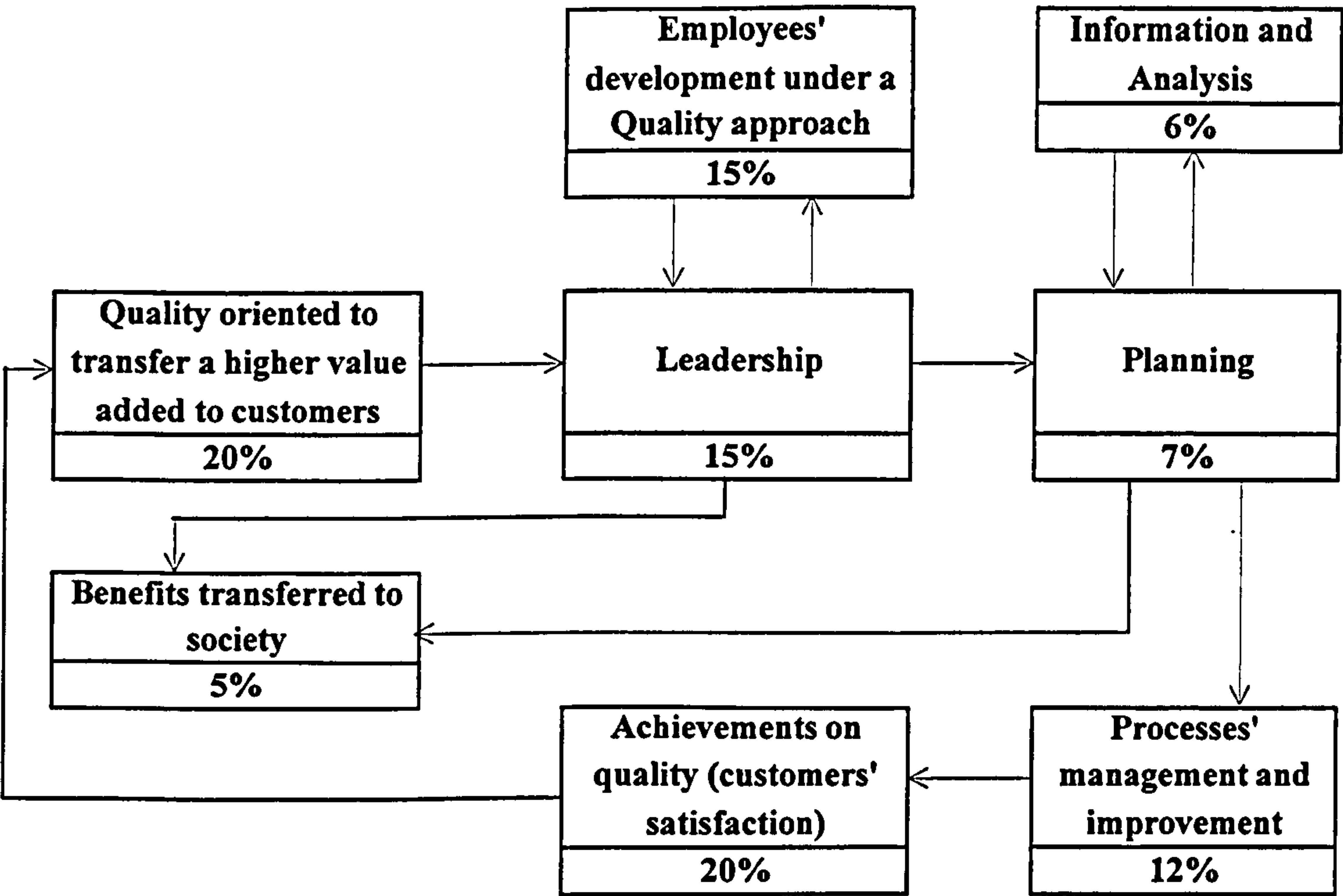
6. Processes' management and improvement. This section examines the most important elements of the administrative process, such as technology development, product's design, quality planning, and quality control and improvement. It is subdivided in 5 areas: procedures used for the design of products and services; management and improvement of key processes; management and improvement of support services; quality assurance of the finished product, services and incoming materials; and procedures to evaluate the capability of the manufacturing processes.

7. Benefits transferred to society. This element focuses on the organisation's efforts to contribute continuously to improve the physical, ecological, social and economical elements of its society. It analyses what the organisation does to spread quality values further than its boundaries, trying to promote them among the community. This section sub-divides in two areas: the preservation of eco-systems, and promotion and diffusion of a culture of quality in the community.

8. Achievements of quality (customers' satisfaction). This category examines numerical indicators and tendencies on quality improvement. It focuses on the improvement achieved on quality and productivity of the key processes for customers' satisfaction. This element sub-divides in 5 areas: products and services; the improvement in quality and productivity of critical processes; the improvement in quality and productivity of support processes; financial indices associated to quality; and customers' satisfaction.

These 8 elements compose the “Mexico’s System for Quality Improvement”, which is shown in Figure 4.13. Each element has a weight in the audit performed on a company interested in getting the award.

Figure 4.13 Elements of Mexico’s Quality Award



On each company under audit, each element is evaluated taking into consideration the following aspects:

- 1) **approach:** evidence of the existence of a continuous improvement system throughout the organisation;
- 2) **implementation:** assesses the extend in which the system is in practice; and
- 3) **results:** goals achieved since the implementation of the system. Every achievement should be measurable, documented, and easy to audit.

The companies that have obtained the MNQA since its creation in 1990 are:

| Year | Organisation | Category |
|-------------|---|--|
| 1990 | American Express Co., SA Hylsa, SA Xerox de Mexico, SA Alambres Profesionales, SA | Services-Large Industrial-Large Industrial-Large Industrial-Small |
| 1991 | General Motors de Mexico, SA (Planta motores y fundicion general) Unidad Crysel (Grupo CYDSA) | Industrial-Large Industrial-Large |
| 1992 | IBM de Mexico, SA (Manufacturing Plant) General Motors de Mexico, SA (Ramos Arizpe Complex) | Industrial-Large Industrial-Large |
| 1993 | Altec Electronica de Chihuahua, SA Surgikos, SA Pinturas OSEL, SA | Industrial-Large Industrial-Large Industrial-Medium |
| 1994 | Engranes Conicos, SA Cementos Yaqui, SA The Ritz-Carlton, Cancun Automovilistica Andrade, SA | Industrial-Large Industrial-Large Services-Large Services-Medium |
| 1995 | Vitro Fibras, SA Velcon, SA Fabricaciones y Representaciones Industriales, SA | Industrial-Large Industrial-Large Industrial-Medium |
| 1996 | Policyd, SA Negromex, SA | Industrial-Large Industrial-Large |
| 1997 | Cementos Tepeyac, SA Nhumo, SA | Industrial-Large Industrial-Large |

4.5.4 The Malcolm Baldrige National Quality Award

This award is the outcome of a consulting process performed during the Administration of Mr. Ronald Reagan in 1982. He requested an analysis of the reduction in productivity observed in the economy of the United States of America. On the basis of this analysis, the committee in charge recommended the implementation of a National Quality Award, similar to Japan's Deming Prize. The award was instituted in 1987, and was named "Malcolm Baldrige National Quality Award" (MBNQA), to honour the former

Secretary of Commerce, who died just before the US Senate approved it. The main objectives of this award are similar to those of the MNQA, and for this reason they will not be discussedp again.

The MBNQA is structured in 3 categories: manufacturing, service and small (no more than 500 employees) organisations.

The MBNQA criteria are sustained in a set of values and concepts in relation to customers' satisfaction and to the operational performance of organisations. Such values and concepts are:

1. The company's administrative system should focus in the total achievement of **customers' satisfaction** by transferring to them a value added through high quality products and services.
2. Top management, through its **leadership**, should create a culture of customers' satisfaction by establishing clear and understandable quality values. They should also participate in developing strategies, systems and methods to achieve excellence.
3. To be a competitive organisation requires a well-defined **continuous improvement** programme. Improvement should be a routine matter in every area of the company, looking for the elimination of root problems, through the search of opportunities for improvement.
4. The success in the improvement of a company's performance depends on the skills and motivation of its employees. Organisations need to put resources and efforts in the **intellectual and human development of their people**, through training and educational programmes and the promotion of their involvement in operational improvement decisions.
5. The **fast and flexible response** to the satisfaction of customers' needs and expectations is nowadays a requirement to be competitive. To get this capability, it is indispensable to have simple and flexible processes (administrative and manufacturing).

The organisation must have an egalitarian consideration for lead time, product's quality and process' productivity; customers' satisfaction requires all of them.

6. The administrative should give a strong emphasis on the **quality of design** for products and services. This is needed to incorporate into them the characteristics expected by consumers. To use procedures, such as concurrent engineering, is desirable to develop the capacity of a prompt response to the every day more changing needs of the market.

7. The achievement of top quality and market's leadership is only possible by looking into the future, establishing a **long-term commitment** of every stakeholder. The company has to create strategies and plans, and to put enough resources for this purpose.

8. Modern organisational systems need to operate within a context of measurement, information and analysis. All administrative and manufacturing processes should be measured, using indicators congruent with company's strategies and plans. This condition will allow to **make administrative decision on the basis of information and facts**, and not only based on the intuition of people.

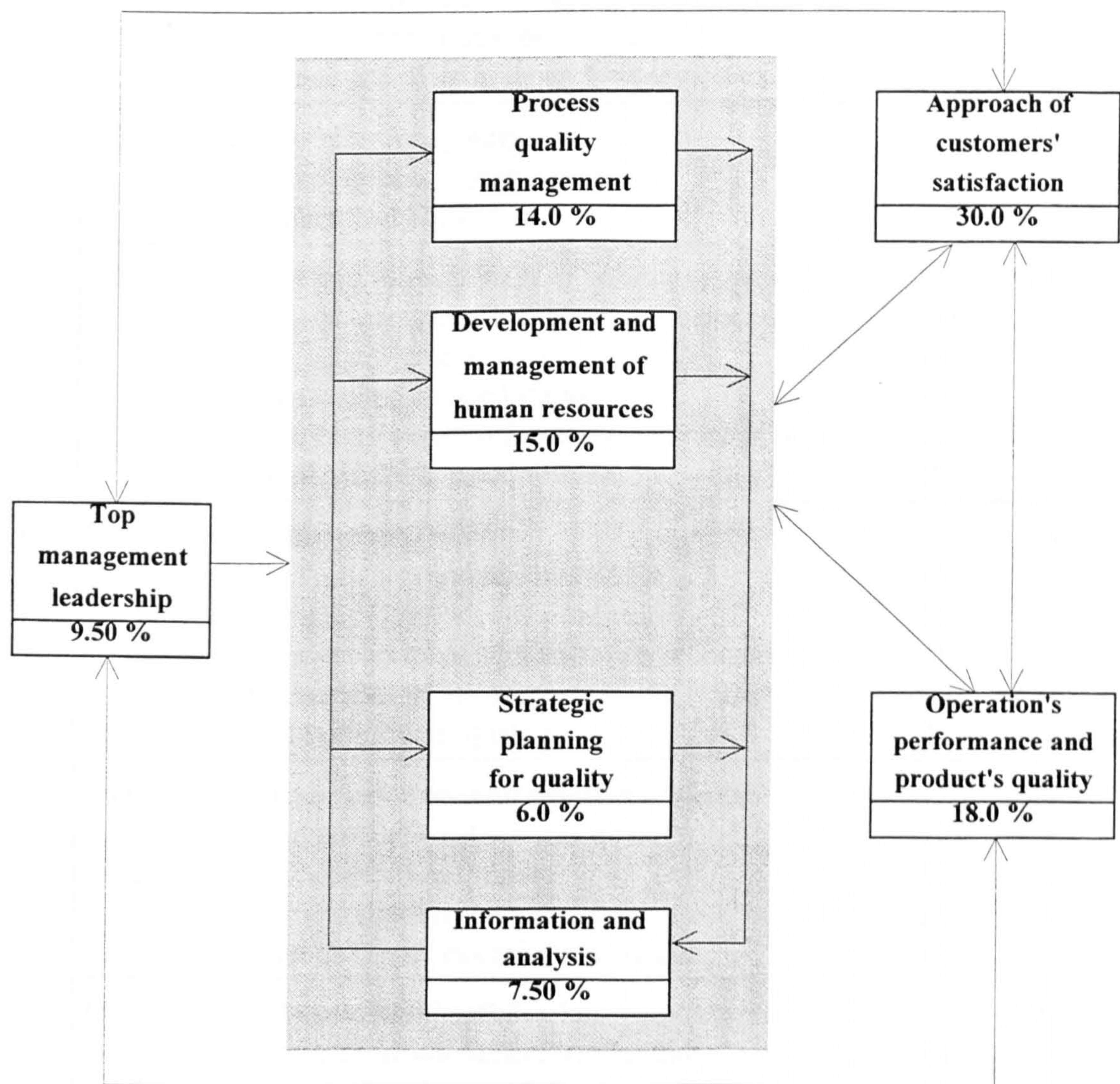
9. Organisations should look for **internal and external "partnerships"** to guarantee the fulfilment of their own goals. Internal "partners" are groups such as employees and the union's workers; from which the company needs a mutual collaboration. External "partners" are the customers, suppliers, educational institutions, technology suppliers, etc.

10. As part of their corporate values, organisations should have a consciousness to **contribute to improve society's welfare**. Corporate value should include ethical aspects, health, safety, ecology, etc. These values support the design of company's operational systems, and the life cycle of their products.

All these ten concepts are evaluated during the audit performed in organisations that requested to participate in the MBNQA. The audit covers the following elements: leadership, information and analysis, strategic planning of quality, development and

management of human resources, quality management of organisational and manufacturing processes, operation's performance and product's quality, and the approach used for the continuous improvement of customers' satisfaction. The MBNQA model is shown in Figure 4.14

Figure 4.14 The model of the MBNQA



Each element sub-divides in several areas. Every area is assessed, receiving certain amount of points by the auditors. The maximum total points that a company can receive are 1000 points. Table 4.2 shows the relative importance of the different areas within each category, expressed in the maximum amount of points assigned to each one.

Table 4.2 Relative importance of the different areas of the MBNQA

| Category | Value (points) |
|--|----------------|
| 1.0 Leadership | 95 |
| 1.1 Top management leadership | 45 |
| 1.2 Quality management | 25 |
| 1.3 Corporate values and social responsibility | 25 |
| 2.0 Information and analysis | 75 |
| 2.1 Management of performance and quality information | 15 |
| 2.2 Competitive comparisons (benchmarking) | 20 |
| 2.3 Analysis and use of information for decision making | 40 |
| 3.0 Strategic planning for quality | 60 |
| 3.1 Quality and process strategic planning | 35 |
| 3.2 Quality plans and objectives | 25 |
| 4.0 Development and management of human resources | 150 |
| 4.1 Planning and management of human resources | 20 |
| 4.2 Employees involvement | 40 |
| 4.3 Employees training and education | 40 |
| 4.4 Analysis of employees performance and recognition | 25 |
| 4.5 Employees satisfaction and welfare | 25 |
| 5.0 Process quality management | 140 |
| 5.1 Quality of products and services design | 40 |
| 5.2 Management of logistics and production | 35 |
| 5.3 Planning and control of administrative processes | 30 |
| 5.4 Quality assurance of incoming materials | 20 |
| 5.5 Evaluation of process' quality | 15 |
| 6.0 Operation's performance and product's quality | 180 |
| 6.1 Results on products and services quality | 70 |
| 6.2 Company's operational results | 50 |
| 6.3 Business' and support services results | 25 |
| 6.4 Results on quality of incoming materials | 35 |
| 7.0 Approach of customers' satisfaction | 300 |
| 7.1 Current and future consumers' expectations | 35 |
| 7.2 Management of customer relations | 65 |
| 7.3 Commitment with customers | 15 |
| 7.4 Estimate of customers' satisfaction | 30 |
| 7.5 Achievements on customers' satisfaction | 85 |
| 7.6 Comparisons of customers' satisfaction | 70 |
| Total points | 1000 |

The companies that received the MBNQA since the beginning are:

| Year | Organisations | Category |
|-------------|---|---|
| 1988 | Motorola, Inc. Westinghouse Commercial (Nuclear Fuel Division) | Manufacturing Manufacturing |
| 1989 | Milliken & Co. Xerox Business Products & Systems Globe Metallurgical, Inc. | Manufacturing Manufacturing Small company |
| 1990 | Cadillac Motor Car Co. IBM Rochester Wallace Co., Inc. Federal Express | Manufacturing Manufacturing Small company Services |
| 1991 | Solelectron Corp. Zytec Corp. Marlow Industries | Manufacturing Manufacturing Small company |
| 1992 | AT&T Network Systems Group (Transmission System Business Unit) AT&T Universal Card Services The Ritz-Carlton Hotel Co. Granite Rock Co. | Manufacturing Small company Small company Services |
| 1993 | Eastman Chemical Co. Ames Rubber Co. | Manufacturing Small company |
| 1994 | Wainwright Industries AT&T Communications Services GTE Directories | Small company Small company Services |
| 1995 | Armstrong World Industries Building Products Operations Corning Telecommunications | Manufacturing Small Company Services |
| 1996 | Danna Commercial Credit Corp. ADAC Laboratories Custom Research Trident Precision Manufacturing | Services Services Services Manufacturing |
| 1997 | 3M Dental Products Division Solelectron Corp. Merrill Lynch Credit Corp. XEROX Business Services | Manufacturing Manufacturing Services Services |

4.5.5 The European Quality Award

The European Quality Award (EQA), introduced in 1991, is based on the Total Quality Model of the European Foundation for Quality Management (EFQM). Its conception is supported in Japan's Deming Prize and in the MBNQA of USA. EFQM's model is structured in 9 criteria, described as follows.

The following statement describes in general the EFQM's quality management model: positioning a company towards the achievement of excellence in performance requires the assurance of the satisfaction of customers, employees and society; this satisfaction is obtained through the establishment of a quality policy and strategic guidelines for leadership, and an effective management of employees, resources and processes (Heller 1993).

1.- Leadership. Every manager's decision in the organisation should focus on total quality principles. This element asks for evidence in six areas: a clear involvement of top management in directing the total quality programme, the existence of a consistent culture of quality, individuals' and teams' recognition for their achievements in total quality, the support to the total quality programme by assigning enough financial resources into it, the involvement of executives with customers and suppliers, and the active promotion of quality concepts outside the company.

2.- Policies and strategies. This section evaluates the way in which the mission, vision, values and strategies of the company are put in practice. It requires evidence that quality policies and strategies are based on total quality concepts, support the business plan, are appropriately communicated, and constantly reviewed and monitored.

3.- Employees' management. How the company promotes the use people's potential for continuous improvement. This element requests the implementation of a plan for the continuous improvement of personnel's skills. People have to determine individual and team goals. It is needed as well, to empower employees, to have open communication and involve them in decision making.

4.- Resources. This section evaluates the effectiveness in the use of company's resources to support the quality policies and strategies. It asks for evidence on the

improvement achieved in the management of financial resources, information, infrastructure and technology.

5.- Processes. How processes are identified and reviewed to support company's continuous improvement. It covers all the activities representing a value added for the company. This element judges the identification and management of critical processes; the measurement of their performance and the feedback needed for control and improvement. It also assesses how the organisation stimulates innovation and creativity for process improvement, and the way in which change is managed.

6.- Customers' satisfaction. This section focuses on the perception that external customers have about company's products and services. It searches for evidence on the critical parameters used by the organisation to measure its overall performance in customers' satisfaction. This performance should pursue excellence in the fulfilment of quality standards and goals, in comparison with the competitors' achievements in the same aspects.

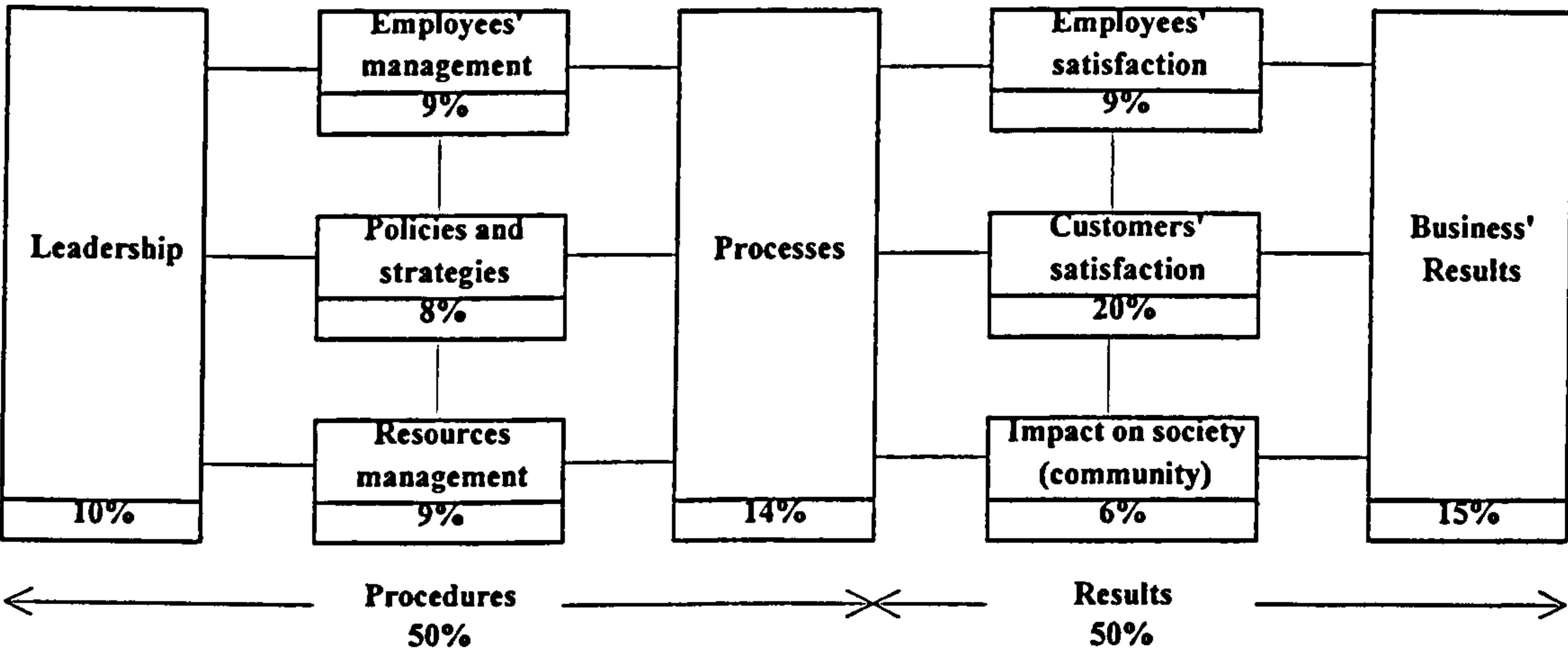
7.- Employees' satisfaction. The procedures used to ensure the satisfaction of employees' needs and expectations from the company.

8.- Impact on society. This element searches for evidence on community's opinion about the company and its performance. It covers the approach used by the company for the preservation and improvement of the society's quality of life, the environment and natural resources.

9.- Business' results. This section concentrates on the analysis of the current versus the planned company's performance. It assesses the continuous success in the achievement of goals and objectives (financial and others), and in the improvement of stakeholders' satisfaction.

The Total Quality Model of the EFQM is presented graphically in Figure 4.15

Figure 4.15 The total quality model of the EFQM Award



Some of the organisations that have received the EQA are: Alenia, British Airways, Royal Mail, American Express (Netherlands), British Telecom, Groupe Bull, ING Bank, Honeywell (UK), and some more.

4.5.6 Analysis of the differences between the MNQA, MBNQA and the EQA

The 3 quality awards previously discussed are, in essence, very similar. This similarity is not surprising since all of them were created at the same time and are based on Japan's Deming Prize. However, there are some differences because of specific needs of the region where they apply. Table 4.3 presents the differences in weight given to each element in the 3 awards analysed.

Table 4.3 Differences on the weight given to each element of the MNQA, MBNQA and EQA

| Element | MNQA | MBNQA | EQA |
|---|------|-------|-----|
| Top management leadership | 15% | 9.5% | 10% |
| Customers' satisfaction | 20% | 30.0% | 20% |
| Employees' development and satisfaction | 15% | 15.0% | 18% |
| Strategic planning of quality | 7% | 6.0% | 8% |
| Impact on society (community) | 5% | - | 6% |
| Processes' management and improvement | 12% | 14.0% | 14% |
| Information and analysis | 6% | 7.5% | - |
| Business' quality and financial results | 20% | 18.0% | 15% |
| Resources management | - | - | 9% |

The Total Quality models introduced in the three quality awards analysed are an excellent guide if an organisation wants to implement a quality system. However, each company has to understand its own circumstances to adjust the model as required to be really useful for competitiveness improvement.

4.6 Conclusions on the literature review

Despite the profound Japanese influence on TQM, many of its roots are in Western management theory and practice (Schmidt & Finnigan, 1992), such as scientific management, group dynamics, training and development, motivation, employee involvement, social-technical systems, organisational development, corporate culture, leadership theory, cross-functional teams, strategic planning, etc. On the other hand, quality management alone does not provide answers to all questions that emerge during the process of incorporating it into the whole management system. Many issues concerns and questions in relation to the interaction between quality management and classical management have yet to be studied to succeed with the incorporation of TQM into the management system. Some of these questions are presented now before defining the approach to use on the field research, because it is intended to search for an acceptable answer during this investigation. These are the most important issues emerging from the interaction of TQM theory and classical management theory:

- 1) Cultural aspects: what are the relevant factors of corporate culture to consider for TQM implementation? Does it require a change in culture or its adaptation to prevailing culture? How does an individual's culture interact with corporate culture? In what situations, do individuals' culture prevail over corporate culture? When does the opposite occur? What are the symptoms that indicate when the organisational culture is congruent with the individuals' culture and has become a sound culture, even if new individuals arrive?
- 2) Change management: are available models for change management appropriate for TQM implementation? How should the change management process be done to implement TQM? How dramatic the change should be? Is it better to have a slow adaptation? Are only situations of crisis "fertile soil" to incorporate total quality concepts into a management system? If so, would it be advantageous to create a crisis intentionally?
- 3) Systems science: is the lack of understanding and consideration of the systems approach one of the main reasons of TQM failure? How to include in TQM theory, the 5th. discipline concepts and ideas of Peter Senge? Is it possible to use Ackoff's ideas on the systems approach to answer some questions on how to change management during TQM implementation? How is the quality mentality of an individual affected by the system in which he or she works and lives?
- 4) Leadership: which leadership styles are more appropriate for TQM? What is the role of the leader in a TQM programme? What are the most adequate leadership styles in middle and lower levels? What do people expect from their formal and informal leaders in a quality management system? How do leaders become committed to lead a TQM programme?
- 5) Strategic planning: how important is strategic planning for TQM implementation? How to define strategies congruent with the quality approach of the organisation? How strategic guidelines should be deployed down to the organisation? In what type of organisation is strategic planning a common practice? What is the relation between TQM and strategic planning?

6) Information systems: what are the characteristics of the information systems required to support a TQM process? How does the information system support the internal supplier-customer chain? Are accounting and the financial approach of classical management a barrier for TQM implementation? Is it required to develop information systems more appropriate for quality management? Or is it necessary to reorient the existing ones to be congruent with total quality principles?

7) Human resources management: what is more significant from TQM: the employees' motivation to work, or the pride developed by doing the work that copes better with his/her needs, capacities, expectations, etc.? What are the design characteristics of a job in an organisation that operates under TQM principles? Are lower level employees prepared to participate as is required in TQM? How do middle and lower level employees learn and develop a commitment to quality improvement? How can an employee's ownership attitude to work be developed? Are stock option plans or net revenues sharing two suitable methods to do it? Is the large difference in salary levels between top executives and lower level employees one of the main reasons for dissatisfaction and lack of commitment to the company's goals on the previous questions? What procedures for reward and recognition should be utilised by companies in their TQM programmes? Is empowerment possible under any leadership style? If not, which should prevail, the leadership style or the empowerment idea? Is empowerment an idea that will make a worker more motivated and proud of his/her work? Or it is some kind of demagoguery? Which type of training is required for TQM implementation and practice? What is the most appropriate timing for training in TQM? Is training the best way to develop the skill and learning required for TQM operation? Why do most companies start TQM implementation with a strong training programme, spending much money on this activity? Which is the best way to develop the communication skills, trust and confidence required to motivate every employee to participate more actively in operational and strategic decisions? Is teamwork (self managed teams, quality circles, etc.) an idea that copes with individuals' culture in Mexico? Is teamwork the best way to empower lower level employees? Is teamwork an indispensable procedure to improve competitiveness and quality? Are traditional performance assessment procedures congruent with total quality ideas? Are they a strong influencing factor on people's performance? What are the methods to assure that individuals' goals match completely with company's goals? What are the main fears suffered by

employees in Mexican organisations, and how do they influence a company's success? what are the human values that Mexicans consider sacred, in such a way that they must be considered for TQM implementation?

8) Marketing: is it necessary to develop awareness on the importance of adequate marketing strategies congruent with total quality postulates? Are quality service ideas equally important for any type of organisation? Does customer power obligate an organisation to implement TQM?

9) Business Ethics: is quality a money related matter only, or are there non-monetary ethics involve on it? Which of the following factors is the strongest in the decision making process, the ethics code that the person has internalised in his/her mind, the pressure exerted by the most powerful stakeholder, a law or rule that regulates the decision, or what? Is the ethics code of an individual something that TQM can change? Are honesty and respect for others' rights cultural values required to implement a TQM program?

The theory presented in this Chapter provides a partial answer to these questions. However, the generation of knowledge on how to incorporate quality management concepts into the management system of an industrial organisation in Mexico, requires more profound answers. These issues will be discussed later in Chapters 6 and 7 when the results of the field investigation are used to make conclusions and recommendations.

CHAPTER 5

THE CONCEPTUAL FRAMEWORK: A BUSINESS MANAGEMENT SYSTEM SUPPORTED ON TQM THEORY

5.1 Introduction

Among the most important business management concepts appearing during recent years are strategic planning, competitor and market analysis, organisational behaviour, total quality management, and operations management. All these are useful, valid and widely accepted by managers everywhere. Research papers and books report success stories from all over the world by their use. Unsuccessful cases, usually not reported, are frequently excused with “cultural barriers”. It is necessary to consider the cultural environment in which any company operates, but it is also important to define the role of each managerial concept in the overall management system.

During the last 15 years or so, total quality management has emerged as a major concept in management. However, the more total quality (TQ) theory is developed, the more confused managers are; for example, consider all the debate created around the idea of using business process re-engineering as an improvement tool instead of TQM (Gadd and Oakland 1996). There is a necessity to put together TQ theory and other managerial concepts in a conceptual business model to guide managers on how to implement the procedures and techniques proposed by a wide diversity of authors (for an even wider variety of organisational environments). It is also important for managers to know how they can change their management system (Burnes 1991), and create the cultural environment in which their organisations will get competitive position. Managers who consider TQ as a set of isolated procedures and techniques will certainly fail in the attempt at improving their companies’ competitiveness. Obviously they will criticise Total Quality, without knowing that the problem is in their misconception of this idea.

The set of total quality management postulates, derived in Chapter 3, provide the basis for the development of the conceptual model to be used as a reference throughout the rest of the research. However, total quality has its roots in many diverse areas of management like organisational development (OD), motivation theories, leadership, scientific management, human performance, corporate culture, employee involvement, teamwork, cross-functional management and many more.

5.2 Systemic analysis of quality management theory

The 26 quality management postulates will be listed again to facilitate the development of the conceptual model.

1. Ensure leadership and commitment of top management
2. Establish teamwork for quality improvement
3. Measurement of actual and potential quality problems
4. Correct quality problems as soon as they appear
5. Form and operate a quality steering committee
6. Provide training and education permanently
7. Define improvement goals and perform periodical reviews on them
8. Prevent the occurrence of defects
9. Give recognition for quality improvement
10. Establish appropriate procedures for the implementation of TQ
11. Total quality supports a profitable growth in the long-term
12. Always satisfy customer needs and expectations
13. Incorporate total quality in the strategic plan
14. Develop and maintain a quality culture throughout the organisation
15. Drive the quality fundamentals on a systemic approach
16. Establish an information system to identify quality problems
17. Define and deploy quality policies
18. Constantly plan for competitiveness
19. Establish management methods for the collaborative focus of TQ
20. Change from functional to process management

21. Plan the production process with capacity to meet specifications
22. Define procedures to assure the quality of inputs
23. Conduct audits to the quality system
24. Design the product or service in accordance with customers needs
25. Develop mission and vision statements
26. Implement techniques for process control

These 26 quality management postulates can be grouped into 7 areas of business management: leadership, strategic planning, marketing, management of human behaviour, management of operations and process control, management of suppliers and quality improvement.

- **Leadership**

- = Constantly plan for competitiveness
- = Develop mission and vision statements
- = Ensure leadership and commitment of top management
- = Establish appropriate procedures for the implementation of TQ
- = Total quality supports a profitable growth in the long-term

- **Strategic planning**

- = Define and deploy quality policies
- = Drive the quality fundamentals on a systemic approach
- = Incorporate total quality in the strategic plan

- **Marketing**

- = Always satisfy customer needs and expectations

- **Management of human behaviour**

- = Develop and maintain a quality culture throughout the organisation
- = Give recognition for quality improvement
- = Provide training and education permanently

- **Management of operations and process control**

- = Change from functional to process management
- = Define improvement goals and perform periodical reviews on them
- = Design the product or service in accordance with customers needs
- = Establish an information system to identify quality problems
- = Establish management methods for the collaborative focus of TQ
- = Implement techniques for process control
- = Plan the production process with capacity to meet specifications
- = Prevent the occurrence of defects

- **Management of Suppliers**

- = Define procedures for assurance of the quality of inputs

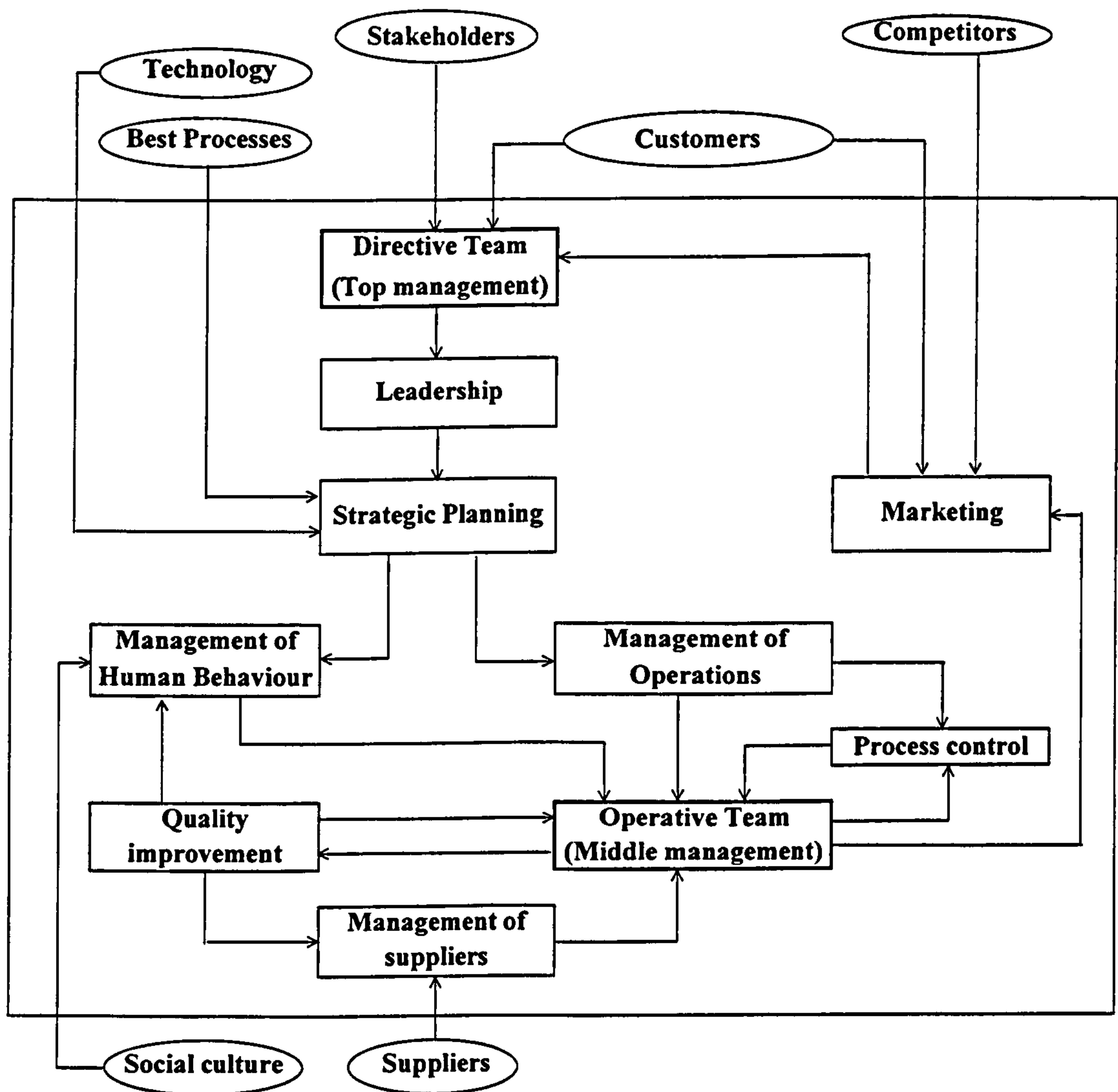
- **Quality Improvement**

- = Conduct audits to the quality system
- = Correct quality problems as soon as they appear
- = Establish teamwork for quality improvement
- = Form and operate a quality steering committee
- = Measurement of actual and potential quality problems

5.3 Development of the management system

The integration of these 7 management areas as a business management model under a systemic approach (Flood & Carson 1988) should help to elevate the productivity and quality of the company to a world-wide competitive level. Overtaking this level will allow the organisation to satisfy customers' needs, desires and expectations, fulfilling its mission and meeting the expectations of its stakeholders. Figure 5.1 shows how the 7 management areas (or sub-systems) can be integrated to form a system of higher-order, which at the same time should interact with other external systems such as stakeholders, technology, competitors, customers, best processes from other industries, suppliers and the social culture.

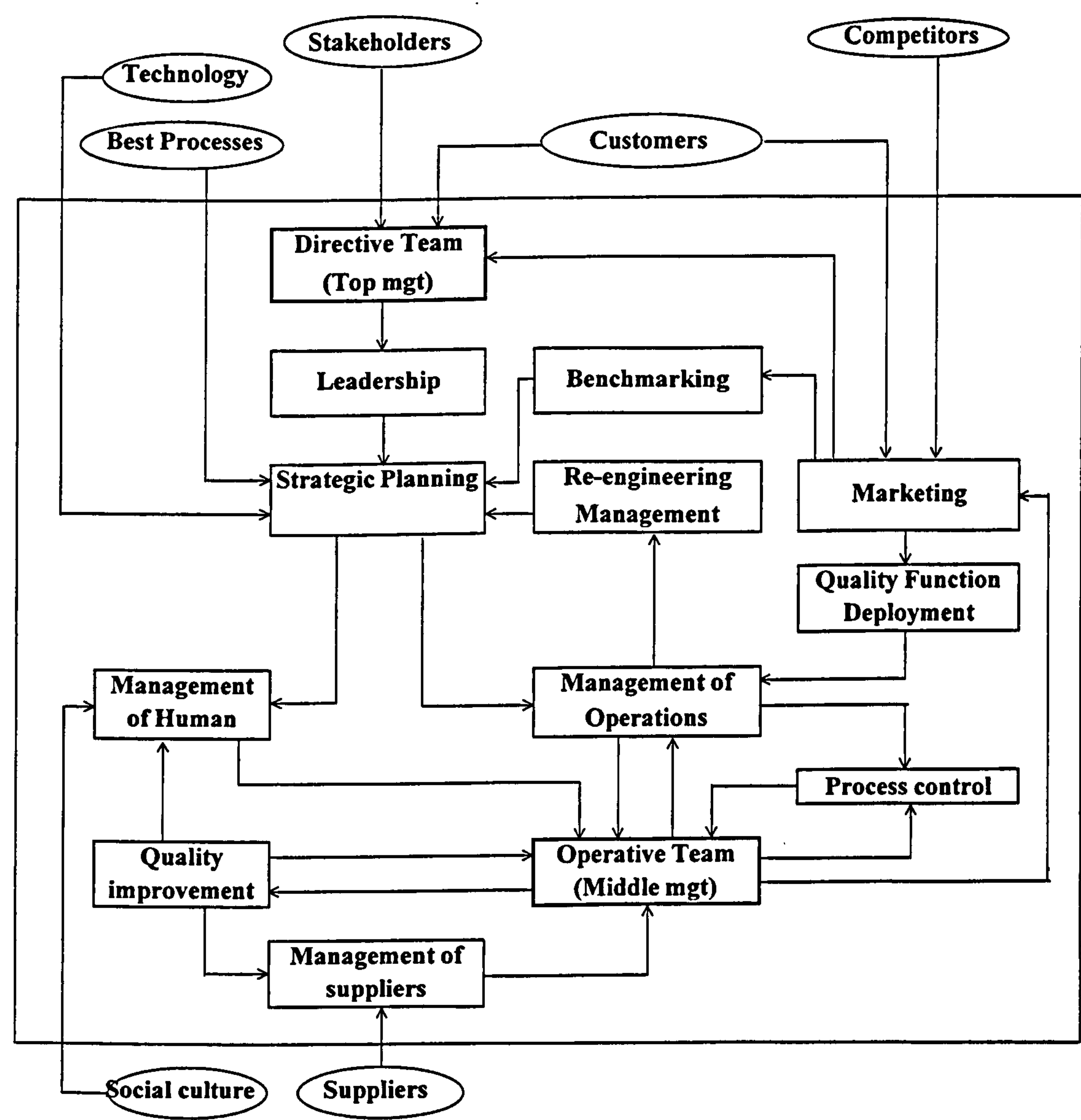
Figure 5.1 The conceptual TQM system



Any management system must improve the competitiveness of the company, turning its operation into a more productive and quality oriented one. Top management should lead this transformation through the deployment of the quality policies that evolve from the strategic planning process. In the system shown in Figure 5.1, the strategic planning process operates as a control device. As any control system, it requires feedback from the operation and from factors external to the business. Due to this reason, external elements such as stakeholders, technology (technical, social and managerial), customers, competitors, and information on the best process used elsewhere were considered in the system. The information provided by the operation and the external elements can be processed by using the following techniques: re-engineering management, benchmarking, the quality function deployment and total quality management.

Additionally, the organisation operates within a social-cultural framework. Figure 5.2 shows the system again but after the introduction of these techniques.

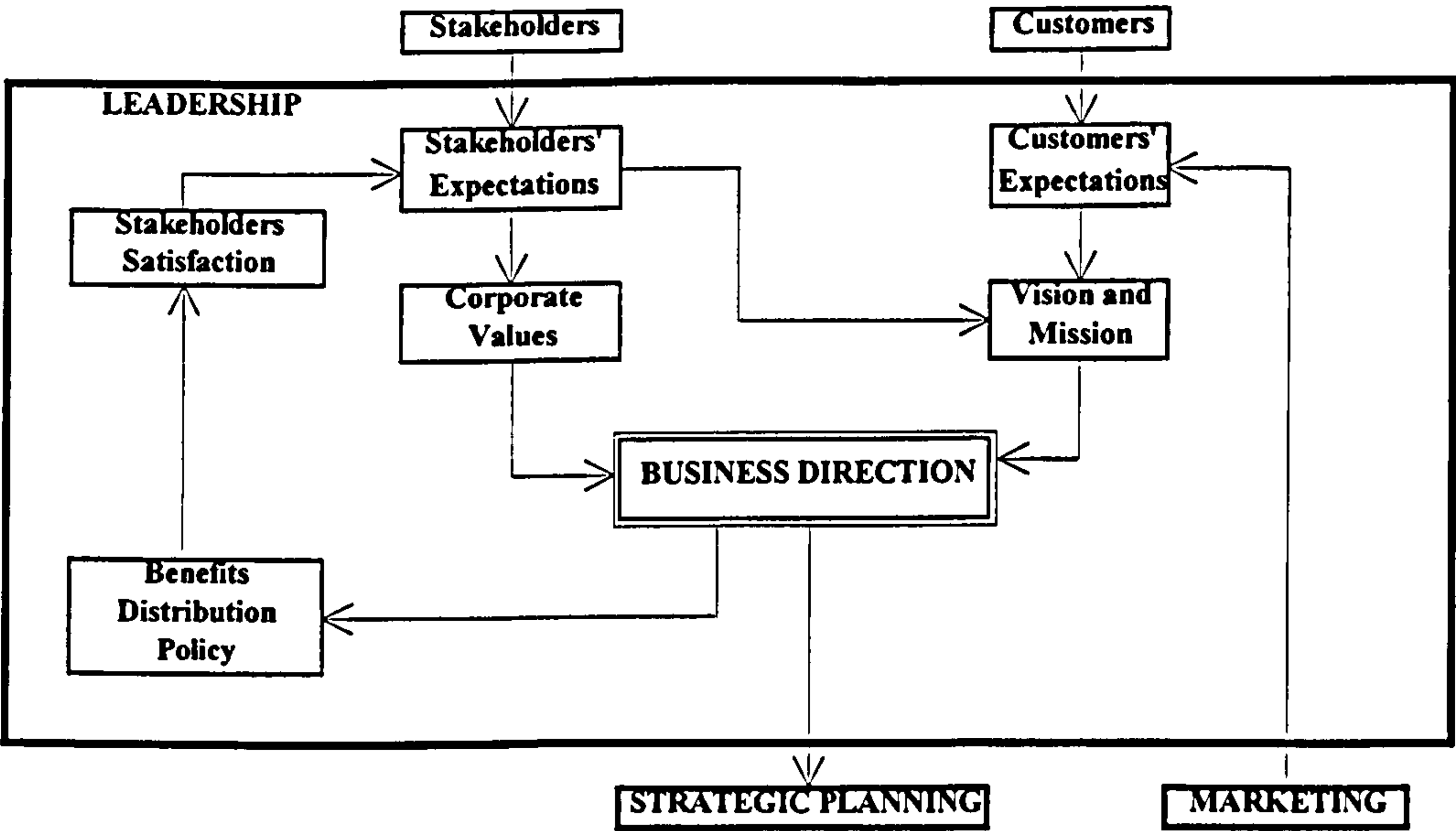
Figure 5.2 The conceptual system after introducing some techniques and external elements



Using the ideas associated with each sub-system, and management techniques introduced into the system, the following definitions were developed for each sub-system. The figure after each definition is a graphical representation to help in the visualisation of each area as a management system interacting with the other areas and with external systems.

Leadership.- Top management must be committed to exercise an effective leadership for the fulfilment of company's mission and vision through the incorporation of the quality postulates and the corporate values (Husted 1993) into the management system, on the basis of a constant plan for competitiveness creating the profitable economic growth required to accomplish stakeholders expectations. For the development of mission and vision statements, it is important that the company select in advance its generic strategy. According to Porter's theory, there are only two possible generic strategies: differentiation or cost (Porter 1980); each organisation should select one of them before it define its own mission and strategies to be competitive. Figure 5.3 shows the sub-system for leadership and how it is interrelated to other sub-systems.

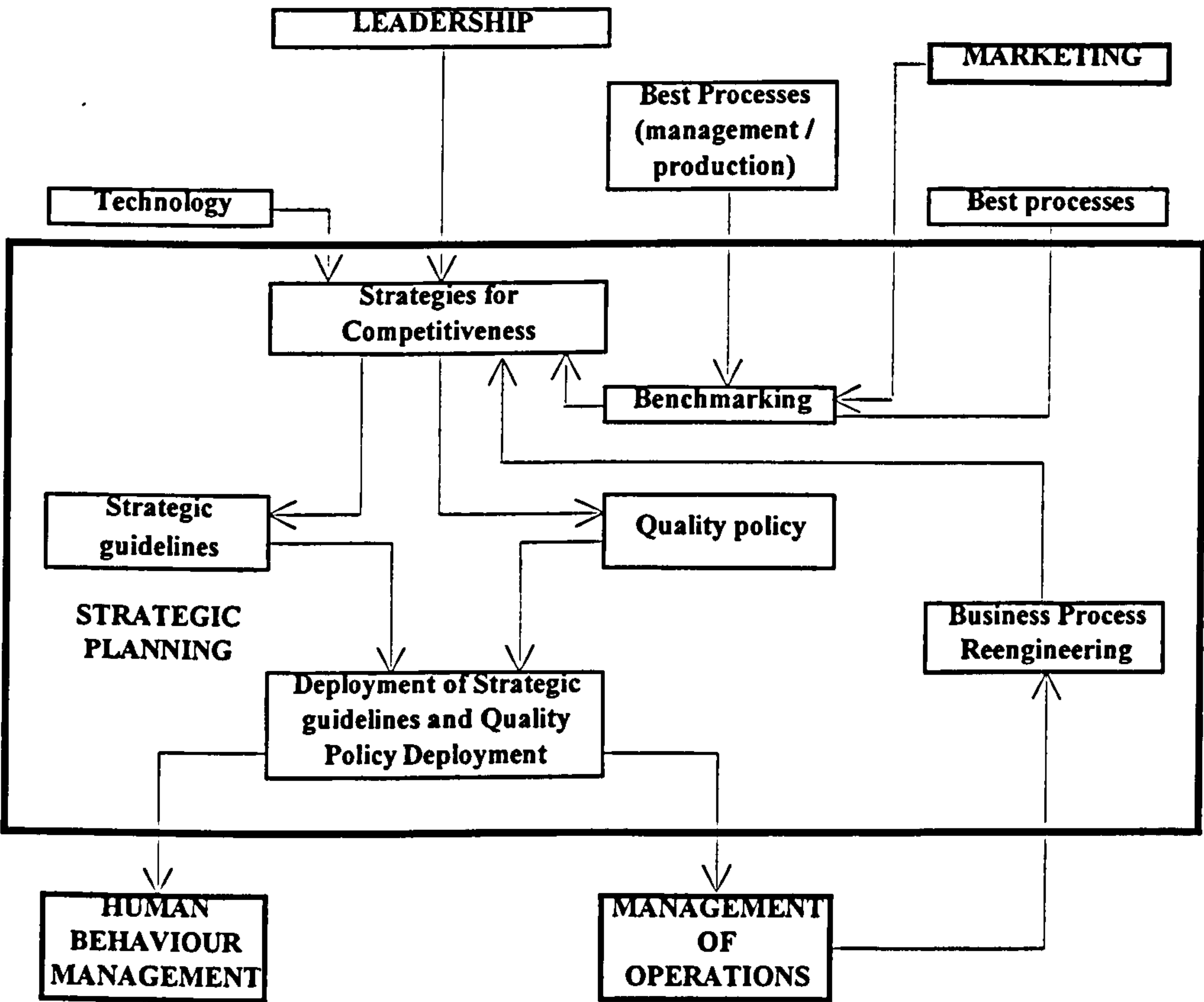
Figure 5.3 Leadership sub-system on the conceptual system



Strategic Planning.- Plan the actions required to preserve a strategic position. These actions must be directed toward the satisfaction of customers' needs and expectations through products and services designed for this purpose (Porter 1996). A systemic approach and the use of techniques such as re-engineering management (Champy 1995) and benchmarking (Camp 1989), should support this process in the definition of adequate quality policies and the way in which they should be deployed throughout the

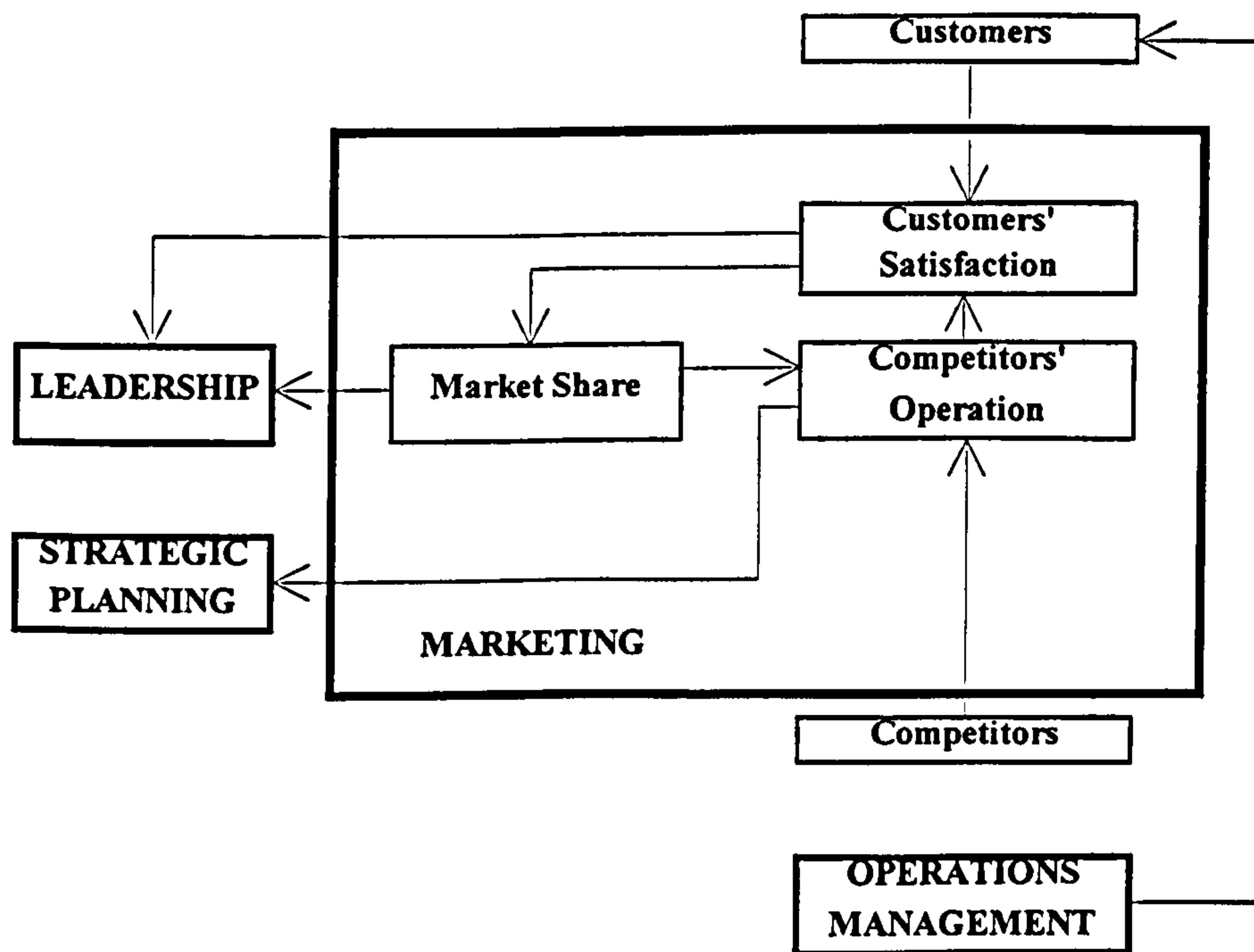
organisation. Figure 5.4 shows the sub-system for strategic planning and how it is interrelated to other sub-systems.

Figure 5.4 Strategic planning sub-system on the conceptual system



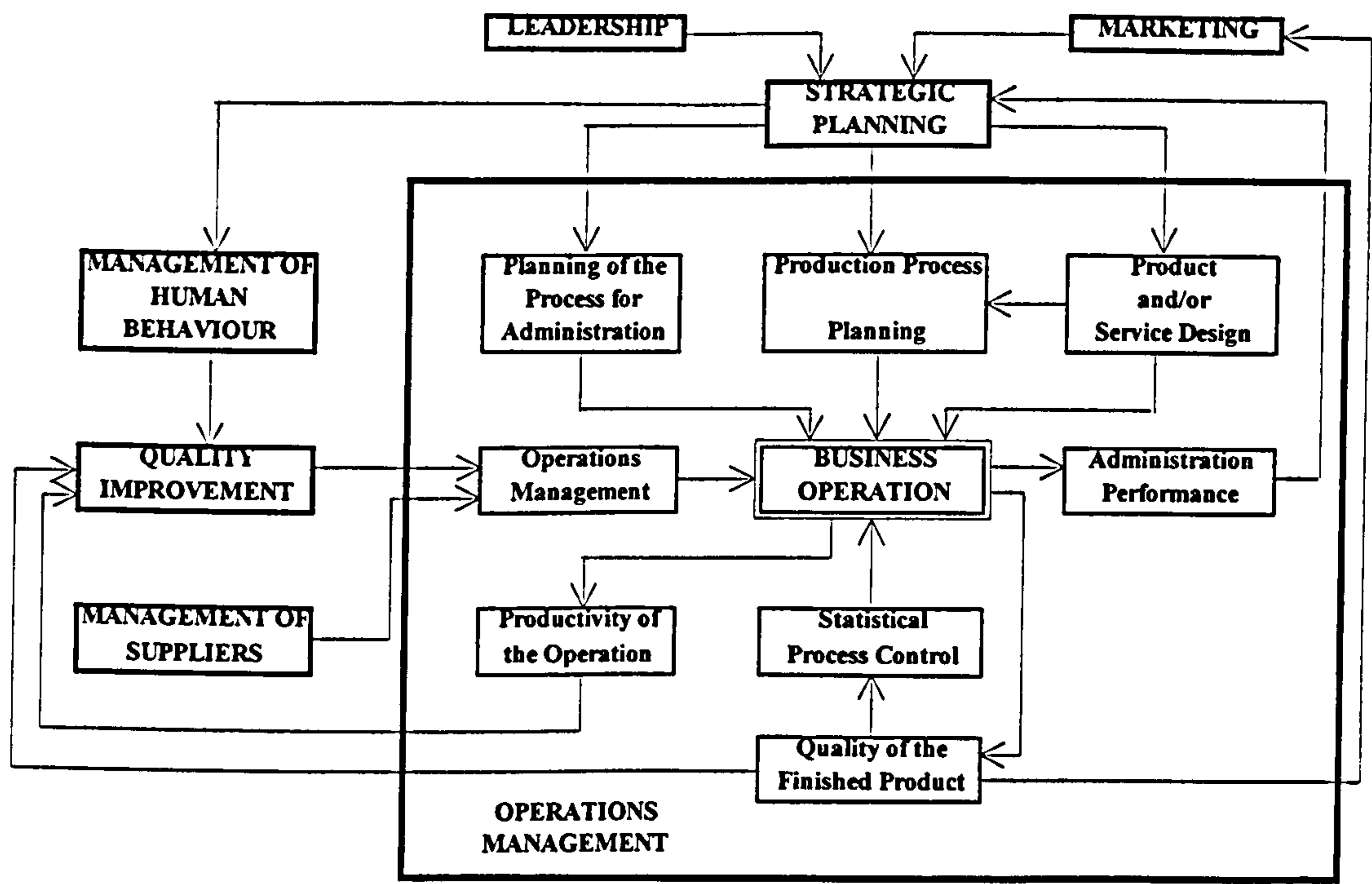
Marketing.- Focus the business operation towards the satisfaction of customers’ needs, taking into consideration the way in which they decide how and what to buy, and the strategies and actions used by competitors to capture market share. This is the best way to strengthen the market position. Figure 5.5 shows the sub-system for marketing and how it is interrelated to other sub-systems.

Figure 5.5 Marketing sub-system on the conceptual system



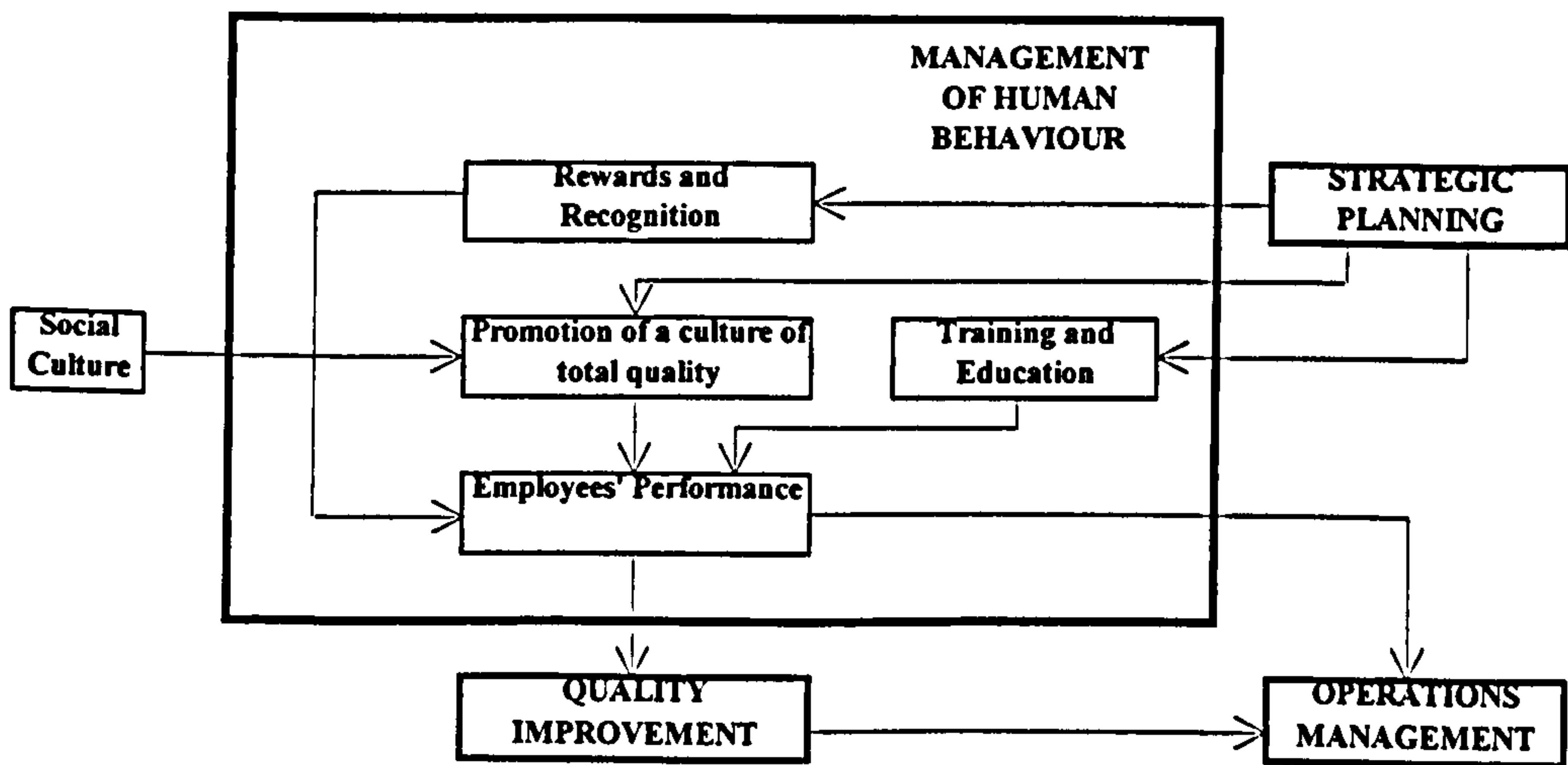
Management of operations and process control.- Change the organisational structure from a functional to a process management, defining improvement goals and performing periodical reviews on them, planning the product or service in accordance with customers needs and the production process with capacity to meet its specifications, establishing an information system to identify quality problems and management methods for the collaborative focus of TQ, and implementing techniques for process control and defects prevention. Figure 5.6 shows the sub-system for the management of operations and process control and how they are interrelated to other sub-systems.

Figure 5.6 Management of operations and process control sub-systems on the conceptual system



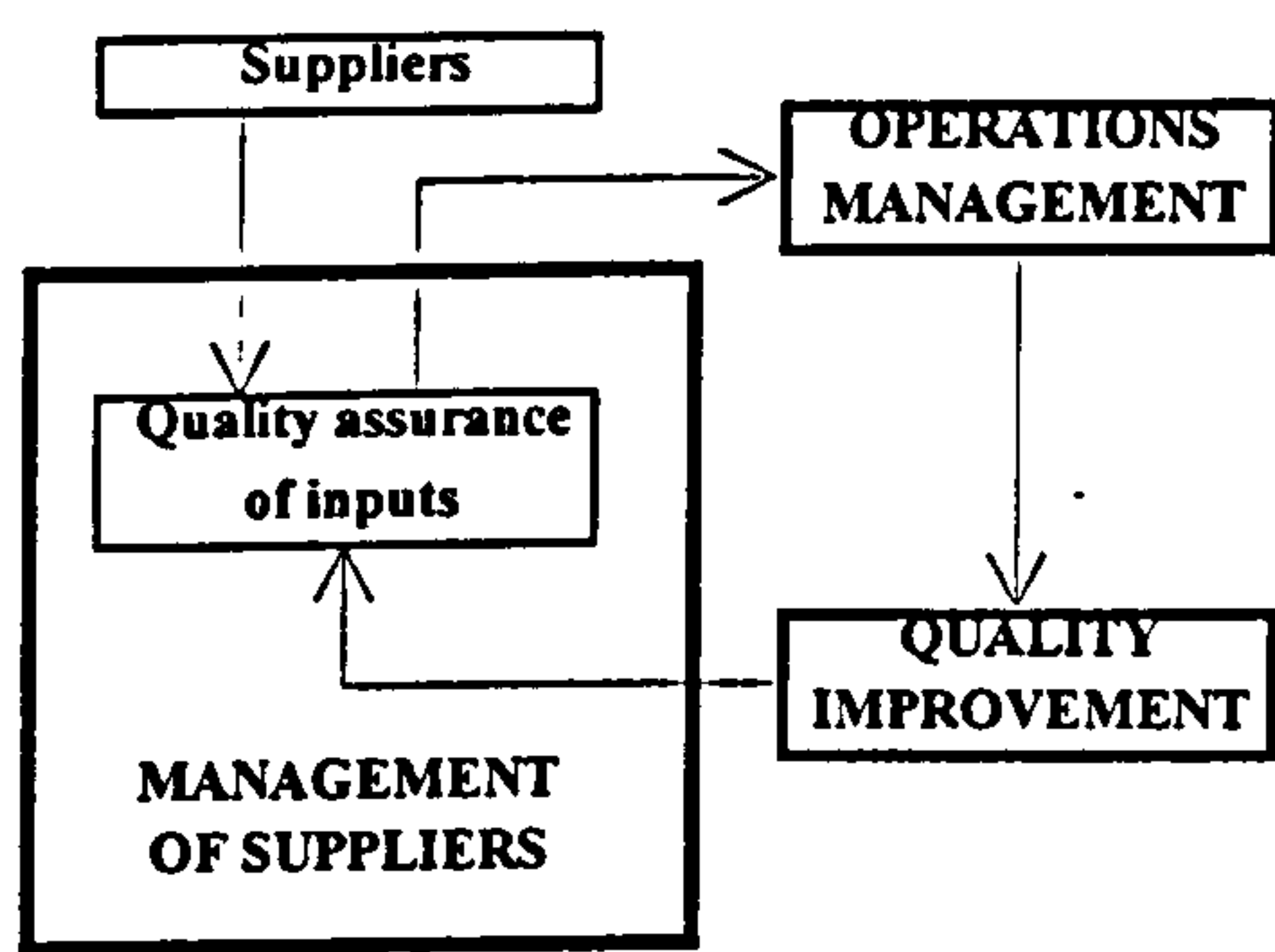
Management human behaviour.- Business competitiveness requires an environment of quality culture reinforced with training, education and appropriate rewards and recognition. Figure 5.7 shows the sub-system for the management of human behaviour and how it is interrelated to other sub-systems.

Figure 5.7 Management of human behaviour sub-system on the conceptual system



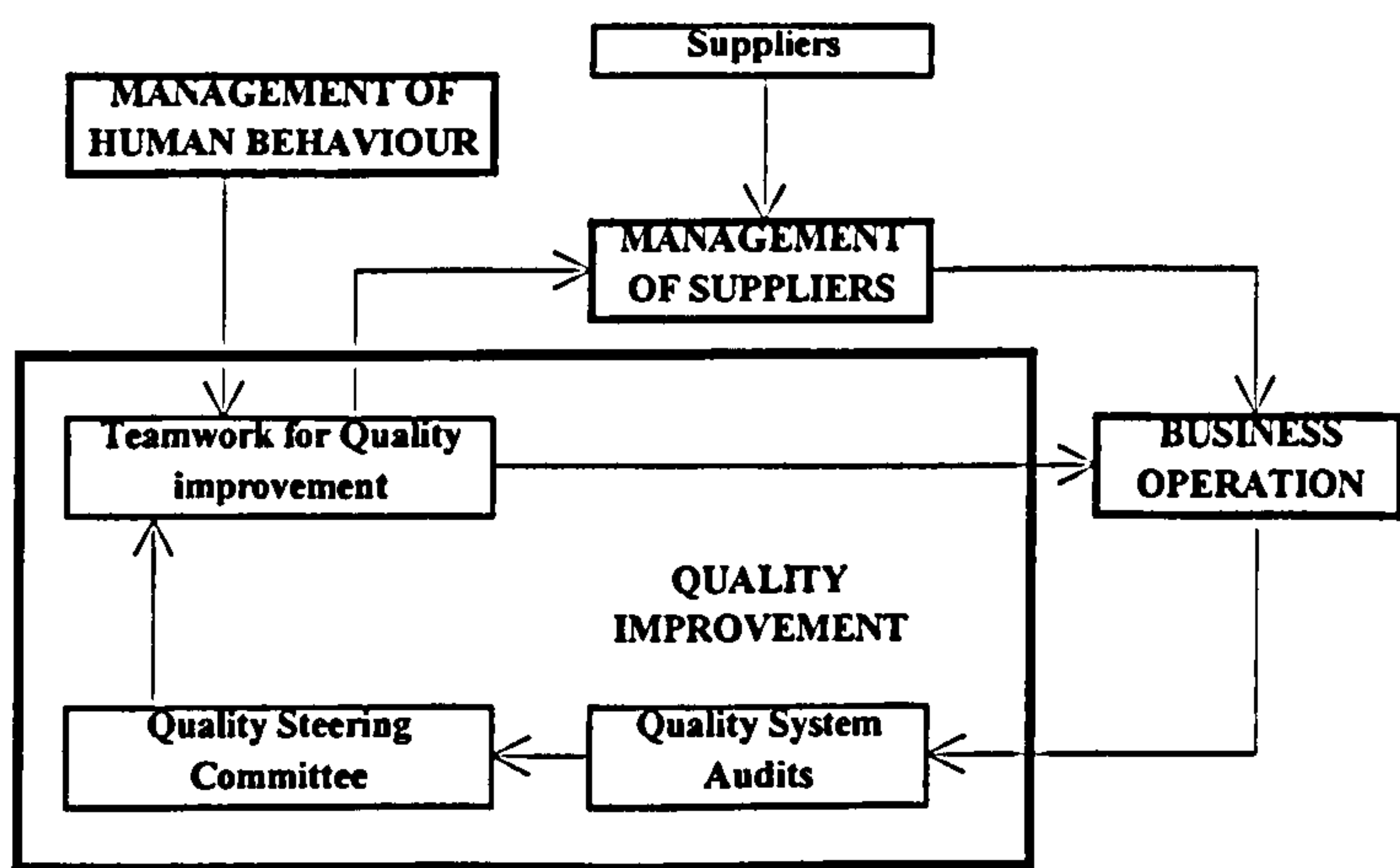
Management of suppliers.- Include in the management system methods to manage the relation with suppliers, assuring the quality of every input entering into the business operation. Figure 5.8 shows the sub-system for the management of suppliers and how it is interrelated to other sub-systems.

Figure 5.8 Management of suppliers sub-system on the conceptual system



Quality Improvement.- Set up a quality steering committee, informed with measurements on the performance of quality matters and with the responsibility of managing the quality improvement effort and performing periodically audits to the quality system. Figure 5.9 shows the sub-system for quality improvement and how it is interrelated to other sub-systems.

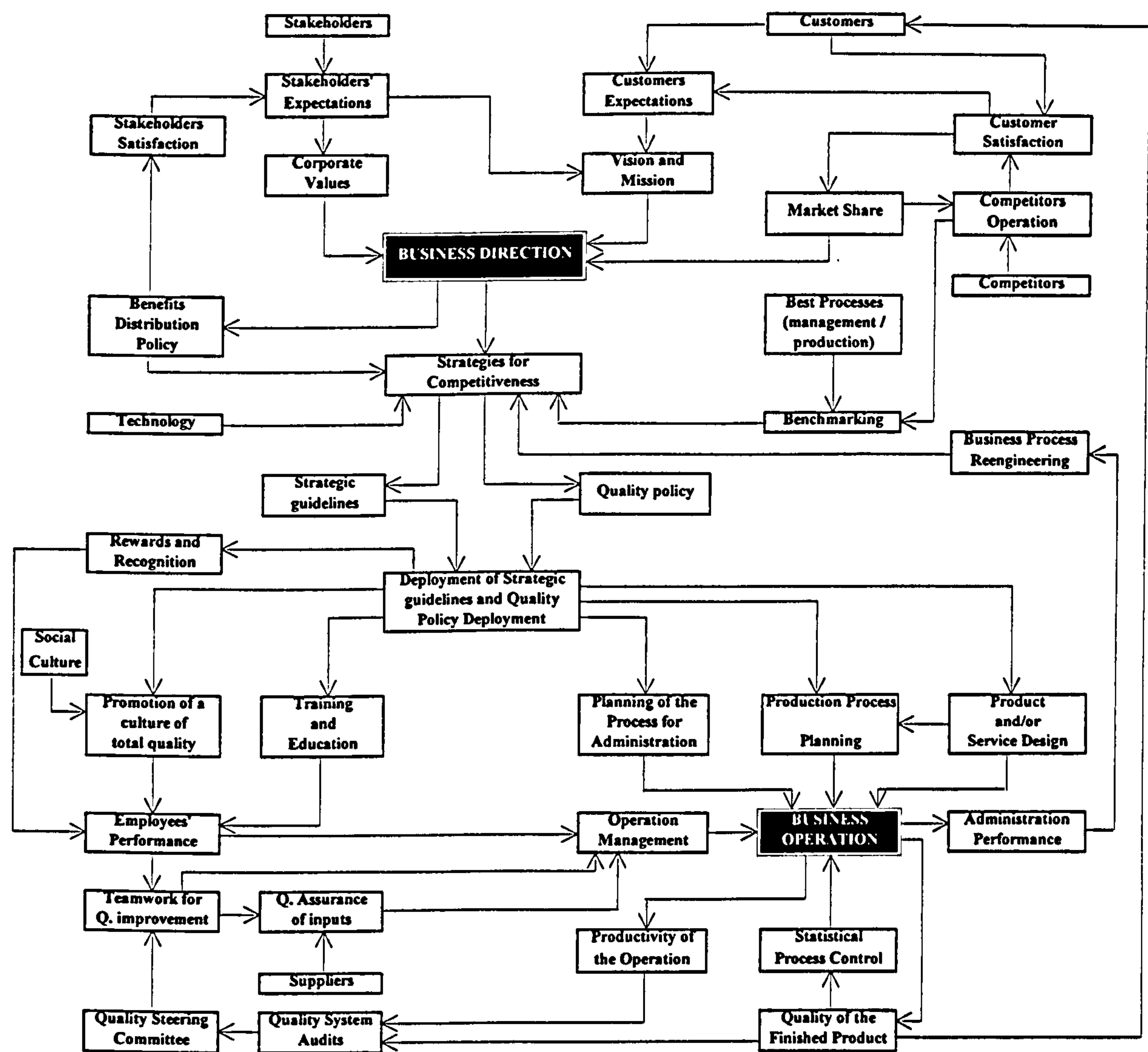
Figure 5.9 Quality improvement sub-system on the conceptual system



5.4 A process management approach for the system

Introducing the information presented in the diagrams shown from Figures 5.3 and 5.9 as in Figure 5.2, and considering the definitions given in the previous section for each sub-system, they can be defined in terms of a series of business processes. The model shown in Figure 5.10 is a graphical representation of the processes derived from this analysis and how are they interrelated. In this diagram, the numbers indicate the starting priority recommended for each process, which follows a logical sequence established by the model's deployment from stakeholders' expectations.

Figure 5.10 The conceptual TQM system in terms of its processes

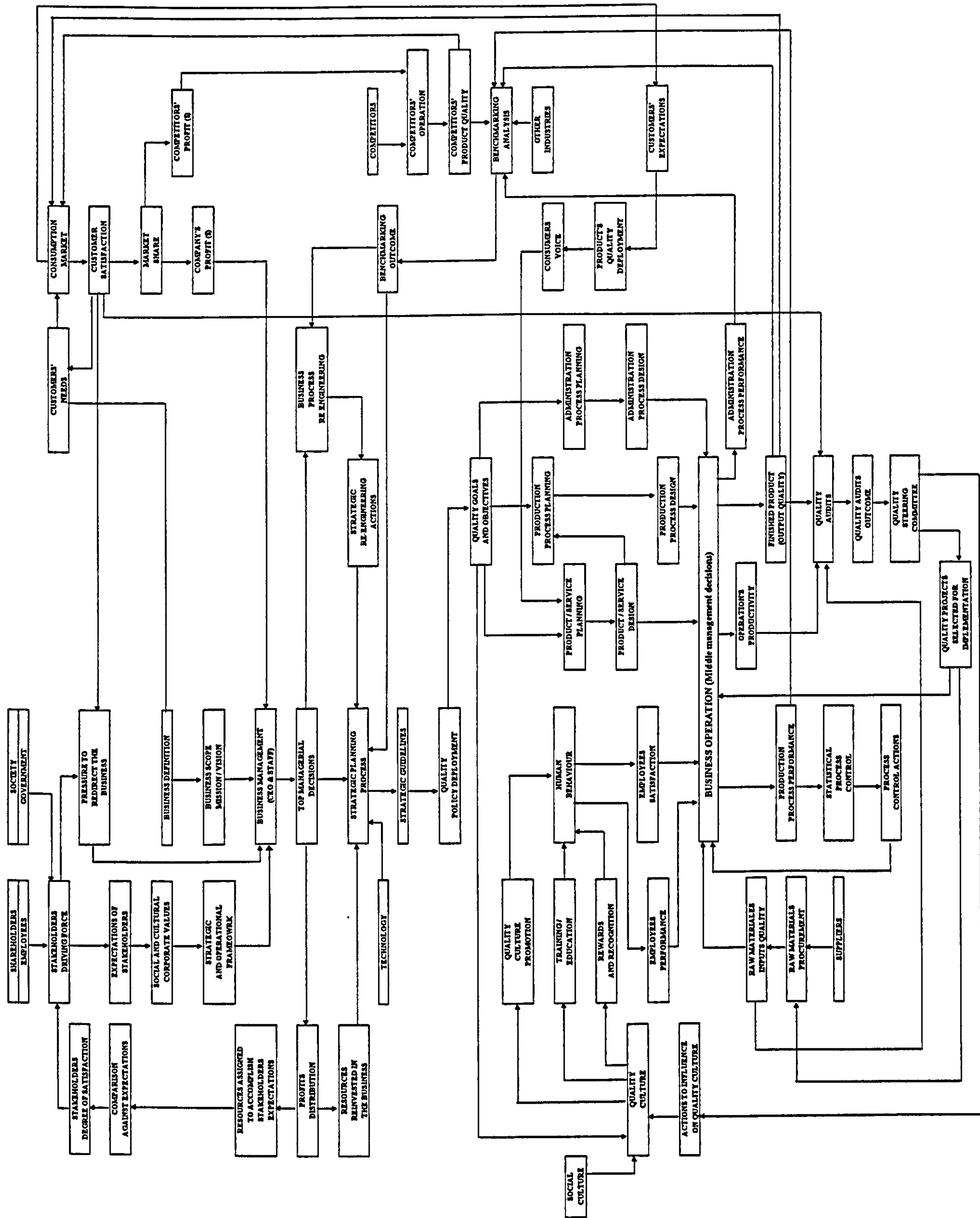


Additionally, each process can be extended in terms of its inputs (internal and external) and outputs to have a better understanding on how we propose the model should operate in practice. This is shown in Table 5.1 and Figure 5.11

Table 5.1 Processes linkage through inputs/outputs in the conceptual system

| Sub-systems | External Inputs | Processes | Internal Inputs | Outputs |
|-------------------------|--------------------|-----------------------------------|---|--|
| Leadership | Stakeholders | Stakeholders Driving Force | Stakeholders' degree of satisfaction | Stakeholders' expectations |
| | | Corporate Values | Stakeholders' expectations | Pressure to redirect the business |
| | | Business Definition | Stakeholders' expectations | Strategic and Operational framework |
| | | Business Management (CEO & Staff) | Pressure to redirect the business | Business scope: vision and mission |
| | | | Strategic and Operational framework | Top Managerial Decisions |
| Strategic Planning | Technology | Profits Distribution | Company's Profit (\$) | Resources assigned to accomplish the expectations of |
| | | | Top Managerial Decisions | Resource reinvested in the business |
| | | Comparison against expectations | Resources assigned to accomplish the expectations of stakeholders | Stakeholders' degree of satisfaction |
| | | Strategic Planning Process | Top Managerial Decisions | Strategic Guidelines |
| | | | Resource reinvested in the business | |
| Market Positioning | Other industries | Re-engineering Management | Benchmarking outcome | Strategic Re-engineering actions |
| | | Benchmarking Analysis | Top Managerial Decisions | Benchmarking outcome |
| | | | Competitors' product quality | |
| | | | Production Process Performance | |
| | | | Administration Process Performance | |
| Operational System | Consumers' Needs | Quality Policy Deployment | Strategic Guidelines | Goals and objectives |
| | | Product Quality Deployment | Production Process Design | Consumers' Voice |
| | | | Customers' expectations | |
| | | Consumption Market | Competitors' product quality | Customers' expectations |
| | | Market Share | Finished product quality | Customer satisfaction |
| Human System | Social Culture | Competitors' Operation | Customer satisfaction | Company's Profit (\$) |
| | | Product Planning | Competitors' Profit (\$) | Competitors' Profit (\$) |
| | | Process Planning | Goals and objectives | Competitors' Product Quality |
| | | Administration Process Planning | Goals and objectives | Product / Service Design |
| | | Quality Culture | Goals and objectives | Production Process Design |
| Management of Suppliers | Suppliers | Human Behaviour | Quality Culture Promotion | Administration Process Design |
| | | | Training / Education | Quality Culture Promotion |
| | | | Rewards and Recognition | Training / Education |
| | | | Quality projects selected | Rewards and Recognition |
| | | | Quality Audits Outcome | Employees' Performance |
| Process Control | Business Operation | Raw Materials Procurement | Operation's Productivity | Employees' Satisfaction |
| | | Quality Steering Committee | Finished product quality | Raw Materials -Inputs Quality |
| | | Quality Audits | Raw Materials -Inputs Quality | Quality projects selected |
| | | | Customer Satisfaction | Actions to influence on Quality Culture |
| | | | Production Process Performance | Quality Audits Outcome |
| Business Operation | | Statistical Process Control | Operation's Productivity | Process Control Actions |
| | | Operational >>> Methods<<< Human | Finished product quality | Operation's Productivity |
| | | | Product / Service Design | Finished product quality |
| | | | Production Process Design | Production Process Performance |
| | | | Administration Process Design | Administration Process Performance |

Figure 5.11 Processes linkage through inputs/outputs in the conceptual system



5.5 Implementation and operation of the model

Processes shown in the model diagram (see Figure 5.11) can be put in operation by 39 activities (procedures and/or techniques), that must be fully documented and implemented in order to be successful in the management of the model, in terms of profitability and customer and stakeholders' satisfaction. Some processes are associated with only one activity, but some others require more than one activity to operate them. The activities were also grouped according to the management function to which they contribute: **Leadership, Strategy, Management of human behaviour, Marketing, Operation's management, Process control, Management of suppliers, and Quality improvement.** The list of these activities, and a brief explanation of each one, is presented next.

- **Leadership**

L1) Stakeholders and customer expectations.- Top management should know and understand what each major stakeholder, as well as customers in every market segment, expects from the company.

L2) Stakeholders' satisfaction.- Top management should measure, at least once a year, the degree of stakeholders' satisfaction, of the fulfilment of their expectations from the company's operation.

L3) Mission and vision.- Mission and Vision statements should be developed on the basis of stakeholders' expectations to set-up the company's strategic and operational framework.

L4) Social and cultural values.- Define the social and corporate values of the organisation as a foundation for the company's strategic and operational framework on the basis of stakeholders expectations.

- **Strategic Planning**

S1) Technology availability.- Define the business' strategic guidelines considering availability of technology (soft and hard) as an input variable.

S2) Capital available for re-investment.- Define the business' strategic guidelines in terms of capital available for re-investment, according to the policy for the distribution of benefits.

S3) Strategic planning.- Determine the business' strategic planning process within the framework set by the company's vision and mission and the corporate social and cultural values.

S4) Strategic guidelines.- Define strategic guidelines by using the outcome of the benchmarking analysis to feedback and adjust the strategic planning process.

S5) Re-engineering strategic actions.- Use re-engineering strategic actions to feedback and adjust the strategic planning process.

S6) Quality policies.- Develop and deploy quality policies throughout the organisation to enable each department to define periodically congruent goals and objectives.

S7) Benchmarking analysis.- Use benchmarking analysis or some other similar technique as a supplier of information to strategy creation, to assess standards and procedures against those used by competitors or similar industries.

S8) Business process reengineering.- Top managers must use BPR or some other similar technique when they realise that the lack of fulfilment of goals and objectives is so strong that a major change is required in business strategy or administration.

- **Management of human behaviour**

H1) Promotion of a quality culture.- Top management, through the quality policy deployment process, should monitor employees' satisfaction and performance to define or modify the way in which quality concepts are promoted among them.

H2) Training and educational programs.- Top management, through the quality policy deployment process, should monitor the effect of employees' satisfaction and performance on the operation's outcome, to define or modify quality training and educational programs.

H3) Rewards and recognition.- Top management, through the quality policy deployment process, should give rewards and recognition to employees with high achievements in quality, to reinforce their satisfaction and performance.

H4) Employees' satisfaction.- Design appropriate methods to measure employees job satisfaction.

H5) Employees' performance.- Design appropriate methods to measure employees performance.

H6) Influence on the quality culture.- Top management, through the quality policy deployment process, should take actions to influence on quality culture among all employees.

- **Marketing**

M1) Customer satisfaction.- Develop a system to measure the degree of customer satisfaction, based on the comparison of the company's product and/or service against competitors', in relation to fulfilment of customers' expectations.

M2) Profits distribution policy.- Design and implement a policy to enable the distribution of the financial resources generated from the operation to accomplish the expectations of each stakeholder.

M3) Competitors' Operation.- Conduct studies to know competitors' product or service strengths and weaknesses, as well as their process competitiveness.

M4) Market share.- Periodically measure the market share of each market segment in which the company participates.

- **Operations Management**

O1) Product and/or service design.- Design products and services in congruency with goals and objectives derived from the deployment of quality policies.

O2) Production process planning.- Plan the production process in congruency with the goals and objectives derived from the deployment of quality policies, assuring its capability to meet product or service specifications.

O3) Administration process planning.- On the basis of the internal supplier-customer chain, plan the administration process in congruency with goals and objectives derived from the quality policies, and review it if BPR indicates so.

O4) Review of products design.- Constantly incorporate, through the use of Quality Function Deployment, the consumers' voice in products design and revision.

O5) Information systems.- Determine the most appropriate information systems to link the production operation to the administration process.

O6) Administration process performance.- Develop, document and implement formal procedures to measure the performance of the production process.

O7) Productivity.- Periodically measure by formal procedures the productivity of the operation.

O8) Quality Control of finished product.- Design and put in operation a system to measure and control the quality of finished products.

- **Process control**

C1) Production control.- Define methods and work standards, material handling procedures, layout, and production control devices to optimise the production process.

C2) Process control actions.- Define procedures and techniques to determine and exercise process control actions.

C3) Statistical Process Control.- Implement Statistical Process Control as a tool to control the manufacturing operation.

- **Management of suppliers**

P1) Quality assurance of inputs.- Establish procedures to assure the quality of inputs from suppliers.

P2) Management of suppliers.- Design and implement a program to select and manage relations with suppliers, and to improve the quality of inputs.

- **Quality improvement**

Q1) Quality improvement projects.- Create a structure to support the analysis and implementation of quality improvement projects.

Q2) Audits to the quality system.- Implement an auditing process for the quality system, based on the comparison of the company's operation outcome versus planned goals and objectives.

Q3) Quality steering committee.- Install a quality steering committee with the responsibility of managing quality improvement projects for the product and the production process through teamwork, and to promote individuals' innovation and creativity.

Q4) Teamwork.- Constantly improve the manufacturing operation and all processes used to manage operation support services, as well as the quality of inputs, through teamwork and by influencing the quality culture.

These activities should be implemented according to a schedule based on a logical sequencing that starts with the understanding of stakeholders' expectations, ends with the measurement of their fulfilment, and follows the path shown in Figure 5.10.

Each activity should be assigned to a specific functional team that will be the "owner" of the activity for implementation and operation purposes. Teams will act as processors, suppliers or customers, depending upon their role for each activity in the process in which they are involved. It is important to notice that team members could be from different functional areas; for example, the team for the activity "management of suppliers" can be integrated by UM and MM from purchasing, manufacturing, engineering and the finance departments. However, it is not intended to supply a complete list of the functional areas recommended to involve on each team because of the variety on organisational structures among large industrial organisations. A tentative implementation sequence and the organisational level of the teams recommended to manage each process are presented in Table 5.2.

Additionally, each activity must have an indicator to measure its effectiveness and contribution to the expected company performance. These measures should be a quantitative index for process output, and can be used to assess the team's performance. Each organisation as a whole should define its measures in terms on the expectations of its stakeholders expresses on company's mission and vision. Some ideas for the measurement of company's performance are:

- The cost of poor quality, as recommended by Juran & Gryna (1993).
- A financial profitability index, such as those analysed later in Chapter 6.
- The share on the most important market segments.
- The degree of employees' satisfaction
- Quality awards recently achieved.
- Quality and productivity indices related to the operation's performance.

Table 5.2 Tentative implementation sequence for the conceptual TQM system

| | Sequential order of incorporation (1) | Yearly Frequency (2) | Mgt teams involved (3) |
|---|---|----------------------------|------------------------------|
| a. Administration process planning | 6 | D | MM-UM |
| b. Audits for the Quality System | 17 | 1 | QSC |
| c. Benchmarking | 24 | 1 | UM |
| d. Competitors' Quality | 22 | 12 | UM-MM |
| e. Customer satisfaction | 19 | 12 | UM-MM |
| f. Fulfilment Stakeholders Expectations | 25 | 1 | UM |
| g. Management of suppliers | 11 | P | UM-MM |
| h. Market share | 20 | 4 | MM-UM |
| i. Measurement of Operational Results | 18 | 12 | UM-QSC |
| j. Mission and Vision | 2 | S-P | UM |
| k. Operation Control | 10 | P | All |
| l. Product/Service design | 7 | D | MM-UM |
| m. Production planning | 8 | D | MM-UM |
| n. Profits/Benefits distribution policy | 21 | 1 | UM |
| o. Promotion of a quality culture | 15 | 2 | UM-MM-Su |
| p. Quality policies | 5 | S-P | UM |
| q. Quality Steering Committee | 9 | S-P | UM-QSC |
| r. Re-engineering Management | 23 | 1 | UM-MM |
| s. Rewards and Recognition | 16 | 2 | UM-MM |
| t. Social and cultural values | 3 | S-P | UM |
| u. Stakeholders expectations | 1 | S-P | UM |
| v. Statistical Process Control | 12 | P | MM-Su-SE |
| w. Strategic planning process | 4 | 1 | UM |
| x. Teamwork | 13 | 4 | MM-S-SE-W |
| y. Training and educational programs | 14 | P | UM-MM-Su |

- (1) In terms of starting priority
(2) Times per year, P if the procedure is permanently in operation,
D if the procedure is done when demanded, or S if done when the
TQM program started or redefined.
(3) UP = upper managers, MM = Middle Managers, Su = Supervisors
SE = staff employees, W = workers, QSC = Quality Steering Committee

These indicators will be reviewed by the Quality Steering Committee as frequent as needed to re-direct the implementation process. Since it is not possible to provide universal recommendations on most of the implementation aspects of the system, mainly because each should create its own implementation strategy during this process, on the basis of results achieved on the indices just mentioned.

Because of this situation, it is impossible to have an idea on how long would it take to implement each activity and the complete system. In the same way, it is not feasible to

comment on the difficulties that the implementation process can face, and which stakeholder will perceive more rapidly the benefits of TQM. Upper managers and the members of the Quality Steering Committee should have in mind that they will “invent” the best system and the most appropriate implementation strategy for their organisation.

CHAPTER 6

FIELD INVESTIGATION: DATA COLLECTION AND ANALYSIS

6.1 Sample selection strategy and methods of data collection

On the basis of the objective of the research: “to enhance the knowledge available in Mexico on how to incorporate quality management concepts into the management system an industrial organisation to make it more profitable”, it is necessary to make an initial supposition to establish the investigation approach. Because the investigation focuses on how an industrial organisation should incorporate quality management processes into its management system, the more complex the organisation involved (in relation to the number of people, products, market segments, processes (managerial and manufacturing), the more likely it is to provide evidence and information for analysis in searching for an answer to the research question and hypothesis. Since it will be necessary to correlate the degree of implementation of the quality management process with an indicator of profitability to probe the hypothesis, it was fundamental to select companies that publish their financial statements. Concentrating the research only on public organisations would have led the investigation to a biased conclusion, because most of the medium sized companies are not public, and the very large multinationals do not make public the individual performance of their Mexican operation. For this reason, the sample for the field investigation was drawn from the list of the 500 largest companies operating in Mexico according to Grupo Editorial Expansion. This list includes in fact a total of 611 companies from all over the country.

Because the 500 list was too large for the small budget available for this research, it was decided to select a smaller but representative sample. For this purpose, the process describe below was used:

1. The first filter to cut-down the sample size was to focus the research only on companies located in Mexico City (Metropolitan area), Monterrey and Guadalajara. Organisations from these 3 cities concentrate 94% of total assets value, 90% of total sales, and 90% of employment of the total companies included in the 500 list, which assure a representative sample.

2. Secondly, service organisations were eliminated because they are out of the focus of the research. In this way, the sample size reduced to 441 manufacturing companies (226 in Mexico City, 75 in Monterrey and 30 in Guadalajara), divided in 38 economic sectors.

3. Because the sample was still too large to be managed, some economic sectors were eliminated. It was considered that the analysis would be more valuable if the investigation concentrated only on labour-intensive companies. These kind of organisations are more complicated than capital-intensive companies for the implementation of a quality management programme, considering that a programme like this has a very significant cultural content.

The 500 Expansion list used to start the investigation is the one published in August 1994. This list reports the 1993 performance of the organisations that appear on it. To classify each economic sector as labour-intensive or capital-intensive, the ratio “assets value / employment” was used.

Table 6.1 shows the AV/E ratios for every industrial sector. Labour-intensive companies are those with the lower AV/E ratios.

Table 6.1 Assets Value/employee for every industrial sector

| Economical sector | AV/E ratio \$/employee | No. Companies per location | | |
|--------------------------|-----------------------------------|---------------------------------------|------------|------------|
| | | MEX | MTY | GDJ |
| Miscellaneous | 4,188 | 5 | 2 | 0 |
| Non electrical machinery | 18,507 | 7 | 3 | 0 |
| Non-metallic mining | 33,666 | 5 | 6 | 0 |
| Non-ferrous metals | 47,576 | 2 | 0 | 0 |
| Metallic furniture | 66,693 | 1 | 1 | 0 |
| Leather and shoes | 86,768 | 0 | 0 | 2 |
| Sport goods | 103,974 | 1 | 0 | 0 |
| Plastic products | 157,969 | 4 | 1 | 0 |
| Clothes | 174,231 | 9 | 0 | 0 |
| Office equipment | 195,883 | 2 | 0 | 0 |
| Office supplies | 209,004 | 2 | 0 | 0 |
| Automobile | 210,363 | 5 | 0 | 0 |
| Construction | 217,356 | 20 | 4 | 0 |
| Autoparts | 219,821 | 11 | 5 | 3 |
| Electrical Machinery | 229,591 | 15 | 1 | 0 |
| Publishers and printing | 232,409 | 9 | 0 | 1 |
| Beverage | 235,505 | 5 | 3 | 5 |
| Textile | 264,557 | 6 | 1 | 1 |
| Metallic products | 265,614 | 6 | 7 | 5 |
| Electric appliances | 294,668 | 0 | 2 | 0 |
| Communications Equipment | 318,609 | 3 | 0 | 0 |
| Pharmaceutical | 327,298 | 11 | 1 | 2 |
| Food | 357,737 | 17 | 4 | 3 |
| Scientific & photography | 378,916 | 3 | 0 | 1 |
| Rubber products | 411,714 | 3 | 0 | 0 |
| Glass and glass prods | 414,788 | 7 | 7 | 1 |
| Other manufacturing | 420,113 | 6 | 0 | 0 |
| Synthetic resins & fibre | 440,578 | 1 | 4 | 0 |
| Chemical | 486,079 | 27 | 10 | 2 |
| Agricultural equipment | 526,969 | 0 | 3 | 0 |
| Mining | 647,347 | 5 | 1 | 0 |
| Tobacco | 660,574 | 1 | 2 | 0 |
| Paper | 673,724 | 7 | 1 | 1 |
| Petrochemical | 707,052 | 9 | 1 | 1 |
| Steel | 796,597 | 3 | 1 | 1 |
| Computer Hardware | 1,026,691 | 2 | 0 | 0 |
| Cement | 1,312,482 | 5 | 4 | 1 |
| Petroleum and gas | 1,431,680 | 1 | 0 | 0 |
| Total | | 226 | 75 | 30 |

There is no way to define a frontier between the labour-intensive and the capital-intensive sectors. However, as many sectors as possible were selected starting from the top of the list (the smaller the AV/E ratio, the more labour-intensive a company is). The

criteria to define the limit was the number of companies that can be managed according to the resources available for this research. In this form, the economic sector selected for the field investigation were (in alphabetical order):

| | |
|--------------------------|--------------------------|
| Automobile | Metallic products |
| Autoparts | Non electrical machinery |
| Beverage | Non-ferrous metals |
| Clothes | Non-metallic mining |
| Communications Equipment | Office equipment |
| Construction | Office supplies |
| Electrical appliances | Pharmaceutical |
| Electrical machinery | Plastic products |
| Food | Publishers and printing |
| Leather and shoes | Sport goods |
| Metallic furniture | Textile |

These sectors included 210 in total, 139 companies from Mexico City, 49 from Monterrey and 22 from Guadalajara. This group of 210 companies formed the initial sample. However, it was reduced to 129 companies since only they initially agreed to collaborate. A questionnaire was given personally to an executive (the one holding the highest responsibility for the quality management function within the company) of each of these 129 companies. These executives received in person an initial detailed explanation on the questionnaire’s content and objective, and had about two weeks to answer it. The people who finally answered the questionnaire had the following characteristics.

| Characteristics of the persons interviewed | | | | |
|--|--|-----|-----|-------------------------|
| Position: | a large variety of positon names, but all holding the highest position for the quality function at his/her locatio | | | |
| Reports to: | President / Director | 38% | 37% | Operations Manager |
| | Quality Vice-President | 18% | 7% | Human Resources Manager |
| Education in TQM | (average # hours | 359 | | |

It can be seen that on average, persons interviewed were not only top level executives, but also experts on the field of quality management.

Only 82 executives returned the filled-in questionnaire, some of them after some pressure. The rate of response was 63.6% (82 of 129 companies); 11 (61%) from Guadalajara, 26 (44%) from Mexico City, and 45 (86%) from Monterrey. The rate of

response was higher in Monterrey because in this city most of the executives interviewed were graduates of ITESM, and normally are more willing to collaborate with projects of this university.

71 out of the 82 companies responded positively to having in operation a quality management programme. The information provided by these 71 organisations was analysed in search of evidence on quality management implementation experiences. Because the objective of the research aimed at a correlation analysis of the depth of use of quality management processes and the financial performance of the companies under investigation, it was necessary to look for detailed financial information on these companies. Only for 40 companies was it possible to find such information, so at this stage the sample reduced to 40 organisations. During the statistical analysis of the information provided by these 40 companies, it was found that only 21 showed a consistent statistical performance (one from which it was possible to draw a conclusion), so the other 19 organisations were discarded and the sample reduced to 21. These final 21 organisations were those that provided the strongest evidence to answer the research question and to make a conclusion on the research hypothesis.

To form the final group of companies, it was intended to include organisations having a foreign cultural influence. This situation was feasible because some of them recently sold part of their stock or agreed a joint venture with a foreign company, or because they have 100% foreign ownership. These companies with a foreign cultural content on their management system were selected to form a control sub-group within the final group in search of conclusions in the final analysis. Companies of the control group had to be recognised as world class organisations without any doubt about their competitiveness. The control group was used as well to probe if the lack of competitiveness in Mexican companies is due to poor or inappropriate management systems or leadership, and not to bad work habits of workers (laziness, irresponsibility, lack of competence, etc.). Remember that in Chapter 1, it was mentioned that there is evidence that important Japanese and American companies, (Ford, General Motors, Sony, etc.) have very productive plants in Mexico, and that the most wealthy state in the United States of America, California, mostly supports its production operations

(agricultural and manufacturing) with Mexican labour. The Mexican managerial style or culture has little influence on foreign companies operating in Mexico, and obviously little influence on Californian companies.

6.2 Questionnaire design

To begin the investigation, a questionnaire was designed considering the recommendations provided by Schuman & Presser (1981) and Oppenheim (1992) for this purpose. It was then sent to the 129 companies that originally agreed to collaborate.

The questionnaire was designed to meet the following objectives:

- determine the percentage of companies involved in a quality management implementation and operation experience during the last 10 years.
- find out which quality management processes (see Chapter 5) are used more in their quality system.
- investigate how they manage the quality management processes they use
- find the most important difficulties presented during the implementation process.
- to determine for each company what sub-system (see Chapter 5) was considered to be:
 - the most related to the company's competitiveness
 - the hardest to implement
 - the one that involves more employees
- estimate how long it took them on average to incorporate quality management into their management system.
- determine the implementation sequence suggested by them.
- to know how they measure the effectiveness of incorporating quality management processes into their management system, and how this measure was related to their economic wealth.

One difficulty of the questionnaire was that it had to communicate or to “teach” the proposed system in Chapter 5 to the person being interviewed. This system was created

as a conceptual answer to the research question and hypothesis, and the main purpose of this questionnaire is to measure the extent in which the proposal is actually being used by Mexican industrial organisations. The questionnaire format, as used to gather information in Mexican industry, is shown in Appendix A

6.3 Information gathered on the field investigation

In this section, a summary of the information provided by the 82 companies that responded to the questionnaire is presented. At the beginning of the questionnaire each company was asked if it has been involved in any type of Total Quality formal practice during the last 10 years. If they answered yes, the questionnaire continued; if not, it ended. Seventy-one companies (86.6%) answered to have a quality management programme in operation. The industrial sectors from which information could be gathered, as well as the number of companies in each sector, whether they answered yes or not to the previous question, are presented next in the following format: sector's name (number of companies with a quality management programme in progress, number of companies without a quality management programme in operation).

| | |
|------------------------------|-------|
| automobile | (2,0) |
| auto-parts | (9,0) |
| beverages | (3,1) |
| construction | (2,3) |
| electric appliances | (2,1) |
| equipment for communications | (1,0) |
| electrical machinery | (4,0) |
| food | (7,0) |
| glass and glass products | (8,0) |
| leather and shoes | (1,0) |
| metallic products | (9,2) |
| non-electric machinery | (5,0) |
| office supplies | (2,0) |
| pharmaceutical | (3,1) |
| plastic products | (3,0) |
| publishers and printing | (2,2) |
| steel | (1,0) |
| textile | (4,1) |
| tobacco | (1,0) |
| other manufacturing | (2,0) |

The individual data of the 82 companies that answered the questionnaire are included in Appendix B.

The information presented here onwards corresponds to data coming from the 71 companies that reported to have a quality management programme in operation. For questionnaire's section number 3, that asked to assess the degree of implementation of each of the system's processes, the following results were obtained. To be able to perform a numerical analysis on the answers to this question, the alphabetical scale used in the questionnaire to assess the degree of implementation of each process (A, B,, F) was transformed to a numerical scale, as shown next.

| | | |
|---|---|---|
| A | - | 6 |
| B | - | 5 |
| C | - | 4 |
| D | - | 3 |
| E | - | 2 |
| F | - | 1 |

The numerical scale was not used in the questionnaire from the beginning to avoid a misunderstanding of its meaning. This numerical scale, when averaged, represents the “degree of implementation” or DI of each process. Table 6.2 presents the average DI's for the system and for each sub-system obtained for the whole sector.

Because this numerical averages have no meaning in terms of the original classification (A, B,, F), groups of processes with similar statistical mean were identified using a test of hypothesis on means with a confidence level of 95%. Table 6.3 shows how each quality management process was on average reported.

Table 6.2 Average DIs at system and sub-system levels

| System's process | DI (mean) | DI (sdev) |
|---|------------|------------|
| L1) Understanding of stakeholders' expectations | 5.2 | 1.1 |
| L2) Satisfaction of stakeholders' expectations | 5.3 | 1.2 |
| L3) Mission and vision statements | 5.6 | 1.0 |
| L4) Corporate social and cultural values | 5.1 | 1.1 |
| Leadership | 5.3 | 0.8 |
| S1) Strategies -stakeholders' & customers' expectations | 4.9 | 1.3 |
| S2) Strategies -capital available | 4.9 | 1.3 |
| S3) Strategies - mission, vision and corporate values | 5.4 | 1.1 |
| S4) Strategies -benchmarking | 4.0 | 1.7 |
| S5) Strategies -re-engineering actions | 4.1 | 1.8 |
| S6) Quality policy | 5.2 | 1.3 |
| S7) Benchmarking analysis | 4.1 | 1.8 |
| S8) Business process re-engineering | 4.2 | 1.8 |
| Strategic planning | 4.6 | 1.1 |
| H1) Quality promotion | 4.6 | 1.4 |
| H2) Training and educational programmes | 4.6 | 1.5 |
| H3) Rewards and recognition | 4.2 | 1.9 |
| H4) Employees' degree of satisfaction on the job | 4.2 | 1.8 |
| H5) Employees' performance. | 4.4 | 1.6 |
| H6) Modification of the corporate culture | 4.6 | 1.4 |
| Management of human behaviour | 4.4 | 1.3 |
| M1) Customer satisfaction | 4.5 | 1.6 |
| M2) Policy for profits and benefits distribution | 4.6 | 1.6 |
| M3) Competitors' quality, strengths & weaknesses | 4.4 | 1.7 |
| M4) Market share | 5.2 | 1.5 |
| Marketing | 4.7 | 1.1 |
| O1) Design of products and services | 4.8 | 1.4 |
| O2) Production process planning | 4.9 | 1.3 |
| O3) Administration process planning | 4.4 | 1.6 |
| O4) Redesign of products and services | 4.9 | 1.5 |
| O5) Production / administration information systems | 4.4 | 1.7 |
| O6) Performance of the administrative process | 5.4 | 1.2 |
| O7) Productivity of the production process | 5.5 | 1.0 |
| O8) Quality of the finished product | 5.6 | 1.0 |
| Operations management | 5.0 | 0.9 |
| C1) Work methods and standards | 5.1 | 1.4 |
| C2) Exercise of process control actions | 5.0 | 1.4 |
| C3) Statistical process control | 4.3 | 1.9 |
| Process control | 4.8 | 1.3 |
| P1) Assurance of the quality of inputs | 5.3 | 1.5 |
| P2) Programme to select suppliers | 4.6 | 1.7 |
| Management of suppliers | 5.0 | 1.3 |
| Q1) Quality improvement projects. | 4.9 | 1.3 |
| Q2) Audits to the management system | 4.6 | 1.8 |
| Q3) Quality steering committee | 5.0 | 1.6 |
| Q4) Teamwork for quality improvement | 4.9 | 1.5 |
| Quality improvement | 4.8 | 1.2 |
| System | 4.8 | 0.8 |

Table 6.3 DI statistical average of each QM process

| System's Processes | Reported on average as: | | |
|---|--|--|---|
| | Widely used and documented (mean = 6) | Widely used but not documented (mean = 5) | Used but different and not documented (mean = 4) |
| Leadership | | | |
| L1) Understanding of stakeholders' expectations | | | |
| L2) Satisfaction of stakeholders' expectations | | | |
| L3) Mission and vision statements | | | |
| L4) Corporate social and cultural values | | | |
| Strategic planning | | | |
| S1) Strategies -stakeholders' & customers' expectations | | | |
| S2) Strategies -capital available | | | |
| S3) Strategies - mission, vision and corporate values | | | |
| S4) Strategies -benchmarking | | | |
| S5) Strategies -re-engineering actions | | | |
| S6) Quality policy | | | |
| S7) Benchmarking analysis | | | |
| S8) Business process re-engineering | | | |
| Management of human behaviour | | | |
| H1) Quality promotion | | | |
| H2) Training and educational programmes | | | |
| H3) Rewards and recognition | | | |
| H4) Employees' degree of satisfaction on the job | | | |
| H5) Employees' performance. | | | |
| H6) Modification of the corporate culture | | | |
| Marketing | | | |
| M1) Customer satisfaction | | | |
| M2) Policy for profits and benefits distribution | | | |
| M3) Competitors' quality, strengths & weaknesses | | | |
| M4) Market share | | | |
| Operations Management | | | |
| O1) Design of products and services | | | |
| O2) Production process planning | | | |
| O3) Administration process planning | | | |
| O4) Redesign of products and services | | | |
| O5) Production / administration information systems | | | |
| O6) Performance of the administrative process | | | |
| O7) Productivity of the production process | | | |
| O8) Quality of the finished product | | | |
| Process control | | | |
| C1) Work methods and standards | | | |
| C2) Exercise of process control actions | | | |
| C3) Statistical process control | | | |
| Management of suppliers | | | |
| P1) Assurance of the quality of inputs | | | |
| P2) Programme to select suppliers | | | |
| Quality improvement | | | |
| Q1) Quality improvement projects. | | | |
| Q2) Audits to the management system | | | |
| Q3) Quality steering committee | | | |
| Q4) Teamwork for quality improvement | | | |

The average degree of implementation for all processes is statistically equal to 5 with a significance level of 95%. No activities were found to have a statistical average equal to 3, 2 or 1.

The management sub-systems identified as critical for a successful incorporation of the quality management processes into the management system (accumulating at least 80% of mentions from respondents), from the most to the least mentioned were:

- **supporting company's competitiveness:**
leadership, strategic planning, quality improvement, and operations management.
- **presenting the strongest resistance to change:**
management of human behaviour, process control, quality improvement, and leadership.
- **requiring the strongest support of human and/or financial resources:**
operations management, quality improvement, process control, management of human behaviour.

The most important difficulties faced during the incorporation of the quality management processes into the management system were:

| Type of difficulty | % as most important | % as 2nd most important | % as 3rd most important | % not important |
|--------------------------------|---------------------|-------------------------|-------------------------|-----------------|
| Top management involvement | 30% | 8% | 6% | 56% |
| Low educational level | 23% | 17% | 15% | 45% |
| Lack of quality suppliers | 4% | 8% | 13% | 75% |
| Lack of working methods | 18% | 21% | 18% | 42% |
| Oposition of middle management | 14% | 17% | 17% | 52% |
| Low technological level | 1% | 8% | 14% | 76% |
| Customer do not demand quality | 1% | 8% | 8% | 82% |
| Lack of financial resources | 3% | 6% | 3% | 89% |
| Other | 7% | 6% | 6% | 82% |

The estimated time for the implementation of their QM programme, from planning up to the point in which all procedures and techniques were in operation (even if not in optimal conditions), has an average 4.06 years, with a standard deviation of 1.9 years.

In section 7 of the questionnaire, the respondents were asked to suggest an ideal sequence of implementation, assigning an order from 1 to 25 to each process, as they considered when would be more appropriate to implement it. Number one was assigned to the process he/she would implement first. A different sequential order had to be

assigned to each process. The sequence assigned was the respondent's suggestion, and not necessarily the one followed by his/her company. Table 6.4 compares the sequence suggested in the proposed system versus the one obtained in the survey. The survey's sequence was obtained from an statistical analysis on the individual means with a confidence level of 95%. The most significant differences are highlighted in bold.

Table 6.4 Suggested sequence of implementation versus the one obtained in the investigation

| Quality management process | Proposal | Survey |
|--|----------|-----------|
| i. Stakeholders expectations | 1 | 2 |
| j. Mission and vision | 2 | 3 |
| y. Social and cultural values | 3 | 22 |
| p. Strategic planning process | 4 | 4 |
| o. Quality policies | 5 | 5 |
| v. Design of the administration process | 6 | 14 |
| n. Product/service planning | 7 | 9 |
| m. Production process planning | 8 | 8 |
| d. Quality steering committee | 9 | 1 |
| k. Management of operation | 10 | 10 |
| e. Management of suppliers | 11 | 19 |
| f. Process control | 12 | 15 |
| s. Quality improvement projects | 13 | 11 |
| q. Training and educational programmes | 14 | 6 |
| r. Promotion of a culture of quality | 15 | 7 |
| u. Rewards and recognition | 16 | 23 |
| a. Audits for the quality system | 17 | 12 |
| w. Business operation outcome | 18 | 16 |
| x. Customer satisfaction | 19 | 13 |
| l. Market share | 20 | 17 |
| h. Profits distribution | 21 | 25 |
| c. Competitors' quality | 22 | 18 |
| t. Re-engineering management | 23 | 24 |
| b. Benchmarking | 24 | 20 |
| g. Fulfilment of stakeholders' expectation | 25 | 21 |

From this table, it was possible to conclude that most of the executives interviewed suggested for the implementation of a quality management programme should start by the formation of a quality steering committee (QSC). Presumably, the initial task of the

“qsc” consists in the search of the expectations of customers and stakeholders to be able to define company’s mission and vision. Once this is done, they become involved in a strategic planning process to define the quality policies that should be deployed into the operation of the company. Next, they put in progress an intensive educational and promotional programme in quality, and only a few executives recommended to start in parallel the redesign of their main products and services and/or their production process. The educational and promotional programme normally takes place in several stages, from top to bottom of the organisation. After this programme is completed, the next step is to start-up a quality and productivity improvement programme through teamwork. This programme is primarily focused on production aspects and related to problems with the quality of the finished product and customer satisfaction. There is not a clear common sequence for the rest of the processes, but evidently only on very rare occasions it was recommended to include the following elements: 1) a policy for the distribution of benefits among stakeholders, 2) business process re-engineering, 3) a rewards and recognition programme, 4) promotion of corporate values, 5) measurement of stakeholders satisfaction and 6) benchmarking analysis.

To measure how effective has been the incorporation of quality management processes into the management system, industrial companies in Mexico use the indexes presented in Table 6.5, in order of importance from 1 (the one used more) to 3 (the one used least).

Table 6.5 Indices used to measure the effectiveness of TQM in Mexican industry

| Index | %1 | %2 | %3 | % not used |
|--------------------------------|-----|-----|-----|------------|
| Quality & Productivity indexes | 52% | 17% | 11% | 20% |
| Financial profitability | 21% | 25% | 32% | 20% |
| Cost of poor quality | 8% | 20% | 17% | 55% |
| Market share | 6% | 20% | 18% | 56% |
| Quality Awards | 3% | 4% | 7% | 85% |
| Employees' satisfaction | 0% | 10% | 11% | 79% |
| Other | 8% | 4% | 3% | 83% |

The degree in which the satisfaction of stakeholders has been improved due to the implementation of quality management processes was also assessed. This was performed by the use of the following subjective scale:

- 1 (if decreased),
- 0 (if stays the same),
- +1 (if observed a small increment),
- +2 (if observed a large increment).

As an indicator of the degree of satisfaction achieved on the fulfilment of stakeholders' expectations (SS index) in each company, the average effect reported for the five stakeholders selected was estimated.

Since all the companies under study reported their financial performance in the 500 Expansion list, a subjective profitability index (P index) was also estimated. The scale used for this purpose was the same, from -1 to 2. To compute this index, 5 financial indices were analysed for the period of 1992 to 1995 (reported in the 1993 to 1996 issues):

- Net Margin (profit/loss as % of sales),
- ROI (profit/loss as % of total assets),
- Profit/Loss per employee,
- Total Sales, and
- Total Assets per employee.

The criteria used to grade each company from a financial perspective was:

- 1 if it had a consistent negative tendency in its financial performance
- 0 if it experienced stable (no growth, no decay) conditions
- +1 if it showed an average positive growth in 2 or 3 of the indices
- +2 if it had an average positive growth in 4 or 5 of the indicators

The mean, standard deviation, the confidence interval of the effect achieved on each stakeholder, and the "SS and the P indices" are presented in Table 6.6

Table 6.6 SS and P indices by stakeholder

| Stakeholder | Mean | SDev | Confidence Interval (95%) | |
|----------------|-------|-------|---------------------------|-----|
| Shareholders | 1,127 | 0,773 | 0,9 | 1,3 |
| Top Management | 1,408 | 0,645 | 1,3 | 1,6 |
| Employees | 1,169 | 0,737 | 1,0 | 1,3 |
| Suppliers | 0,859 | 0,816 | 0,7 | 1,0 |
| Customers | 1,366 | 0,702 | 1,2 | 1,5 |
| SS Index | 1,186 | 0,495 | 1,1 | 1,3 |
| P Index | 0,370 | 0,849 | 0,2 | 0,6 |

6.4 Analysis of the information

In the first stage of the analysis, it was intended to probe in general (for the whole sector) two aspects related to the research hypothesis: 1) if there was correlation between the degree of implementation of quality management processes (DI) and the level of satisfaction achieved on the fulfilment of the expectation of stakeholders (SS); and 2) if there was correlation between the degree of implementation of quality management processes (DI) and the profitability achieved (P).

After a statistical analysis conducted on the relation of the system’s DI index and the performance indices (SS and P), it was concluded that stakeholders satisfaction (SS) is significantly correlated to the system’s DI (0.45); while profitability (P index) is not (0.04). This situation could suggest that the implementation of quality management processes, if indeed it helps to keep the stakeholders satisfied, it does not assure a better profitability state.

Performing the same analysis but using the sub-system’s DI indices, it was found that the sub-systems more correlated to SS were:

| | |
|---------------------|--------|
| Quality improvement | (0.46) |
| Leadership | (0.42) |
| Marketing | (0.39) |

Whilst the only sub-system slightly correlated to profitability was:

| | |
|-----------------|--------|
| Process control | (0.19) |
|-----------------|--------|

The correlation analysis between the processes' DI and the SS and P indices, permitted to observe that the 5 processes more correlated to SS were:

| | |
|---|---------|
| Q4) teamwork for quality improvement | (0.431) |
| L1) understanding of stakeholders' expectations | (0.423) |
| Q3) quality steering committee | (0.383) |
| S6) quality policy | (0.360) |
| C1) work methods and standards | (0.347) |

On the other hand, the 5 processes better correlated to the P index were:

| | |
|-------------------------------------|---------|
| H1) promotion of a quality culture | (0.199) |
| C3) statistical process control | (0.185) |
| Q3) quality steering committee | (0.173) |
| H5) employees performance | (0.130) |
| S5) reengineering strategic actions | (0.123) |

It is important to notice that according to Fisher's rule based on sample size, correlation figures obtained for the SS index are statistically significant; however, that is not true for the P index.

6.5 Stratification analysis

The analyses performed up to this point correspond to information coming from the whole set of 71 companies; however, it was considered appropriate to stratify the information in search of more specific conclusions. By using the information related to the industrial sector and the products manufactured, each company was classified according to the following criteria:

- a) type of market attended: durable and capital, non-durable, intermediate;
- b) production process volume: low and high;
- c) type of material used as main components of the finished products: metal, plastic/glass, food, and auto industry;
- d) the origin of its capital: Mexican or foreign; and
- e) some combinations of the above.

Because of the diverse characteristics of each company, they were assigned in more than one category. The list of sub-sector and the number of companies associated to each one are shown in Table 6.7

Table 6.7 List of industrial sub-sectors

| Category | Companies |
|--------------------------------|-----------|
| Auto Industry | 11 |
| Durable + Capital Goods | 18 |
| Food / Agriculture | 11 |
| Foreign Capital | 23 |
| High Volume | 37 |
| High Volume Intermediate | 17 |
| High Volume Non-Intermediate | 20 |
| Intermediate goods | 35 |
| Intermediate goods (metal) | 17 |
| Intermediate goods (non-metal) | 18 |
| Low Volume | 34 |
| Low Volume Intermediate | 18 |
| Low Volume Non-Intermediate | 16 |
| Metal | 30 |
| Mexican Capital | 48 |
| Miscellaneous | 11 |
| Non-durable goods | 18 |
| Plastic / Glass | 19 |

Some groups are relatively small for statistical significance, but interesting conclusions were obtained any way.

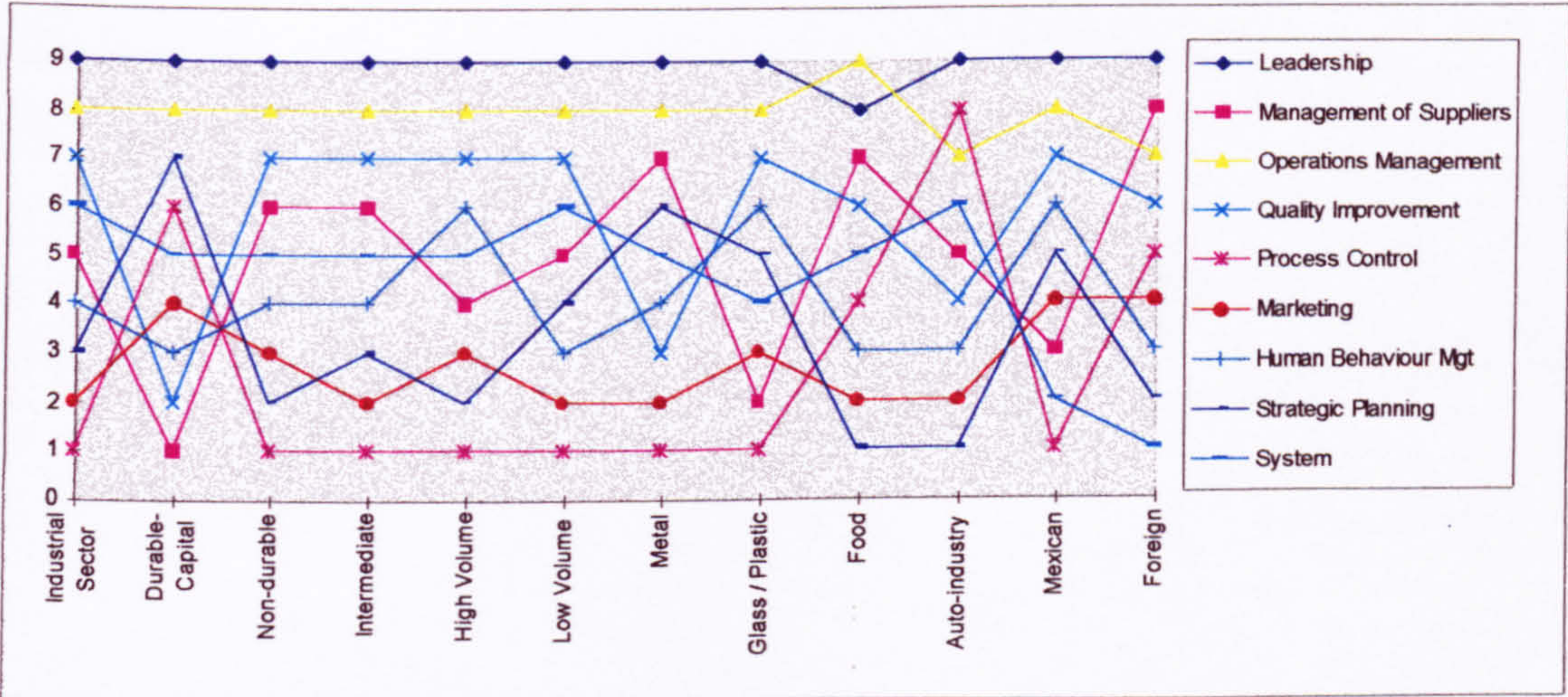
The average DI indices on each sub-system, as well as the SS and P indices obtained for each sector are presented in Table 6.8

Table 6.8 Average DI, SS and P indices by sub-sector

| | Performance Index | | Sub-system | | | | | | | |
|--------------------------------|--------------------------|---------------|-------------------|-----------|----------|----------|----------|----------|----------|----------|
| Sub-sector | SS | Profit | L | SP | H | M | O | C | P | Q |
| Durable + Capital Goods | 1.29 | 0.39 | 5.2 | 4.6 | 4.4 | 4.6 | 4.7 | 4.6 | 4.7 | 4.5 |
| Non-durable goods | 0.96 | 0.72 | 5.2 | 4.6 | 4.6 | 4.7 | 5.0 | 4.7 | 4.9 | 4.9 |
| Intermediate goods (metal) | 1.27 | 0.18 | 5.3 | 4.6 | 4.6 | 4.6 | 4.7 | 4.9 | 5.1 | 4.8 |
| Intermediate goods (non-metal) | 1.23 | 0.17 | 5.4 | 4.6 | 4.8 | 4.7 | 5.1 | 4.9 | 5.1 | 5.2 |
| Intermediate goods | 1.25 | 0.17 | 5.4 | 4.6 | 4.7 | 4.7 | 4.9 | 4.9 | 5.1 | 5.0 |
| High Volume Intermediate | 1.24 | 0.24 | 5.5 | 4.6 | 4.9 | 4.7 | 5.0 | 4.7 | 5.3 | 5.0 |
| High Volume Non-Intermediate | 1.07 | 0.85 | 5.3 | 4.8 | 4.7 | 4.9 | 5.0 | 4.9 | 5.1 | 5.0 |
| Low Volume Intermediate | 1.27 | 0.11 | 5.2 | 4.6 | 4.5 | 4.7 | 4.8 | 5.1 | 4.9 | 4.9 |
| Low Volume Non-Intermediate | 1.19 | 0.19 | 5.1 | 4.3 | 4.2 | 4.4 | 4.6 | 4.4 | 4.5 | 4.4 |
| High Volume | 1.15 | 0.57 | 5.4 | 4.7 | 4.8 | 4.8 | 5.0 | 4.8 | 5.2 | 5.0 |
| Low Volume | 1.23 | 0.15 | 5.1 | 4.5 | 4.3 | 4.5 | 4.7 | 4.8 | 4.7 | 4.6 |
| Metal | 1.31 | 0.37 | 5.3 | 4.6 | 4.5 | 4.6 | 4.7 | 4.8 | 5.0 | 4.7 |
| Plastic / Glass | 1.19 | 0.21 | 5.4 | 4.6 | 4.6 | 4.7 | 4.7 | 4.5 | 5.0 | 4.8 |
| Food / Agriculture | 0.85 | 0.73 | 5.3 | 4.6 | 4.8 | 5.0 | 5.3 | 5.1 | 5.0 | 5.2 |
| Miscellaneous | 1.18 | 0.27 | 5.1 | 4.5 | 4.6 | 4.3 | 4.9 | 5.0 | 4.7 | 5.0 |
| Auto Industry | 1.41 | 0.64 | 5.5 | 4.8 | 4.8 | 4.9 | 5.0 | 5.3 | 5.5 | 5.1 |
| Mexican Capital | 1.15 | 0.19 | 5.2 | 4.7 | 4.6 | 4.6 | 4.8 | 4.6 | 4.8 | 4.8 |
| Foreign Capital | 1.26 | 0.74 | 5.3 | 4.5 | 4.5 | 4.8 | 5.0 | 5.3 | 5.2 | 5.0 |
| Labour Intensive Manufacturing | 1.19 | 0.37 | 5.3 | 4.6 | 4.6 | 4.7 | 4.8 | 4.8 | 5.0 | 4.8 |

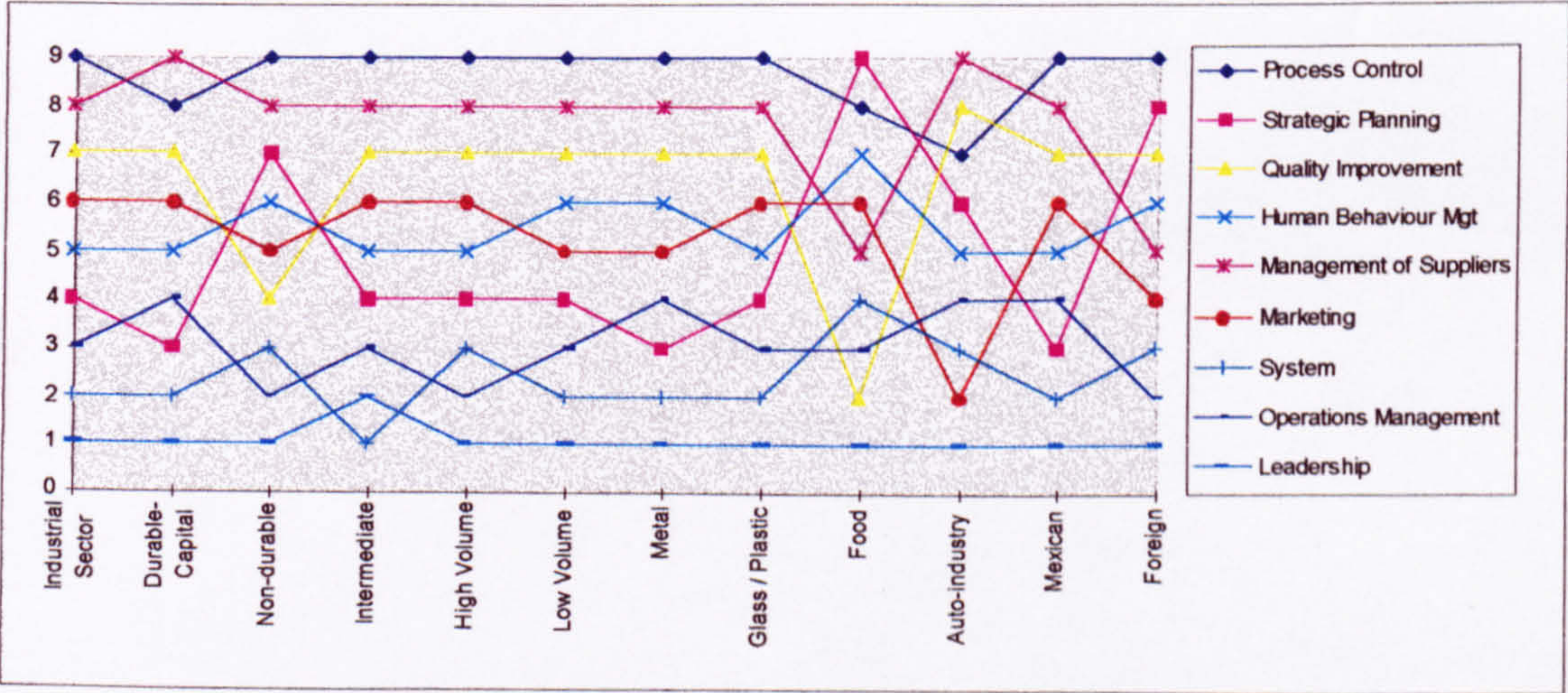
Figure 6.2 shows the relative position (9 = the highest relative mean, 1 = the lowest relative mean) of the DI indices (system and sub-systems) for each of the sub-sector involved in this analysis.

Figure 6.2 Relative position (mean) of DI indices by sub-sector



Additionally, Figure 6.3 shows the relative position (9 = the highest relative standard deviation, 1 = the lowest relative standard deviation) of the DI indices (system and sub-systems) for each of the sub-sector involved in this analysis.

Figure 6.3 Relative position (standard deviation) of DI indices by sub-sector



It is clear that regardless of the sub-sector and although DI scores are relatively high for all sub-systems, leadership always gets the highest mean and the lowest standard deviation, and process control almost always gets the lowest mean and the highest standard deviation. The second highest DI score is operations management, except the

for auto industry in which the second highest is process control, and for foreign companies in which management of suppliers takes the second place. These graphs are an interesting indication about on what sub-systems organisations of a given sub-sector are focusing their quality management implementation efforts.

In the correlation analysis performed for each category, it was found that some of them were more correlated than the others to the SS index. Table 6.9 is a summary that shows the sub-system to which the different categories are significantly correlated to this index.

Table 6.9 Correlation of sub-systems to the SS index on each sub-sector

| Category | Correlation | Sub-system |
|--|----------------------|--------------------------------------|
| Metal Intermediate goods Plastic / Glass | 0,517 to 0,566 | Quality improvement |
| Intermediate goods (metal) High Volume Intermediate Low Volume Non-Intermediate | 0,462 to 0,753 | Management of human behaviour |
| Miscellaneous Low Volume Intermediate Low Volume Mexican Capital | 0,411 to 0,868 | Leadership |
| Non-durable goods High Volume Non-Intermediate Labour Intensive Manufacturing High Volume Food / Agriculture | 0,265 to 0,543 | Marketing |
| Foreign Capital Durable + Capital Goods | 0,643 0,397 | Process Control |
| Auto Industry | 0,493 | Strategic Planning |
| Intermediate goods (non-metal) | 0,316 | Mgt of Suppliers |

From this table it is possible to conclude that organisations having a high performance in the SS index are those:

- from the **metal, intermediate, and glass or plastic** sub-sector that focus their QM efforts in **quality improvement programs**.

- with production processes of **low volume** or of **Mexican capital** that centre their QM management system on **leadership strategies**.
- selling **non-durable goods** or **food**, or with production processes of **high volume** concentrating their QM programme in **marketing**.
- from the **automobile** sector supporting their success mostly in adequate **competitive strategies**.
- of **foreign capital** or selling **durable** or **capital goods** with a quality management system intensified on **statistical process control**.

In the same way, Table 6.10 shows the sub-systems to which the different sub-sector were significantly correlated to the P index.

Table 6.10 Correlation of sub-systems to the P index on each sub-sector

| Category | Correlation | Sub-system |
|---|----------------------|----------------------------|
| Miscellaneous Foreign Capital Non-durable goods | 0,132 to 0,435 | Quality improvement |
| Metal Low Volume Low Volume Non-Intermediate Durable + Capital Goods | 0,248 to 0,523 | Marketing |
| Intermediate goods Plastic / Glass High Volume Intermediate Mexican Capital Labour Intensive Manufacturing High Volume Intermediate goods (non-metal) Food / Agriculture | 0,206 to 0,436 | Process Control |
| Intermediate goods (metal) Low Volume Intermediate Auto Industry | 0,260 to 0,304 | Strategic Planning |
| High Volume Non-Intermediate | 0,522 | Mgt of Suppliers |

Similarly, from this table it is possible to conclude that organisations with a high performance in the P index are those:

- of foreign capital or in the non-durable goods business that focus their QM efforts in quality improvement programs.
- from the metal, low volume, durable or capital goods sub-sector that centre their QM management system on marketing strategies.
- selling intermediate goods or food, or products containing plastic or glass, or with production processes of high volume, or of Mexican capital concentrating their QM programme in the use of statistical process control methods.
- offering intermediate goods (non-metal or low volume) and from the automobile sector which base their financial success mostly in appropriate competitive strategies.

On the other hand, it was not possible in the stratification analysis to find any evidence that a specific sub-sector faced different obstacles than those found for the whole sector, except that the high volume category faced some problems in relation to the quality of the raw materials they use.

It was found that for all sub-sectors, profitability and quality & productivity indices are used to measure the effectiveness of their quality management programme. However, those companies from the end consumer or low volume markets, also use the market share as an index for the same purpose, while others use the cost of poor quality, and only companies of the food/agriculture category measure the degree of satisfaction of their employees for this purpose.

For all the sub-sectors, a strong correlation (the lowest was 0.604 in the plastic/glass category) was found between the sequence of implementation of the system's processes and the priority sequence proposed in Chapter 4. The strongest correlation observed was in the auto-industry and in the food/agriculture categories (0.94).

No statistical evidence was found, in relation to differences among the sub-sector on the time required for the implementation of a quality management programme. Using Duncan's test, with a confidence level of 95%, it was concluded that the average implementation time is the same for all categories, around 4 years.

At this stage of the investigation it was possible to conclude that a high proportion of Mexican industrial organisations have tried to incorporate QM processes into their management system to become more competitive in international markets; however, most of them are facing many difficulties, with the consequence of waste of money and time.

Mexican large industrial organisations, generally speaking, use the quality management processes included in the proposed system; however, only 5% of the processes are widely used and formally documented; 65% are widely used but in an informal way (which is characteristic of Mexican management style), and 30% are also used but in an unconventional manner.

Leadership and strategic planning are critical for the competitiveness of Mexican industry; however, there is more resistance to change in the management of human behaviour and on quality improvement, and more utilisation of human and financial resources for the management of the operation and for process control.

The implementation of a quality management programme in Mexican industry takes on average 4 years, and confronts the following obstacles: 1) a weak top management involvement, 2) workers' low educational levels, and 3) the lack of working methods, which is characteristic on Mexico's work culture (Lawrence and Yeh 1994).

Industry mostly follows the priority sequence proposed in the model (only 4 processes had a significant difference). The most important disagreements are: 1) the low priority gave in practice to social and cultural values, 2) the reluctance to reward and recognise the employees because of their quality achievements, and 3) the lack of dedication to plan and design an adequate administration process; in contrast, a high priority is given to the formation of a quality steering committee, which is not considered in the proposed system. An explanation could be that in the proposed system, the quality steering committee is part of the quality improvement sub-system, and in most of the cases investigated the quality management programme is visualised in a reduced perspective, not in the broad one considered for the development of the proposed system.

Profitability and productivity & quality indices are the most common measures used to assess the effectiveness of the management system; however, in some sub-sector, market share is also used. Employees' satisfaction and quality awards are definitely not measured for this purpose.

Employees, top management, and customers are the most satisfied with the implementation of the quality management programme; shareholders and suppliers are less happy. There is no correlation between stakeholders' satisfaction and profitability. However, enough evidence was found to conclude that a complete understanding of the expectations of the stakeholders, the search for quality improvement through teamwork, the definition and deployment of quality policies, the operation of a quality steering committee, and the control of the administration process, lead to a better degree of stakeholders' satisfaction. On the other hand, there is no correlation between the utilisation of quality management processes and profitability; however, the promotion of a quality culture, the implementation of a statistical control, the operation of a quality steering committee, an effective administration of employees' performance, and the definition of reengineering strategic actions, are fundamental to support a strong financial health of any organisation.

Some of the sub-systems contained in the proposed system are more likely to have a positive influence than others in terms of stakeholders' satisfaction and profitability. Based on the findings of this study, a company in a particular category should concentrate its implementation efforts on a specific sub-system to improve the satisfaction of its stakeholders and its profitability. Table 6.11 can be used for this purpose.

Table 6.11 Emphasis of the TQM system by sub-sector for stakeholders' satisfaction and profitability

| Category | Stakeholders' satisfaction - concentrate QM efforts in: | Profitability - concentrate QM efforts in: |
|--------------------------------|--|---|
| Auto Industry | Strategic planning | Strategic planning |
| Durable + Capital Goods | Process Control | Marketing |
| Food / Agriculture | Marketing | Process Control |
| Foreign Capital | Process Control | Q. improvement |
| High Volume | Marketing | Process Control |
| High Volume Intermediate | Mgt Human Behaviour | Process Control |
| High Volume Non-Intermediate | Marketing | Mgt of Suppliers |
| Intermediate goods | Q. improvement | Process Control |
| Intermediate goods (metal) | Mgt Human Behaviour | Strategic planning |
| Intermediate goods (non-metal) | Mgt of Suppliers | Process Control |
| Labour Intensive Manufacturing | Marketing | Process Control |
| Low Volume | Leadership | Marketing |
| Low Volume Intermediate | Leadership | Strategic planning |
| Low Volume Non-Intermediate | Mgt Human Behaviour | Marketing |
| Metal | Q. improvement | Marketing |
| Mexican Capital | Leadership | Process Control |
| Miscellaneous | Leadership | Q. improvement |
| Non-durable goods | Marketing | Q. improvement |
| Plastic / Glass | Q. improvement | Process Control |

The people interviewed had a reasonable level of education in quality management. For this reason, the conclusions of this survey are strong enough to consider that they can provide a sound basis for decision making when planning the incorporation of quality management processes into the management system in the labour-intensive industrial sector in Mexico.

The model proposed in this thesis could provide a solid platform from which companies could plan or redirect their efforts regarding quality management implementation and competitiveness improvement.

The hypothesis of this research states that “organisations are more likely to succeed if they develop a culture of total quality, by the incorporation of TQM into their management system, for planning, control and improvement of their operation. The periodical analysis of the expectations of stakeholders and customers provides the basis to define or modify and deploy quality policies for the operation, to satisfy market needs, and as a consequence, to create the economic wealth required to fulfil

stakeholders' expectations". However, the field investigation found no evidence to assure that quality management is helping Mexican industrial organisations to become more profitable, despite the fact that their stakeholders express a high degree of satisfaction.

Certainly other factors not considered in the theory of quality management, external and internal to the organisations, must be affecting their profitability. Some of these factors could be:

- quality management theory has been developed in countries with a radically different culture, and there is still much knowledge to be created for the Mexican case,
- there has not been enough time to learn how to operate effectively a company within the new policy of free markets,
- the macro-economical, social and political problems associated to this change are causing an instability that make more difficult to learn how to manage effectively an organisation,
- and many more factors that could be hiding or delaying the benefits of using quality management processes.

Learning from the experience of Mexican industry could help to accelerate the consolidation of quality management as a key factor in Mexico's competitiveness and external image. However, still remains the question on which other factors a management system should consider, apart from quality management processes, to help the company to improve, not only the satisfaction of their stakeholders, but their profitability.

6.6 Detailed analysis of external factors

The analyses discussed in previous sections were performed using a subjective profitability index. To strengthen the conclusions of this research, it was decided to enhance the correlation analysis with the original financial ratios, instead of the subjective interpretation made before. For this in-depth analysis, the following financial variables of the year 1995 were considered:

- Net Margin (Net profit/loss as % of sales),
- Profitability (Net profit/loss as % of capital),
- Debt/Worth (Total liabilities/capital),
- Assets/Worth (Total assets/capital),
- Liquidity (current assets/current liabilities),
- Sales per employee, and
- Sales/Total assets ratio.

Only for 40 out of the original 71 companies was it possible to find information on these variables. This was because some of them did not report detailed financial information on their own but included it in the report of the holding company to which they belong.

A statistical analysis was performed on the financial information of these 40 organisations and the data previously obtained in the questionnaire. In this analysis, few significant correlation figures were found between the sub-systems of the model and the financial variables listed before. Some of the most important conclusions at this stage were:

- the human behaviour management sub-system is correlated (0.542) to profitability
- profitability and the debt/worth ratio are also correlated (0.571)
- process control is correlated as well to the debt/worth ratio (0.446)
- All other correlation figures are not significant

These figures suggest that to obtain a high profitability performance and a good debt to worth ratio in the industrial sector, QM programmes should have a strong sub-system for the management of the human behaviour, while keeping an acceptable debt to worth ratio requires additionally concentration in process control.

No other significant conclusions could be made for the rest of the financial variables, which meant we still did not have a satisfactory answer to the question on how to improve profitability by the incorporation of quality management processes into the

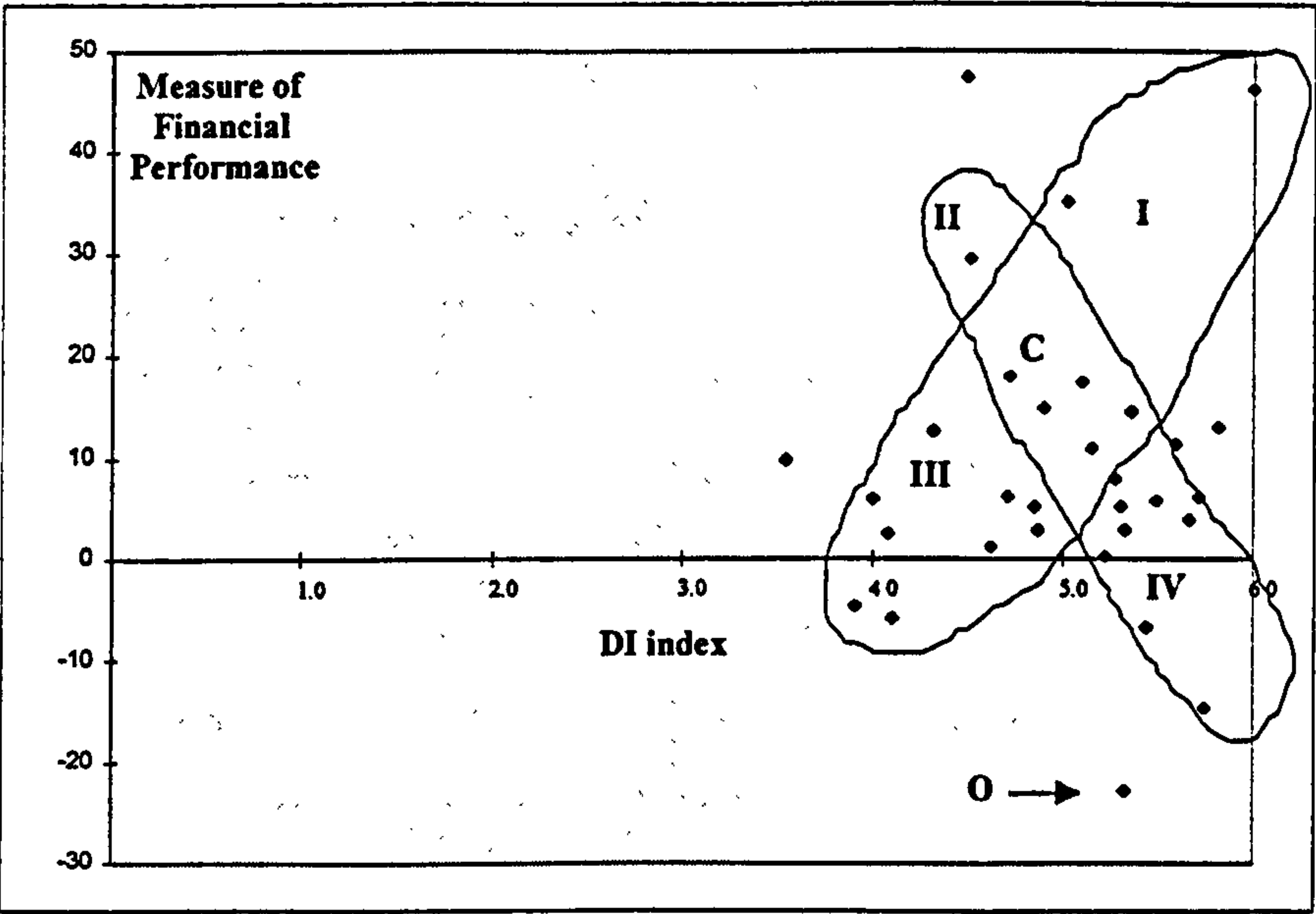
management system of an industrial organisation in Mexico. So, it was decided to analyse the performance of each financial variable against the DI indices (system and sub-system).

By this analysis, it was expected to classify each company in any of the following categories:

- I) high DI index with high financial performance,
- II) low DI index and still high financial performance,
- III) low DI index and low financial performance,
- IV) high DI index but low financial performance,
- C) mid DI index and mid financial performance, and
- O) unable to classify

Companies type I and III are those that show a positive correlation between the DI index and the measure of financial performance under analysis, which in fact would probe our hypothesis (the more quality management incorporated into the management system, the more profitable a company must be); organisations type II and IV have a negative correlation; type C are those with no correlation in any sense, and companies type O are those that have a performance far away from the rest. Figure 6.4 shows graphically the characteristics of each type of organisation.

Figure 6.4 Statistical performance of each type of Organisation (I, II, III, IV, C)



Each organisation was classified in each of the combinations for a given financial performance variable and a given DI index. The total variables involved were:

INDEPENDENT VARIABLES:

- System
- Leadership
- Strategic Planning
- Management of human behaviour
- Marketing
- Management of operations
- Process control
- Management of suppliers
- Quality improvement

RESPONSE VARIABLES:

- Stakeholders' satisfaction indices:
- Shareholders
 - Top management
 - Employees
 - Suppliers
 - Customers
- Financial health indices:
- Net margin
 - Profitability
 - Debt/worth
 - Assets/worth
 - Liquidity
 - Sales/employee

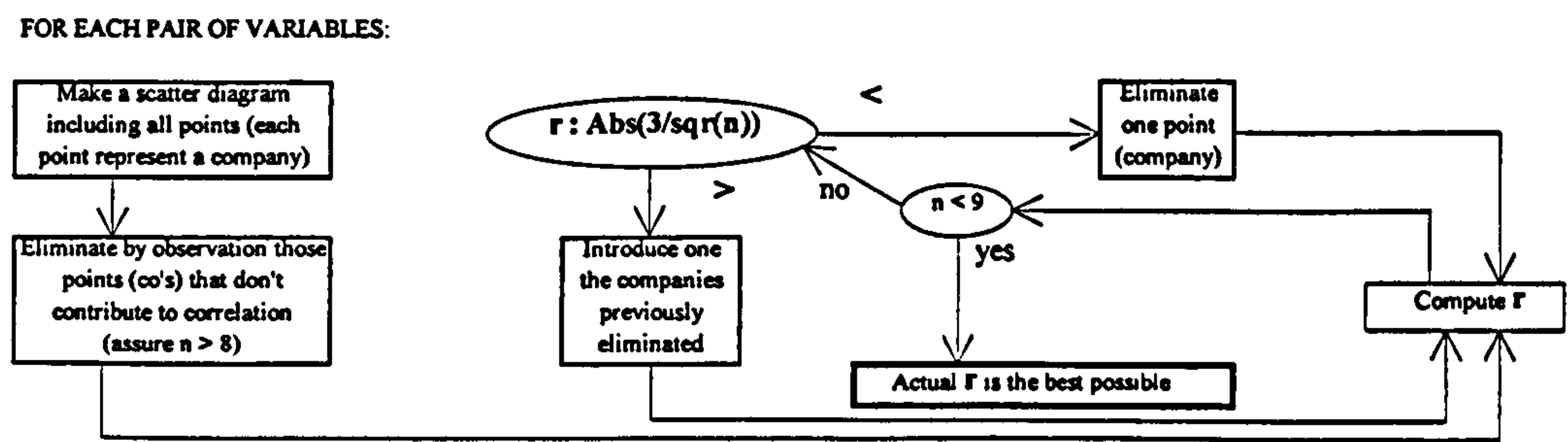
However, because the DI indices of the sub-systems strategic planning, management of human behaviour, management of operations and quality improvement were highly correlated, their DI's were averaged and considered as one group. The same situation applied to process control and management of suppliers. So the original 9 independent

variables reduced to 4: system, leadership, (strategic planning / marketing / management of human behaviour / management of operations / quality improvement), and (process control / management of suppliers).

The 7 financial performance variables, plus the 5 variables measuring stakeholders' satisfaction (12 in total) were used as response variables on this analysis. However, for some companies it was not possible to find information on some of the financial indices. Each combination of independent to response variable was considered on this classification analysis.

For each combination, the analysis started with a visual classification of each organisation. Then the correlation of each set (positive: I, III and C) or (negative: II, IV and C) was computed. Using an iterative approach, the points around the boundaries of each area were introduced one at a time to see if correlation improved. This procedure stopped when correlation could not be improved. It is important to notice that a given organisation did not classify as the same type in all combinations. The diagram presented in Figure 6.5 shows how the analysis for each combination of variables was performed.

Figure 6.5 Procedure to classify each company by type



On the first part of this analysis, the system's DIs were compared to each response variable. Depending on the position of each company in the scatter diagram of each combination, it was classified as type I, II, III, IV, C or O. Table 6.12 shows how many times each company was classified in each type (numbers under the NA column represent the number of response variables for which information was not available).

Table 6.12 Analysis of the system’s DI index versus each response variable

| Company's Name | Number of times classified as type: | | | | | | |
|-----------------------------|-------------------------------------|----|-----|----|---|----|----|
| | I | II | III | IV | C | O | NA |
| General Motors de México | 5 | 0 | 0 | 2 | 0 | 3 | 2 |
| Chrysler de México | 5 | 0 | 0 | 0 | 0 | 5 | 2 |
| GRUPO VITRO | 0 | 1 | 3 | 2 | 3 | 3 | 0 |
| GRUPO ALFA | 0 | 0 | 1 | 2 | 5 | 4 | 0 |
| Grupo Industrial BIMBO | 0 | 0 | 0 | 5 | 0 | 7 | 0 |
| Empresas La Moderna | 1 | 0 | 0 | 6 | 3 | 2 | 0 |
| FEMSA Cerveza | 2 | 0 | 0 | 5 | 1 | 4 | 0 |
| Grupo IMSA | 0 | 0 | 0 | 6 | 0 | 6 | 0 |
| Grupo CYDSA | 0 | 0 | 0 | 7 | 0 | 3 | 2 |
| Grupo Industrial Maseca | 2 | 0 | 2 | 0 | 5 | 3 | 0 |
| FEMSA Empaque | 0 | 4 | 3 | 0 | 0 | 5 | 0 |
| Embotelladora Metropolitana | 1 | 0 | 0 | 3 | 2 | 6 | 0 |
| Ganaderos Prod. Leche Pura | 2 | 0 | 0 | 0 | 0 | 10 | 0 |
| BASF Mexicana | 0 | 1 | 1 | 0 | 0 | 8 | 2 |
| John Deere | 2 | 0 | 0 | 1 | 1 | 8 | 0 |
| Metalsa | 1 | 1 | 0 | 1 | 2 | 7 | 0 |
| Ladrillera Monterrey | 0 | 1 | 6 | 1 | 0 | 4 | 0 |
| Cerrey | 0 | 0 | 0 | 7 | 1 | 4 | 0 |
| Helados Holanda | 0 | 1 | 5 | 0 | 1 | 3 | 2 |
| Fab. Calzado Canada | 0 | 1 | 4 | 0 | 0 | 7 | 0 |

| Company's Name | Number of times classified as type: | | | | | | |
|--------------------------------|-------------------------------------|----|-----|----|---|---|----|
| | I | II | III | IV | C | O | NA |
| Valvulas URREA | 1 | 0 | 5 | 0 | 1 | 5 | 0 |
| Electro Optica | 0 | 2 | 2 | 1 | 0 | 4 | 3 |
| Berol | 1 | 0 | 2 | 0 | 0 | 9 | 0 |
| Equipo Automotriz Hemex | 0 | 1 | 2 | 2 | 0 | 4 | 3 |
| SEARLE de Mexico | 6 | 0 | 0 | 1 | 0 | 5 | 0 |
| Industria Automotriz | 2 | 0 | 0 | 4 | 0 | 6 | 0 |
| Fab. y Represent. Industriales | 0 | 4 | 2 | 2 | 1 | 3 | 0 |
| Chocolatera de Jalisco | 2 | 2 | 3 | 0 | 0 | 5 | 0 |
| Soc. Electromecanica | 0 | 0 | 3 | 0 | 2 | 6 | 1 |
| Hilasal Mexicana | 0 | 0 | 2 | 1 | 2 | 7 | 0 |
| Refre-Mex | 2 | 3 | 1 | 0 | 3 | 3 | 0 |
| Industrias BAGO | 3 | 2 | 4 | 0 | 2 | 0 | 1 |
| Molinos Azteca | 1 | 0 | 0 | 5 | 1 | 5 | 0 |
| Ind. Metalicas Monterrey | 6 | 0 | 0 | 2 | 0 | 4 | 0 |
| Galvak | 1 | 0 | 1 | 2 | 2 | 6 | 0 |
| TERZA | 0 | 2 | 1 | 2 | 0 | 5 | 2 |
| Galvamet | 0 | 1 | 4 | 0 | 1 | 6 | 0 |
| HYLSA | 2 | 0 | 0 | 2 | 0 | 8 | 0 |
| Teleindustria Ericsson | 1 | 0 | 0 | 3 | 2 | 6 | 0 |
| Bebidas Azteca del Golfo | 2 | 0 | 0 | 2 | 1 | 6 | 1 |

Table 6.13 shows a summary of the analysis of the Leadership’s DIs versus each financial variable.

Table 6.13 Analysis of the leadership’s DI index versus each response variable

| Company's Name | Number of times classified as type: | | | | | | |
|-----------------------------|-------------------------------------|----|-----|----|---|---|----|
| | I | II | III | IV | C | O | NA |
| General Motors de México | 4 | 0 | 0 | 2 | 1 | 3 | 2 |
| Chrysler de México | 7 | 0 | 0 | 1 | 0 | 2 | 2 |
| GRUPO VITRO | 0 | 0 | 1 | 4 | 7 | 0 | 0 |
| GRUPO ALFA | 1 | 0 | 0 | 1 | 6 | 4 | 0 |
| Grupo Industrial BIMBO | 1 | 0 | 0 | 5 | 0 | 6 | 0 |
| Empresas La Moderna | 4 | 0 | 0 | 5 | 1 | 2 | 0 |
| FEMSA Cerveza | 2 | 0 | 1 | 3 | 0 | 6 | 0 |
| Grupo IMSA | 3 | 0 | 0 | 4 | 3 | 2 | 0 |
| Grupo CYDSA | 0 | 0 | 1 | 2 | 5 | 2 | 2 |
| Grupo Industrial Maseca | 0 | 2 | 2 | 0 | 4 | 4 | 0 |
| FEMSA Empaque | 0 | 5 | 2 | 0 | 4 | 1 | 0 |
| Embotelladora Metropolitana | 0 | 2 | 6 | 0 | 0 | 4 | 0 |
| Ganaderos Prod. Leche Pura | 0 | 1 | 1 | 2 | 3 | 5 | 0 |
| BASF Mexicana | 0 | 2 | 2 | 0 | 0 | 6 | 2 |
| John Deere | 4 | 0 | 0 | 2 | 0 | 6 | 0 |
| Metalsa | 7 | 0 | 0 | 2 | 0 | 3 | 0 |
| Ladrillera Monterrey | 0 | 3 | 4 | 0 | 0 | 5 | 0 |
| Cerrey | 3 | 0 | 0 | 4 | 3 | 2 | 0 |
| Helados Holanda | 0 | 0 | 5 | 0 | 0 | 5 | 2 |
| Fab. Calzado Canada | 1 | 0 | 0 | 2 | 0 | 9 | 0 |

| Company's Name | Number of times classified as type: | | | | | | |
|--------------------------------|-------------------------------------|----|-----|----|---|----|----|
| | I | II | III | IV | C | O | NA |
| Valvulas URREA | 0 | 2 | 5 | 0 | 0 | 5 | 0 |
| Electro Optica | 6 | 0 | 0 | 0 | 2 | 1 | 3 |
| Berol | 0 | 0 | 1 | 0 | 0 | 11 | 0 |
| Equipo Automotriz Hemex | 0 | 3 | 0 | 0 | 0 | 6 | 3 |
| SEARLE de Mexico | 7 | 0 | 0 | 1 | 1 | 3 | 0 |
| Industria Automotriz | 3 | 0 | 0 | 4 | 0 | 5 | 0 |
| Fab. y Represent. Industriales | 3 | 2 | 0 | 0 | 4 | 3 | 0 |
| Chocolatera de Jalisco | 0 | 3 | 1 | 0 | 0 | 8 | 0 |
| Soc. Electromecanica | 3 | 0 | 0 | 3 | 0 | 5 | 1 |
| Hilasal Mexicana | 0 | 3 | 4 | 0 | 1 | 4 | 0 |
| Refre-Mex | 0 | 4 | 1 | 1 | 1 | 5 | 0 |
| Industrias BAGO | 0 | 2 | 2 | 0 | 0 | 7 | 1 |
| Molinos Azteca | 1 | 0 | 0 | 5 | 2 | 4 | 0 |
| Ind. Metalicas Monterrey | 7 | 0 | 0 | 3 | 0 | 2 | 0 |
| Galvak | 0 | 3 | 3 | 1 | 2 | 3 | 0 |
| TERZA | 1 | 5 | 0 | 0 | 0 | 4 | 2 |
| Galvamet | 3 | 0 | 0 | 1 | 0 | 8 | 0 |
| HYLSA | 0 | 1 | 0 | 1 | 5 | 5 | 0 |
| Teleindustria Ericsson | 6 | 0 | 0 | 0 | 0 | 6 | 0 |
| Bebidas Azteca del Golfo | 2 | 0 | 0 | 3 | 0 | 6 | 1 |

Table 6.14 shows the results obtained when the average DI of the sub-systems strategic planning, marketing, management of human behaviour, management of operations and quality improvement, were compared to the response variables.

Table 6.14 Analysis of the average DI of the sub-systems S-M-H-O-Q versus each response variable

| Company's Name | Number of times classified as type: | | | | | | |
|-----------------------------|-------------------------------------|----|-----|----|---|---|----|
| | I | II | III | IV | C | O | NA |
| General Motors de México | 3 | 0 | 1 | 3 | 0 | 3 | 2 |
| Chrysler de México | 3 | 0 | 0 | 2 | 0 | 5 | 2 |
| GRUPO VITRO | 0 | 0 | 3 | 0 | 5 | 4 | 0 |
| GRUPO ALFA | 1 | 0 | 1 | 0 | 4 | 6 | 0 |
| Grupo Industrial BIMBO | 1 | 0 | 0 | 6 | 0 | 5 | 0 |
| Empresas La Moderna | 0 | 0 | 1 | 3 | 4 | 4 | 0 |
| FEMSA Cerveza | 2 | 0 | 0 | 8 | 0 | 2 | 0 |
| Grupo IMSA | 2 | 0 | 0 | 7 | 0 | 3 | 0 |
| Grupo CYDSA | 1 | 0 | 0 | 6 | 0 | 3 | 2 |
| Grupo Industrial Maseca | 1 | 0 | 0 | 2 | 5 | 4 | 0 |
| FEMSA Empaque | 1 | 3 | 4 | 0 | 0 | 4 | 0 |
| Embotelladora Metropolitana | 1 | 0 | 0 | 5 | 0 | 6 | 0 |
| Ganaderos Prod. Leche Pura | 2 | 0 | 0 | 4 | 0 | 6 | 0 |
| BASF Mexicana | 0 | 1 | 3 | 0 | 0 | 6 | 2 |
| John Deere | 1 | 0 | 0 | 2 | 0 | 9 | 0 |
| Metalsa | 6 | 0 | 0 | 3 | 0 | 3 | 0 |
| Ladrillera Monterrey | 0 | 0 | 8 | 0 | 0 | 4 | 0 |
| Cerrey | 2 | 0 | 0 | 7 | 0 | 3 | 0 |
| Helados Holanda | 0 | 2 | 6 | 0 | 0 | 2 | 2 |
| Fab. Calzado Canada | 0 | 1 | 3 | 0 | 0 | 8 | 0 |

| Company's Name | Number of times classified as type: | | | | | | |
|--------------------------------|-------------------------------------|----|-----|----|---|---|----|
| | I | II | III | IV | C | O | NA |
| Valvulas URREA | 0 | 1 | 9 | 0 | 0 | 2 | 0 |
| Electro Optica | 0 | 1 | 3 | 0 | 0 | 5 | 3 |
| Berol | 0 | 2 | 3 | 0 | 0 | 7 | 0 |
| Equipo Automotriz Hemex | 0 | 2 | 2 | 0 | 0 | 5 | 3 |
| SEARLE de Mexico | 5 | 0 | 0 | 1 | 0 | 6 | 0 |
| Industria Automotriz | 0 | 0 | 0 | 6 | 0 | 6 | 0 |
| Fab. y Represent. Industriales | 0 | 4 | 1 | 0 | 2 | 5 | 0 |
| Chocolatera de Jalisco | 0 | 2 | 3 | 0 | 1 | 6 | 0 |
| Soc. Electromecanica | 0 | 1 | 4 | 0 | 0 | 6 | 1 |
| Hilasal Mexicana | 2 | 0 | 0 | 3 | 1 | 6 | 0 |
| Refre-Mex | 0 | 4 | 4 | 0 | 1 | 3 | 0 |
| Industrias BAGO | 0 | 2 | 3 | 0 | 0 | 5 | 1 |
| Molinos Azteca | 3 | 0 | 0 | 7 | 0 | 2 | 0 |
| Ind. Metalicas Monterrey | 5 | 0 | 0 | 2 | 0 | 5 | 0 |
| Galvak | 1 | 0 | 1 | 4 | 2 | 4 | 0 |
| TERZA | 0 | 1 | 2 | 0 | 0 | 7 | 2 |
| Galvamet | 0 | 0 | 3 | 0 | 0 | 9 | 0 |
| HYLSA | 2 | 0 | 0 | 5 | 0 | 5 | 0 |
| Teleindustria Ericsson | 3 | 0 | 0 | 4 | 1 | 4 | 0 |
| Bebidas Azteca del Golfo | 0 | 0 | 0 | 5 | 0 | 6 | 1 |

Finally, Table 6.15 the results obtained when the average DI of the sub-systems process control and management of suppliers, were compared to the response variables.

Table 6.15 Analysis of the average DI of the sub-systems PC and MS versus each response variable

| Company's Name | Number of times classified as type: | | | | | | |
|-----------------------------|-------------------------------------|----|-----|----|---|----|----|
| | I | II | III | IV | C | O | NA |
| General Motors de México | 5 | 0 | 0 | 1 | 0 | 4 | 2 |
| Chrysler de México | 7 | 0 | 0 | 0 | 0 | 3 | 2 |
| GRUPO VITRO | 0 | 0 | 0 | 5 | 3 | 4 | 0 |
| GRUPO ALFA | 4 | 0 | 0 | 4 | 3 | 1 | 0 |
| Grupo Industrial BIMBO | 3 | 0 | 0 | 6 | 1 | 2 | 0 |
| Empresas La Moderna | 2 | 0 | 0 | 5 | 0 | 5 | 0 |
| FEMSA Cerveza | 1 | 1 | 0 | 2 | 5 | 3 | 0 |
| Grupo IMSA | 5 | 0 | 0 | 2 | 0 | 5 | 0 |
| Grupo CYDSA | 0 | 1 | 0 | 2 | 2 | 5 | 2 |
| Grupo Industrial Maseca | 0 | 4 | 4 | 0 | 4 | 0 | 0 |
| FEMSA Empaque | 0 | 4 | 1 | 0 | 1 | 6 | 0 |
| Embotelladora Metropolitana | 0 | 0 | 0 | 2 | 0 | 10 | 0 |
| Ganaderos Prod. Leche Pura | 1 | 0 | 0 | 3 | 1 | 7 | 0 |
| BASF Mexicana | 0 | 1 | 5 | 0 | 0 | 4 | 2 |
| John Deere | 2 | 0 | 0 | 0 | 0 | 10 | 0 |
| Metalsa | 1 | 2 | 1 | 0 | 2 | 6 | 0 |
| Ladrillera Monterrey | 0 | 2 | 7 | 0 | 0 | 3 | 0 |
| Cerrey | 2 | 0 | 0 | 3 | 0 | 7 | 0 |
| Helados Holanda | 0 | 1 | 4 | 1 | 1 | 3 | 2 |
| Fab. Calzado Canada | 0 | 1 | 0 | 0 | 0 | 11 | 0 |

| Company's Name | Number of times classified as type: | | | | | | |
|--------------------------------|-------------------------------------|----|-----|----|---|----|----|
| | I | II | III | IV | C | O | NA |
| Valvulas URREA | 0 | 1 | 5 | 0 | 0 | 6 | 0 |
| Electro Optica | 2 | 0 | 0 | 1 | 0 | 6 | 3 |
| Berol | 0 | 1 | 1 | 0 | 0 | 10 | 0 |
| Equipo Automotriz Hemex | 2 | 0 | 0 | 1 | 0 | 6 | 3 |
| SEARLE de Mexico | 7 | 0 | 0 | 0 | 0 | 5 | 0 |
| Industria Automotriz | 2 | 0 | 0 | 2 | 0 | 8 | 0 |
| Fab. y Represent. Industriales | 0 | 6 | 3 | 0 | 0 | 3 | 0 |
| Chocolatera de Jalisco | 3 | 2 | 1 | 0 | 4 | 2 | 0 |
| Soc. Electromecanica | 1 | 1 | 4 | 0 | 1 | 4 | 1 |
| Hilasal Mexicana | 0 | 2 | 4 | 0 | 2 | 4 | 0 |
| Refre-Mex | 0 | 7 | 2 | 0 | 0 | 3 | 0 |
| Industrias BAGO | 1 | 0 | 0 | 1 | 0 | 9 | 1 |
| Molinos Azteca | 2 | 0 | 0 | 3 | 0 | 7 | 0 |
| Ind. Metalicas Monterrey | 6 | 0 | 0 | 1 | 0 | 5 | 0 |
| Galvak | 0 | 1 | 1 | 1 | 2 | 7 | 0 |
| TERZA | 0 | 3 | 4 | 0 | 1 | 2 | 2 |
| Galvamet | 0 | 3 | 6 | 0 | 0 | 3 | 0 |
| HYLSA | 3 | 0 | 0 | 2 | 0 | 7 | 0 |
| Teleindustria Ericsson | 2 | 0 | 0 | 0 | 0 | 10 | 0 |
| Bebidas Azteca del Golfo | 0 | 0 | 0 | 1 | 0 | 10 | 1 |

The final classification of each company into one of types mentioned before, was made considering the type in which a given organisation fell more in the total 4 sets just presented. This total number of times is shown in Table 6.16 in which figures indicated in bold were used to highlight the classification of each company.

Table 6.16 Total number of times each company was classified in each type

| Company's Name | Number of times classified as type: | | | | | | |
|-----------------------------|-------------------------------------|----|-----|----|----|----|----|
| | I | II | III | IV | C | O | NA |
| General Motors de México | 17 | 0 | 1 | 8 | 1 | 13 | 8 |
| Chrysler de México | 22 | 0 | 0 | 3 | 0 | 15 | 8 |
| GRUPO VITRO | 0 | 1 | 7 | 11 | 18 | 11 | 0 |
| GRUPO ALFA | 6 | 0 | 2 | 7 | 18 | 15 | 0 |
| Grupo Industrial BIMBO | 5 | 0 | 0 | 22 | 1 | 20 | 0 |
| Empresas La Moderna | 7 | 0 | 1 | 19 | 8 | 13 | 0 |
| FEMSA Cerveza | 7 | 1 | 1 | 18 | 6 | 15 | 0 |
| Grupo IMSA | 10 | 0 | 0 | 19 | 3 | 16 | 0 |
| Grupo CYDSA | 1 | 1 | 1 | 17 | 7 | 13 | 8 |
| Grupo Industrial Maseca | 3 | 6 | 8 | 2 | 18 | 11 | 0 |
| FEMSA Empaque | 1 | 16 | 10 | 0 | 5 | 16 | 0 |
| Embotelladora Metropolitana | 2 | 2 | 6 | 10 | 2 | 26 | 0 |
| Ganaderos Prod. Leche Pura | 5 | 1 | 1 | 9 | 4 | 28 | 0 |
| BASF Mexicana | 0 | 5 | 11 | 0 | 0 | 24 | 8 |
| John Deere | 9 | 0 | 0 | 5 | 1 | 33 | 0 |
| Metalsa | 15 | 3 | 1 | 6 | 4 | 19 | 0 |
| Ladrillera Monterrey | 0 | 6 | 25 | 1 | 0 | 16 | 0 |
| Cerrey | 7 | 0 | 0 | 21 | 4 | 16 | 0 |
| Helados Holanda | 0 | 4 | 20 | 1 | 2 | 13 | 8 |
| Fab. Calzado Canada | 1 | 3 | 7 | 2 | 0 | 35 | 0 |

| Company's Name | Number of times classified as type: | | | | | | |
|--------------------------------|-------------------------------------|----|-----|----|---|----|----|
| | I | II | III | IV | C | O | NA |
| Valvulas URREA | 1 | 4 | 24 | 0 | 1 | 18 | 0 |
| Electro Optica | 8 | 3 | 5 | 2 | 2 | 16 | 12 |
| Berol | 1 | 3 | 7 | 0 | 0 | 37 | 0 |
| Equipo Automotriz Hemex | 2 | 6 | 4 | 3 | 0 | 21 | 12 |
| SEARLE de Mexico | 25 | 0 | 0 | 3 | 1 | 19 | 0 |
| Industria Automotriz | 7 | 0 | 0 | 16 | 0 | 25 | 0 |
| Fab. y Represent. Industriales | 3 | 16 | 6 | 2 | 7 | 14 | 0 |
| Chocolatera de Jalisco | 5 | 9 | 8 | 0 | 5 | 21 | 0 |
| Soc. Electromecanica | 4 | 2 | 11 | 3 | 3 | 21 | 4 |
| Hilasal Mexicana | 2 | 5 | 10 | 4 | 6 | 21 | 0 |
| Refre-Mex | 2 | 18 | 8 | 1 | 5 | 14 | 0 |
| Industrias BAGO | 4 | 6 | 9 | 1 | 2 | 21 | 4 |
| Molinos Azteca | 7 | 0 | 0 | 20 | 3 | 18 | 0 |
| Ind. Metalicas Monterrey | 24 | 0 | 0 | 8 | 0 | 16 | 0 |
| Galvak | 2 | 4 | 6 | 8 | 8 | 20 | 0 |
| TERZA | 1 | 11 | 7 | 2 | 1 | 18 | 8 |
| Galvamet | 3 | 4 | 13 | 1 | 1 | 26 | 0 |
| HYLSA | 7 | 1 | 0 | 10 | 5 | 25 | 0 |
| Teleindustria Ericsson | 12 | 0 | 0 | 7 | 3 | 26 | 0 |
| Bebidas Azteca del Golfo | 4 | 0 | 0 | 11 | 1 | 28 | 4 |

In summary, the companies more representative of what was called type I tend to be large, foreign owned and from the automobile sector:

| Company's Name | Position 1996 | Relative size | Origin of capital | Industrial sector |
|--------------------------------|---------------|---------------|-------------------|-------------------|
| General Motors de México | 3 | Large | Foreign | Automobile |
| Chrysler de México | 4 | Large | Foreign | Automobile |
| SEARLE de Mexico | 271 | Medium | Foreign | Pharmaceutical |
| Industrias Metalicas Monterrey | 445 (94) | Small | Mexico | Auto-parts |

The companies more representative of type II tend to be medium to small, Mexican and serving the market of intermediate goods:

| Company's Name | Position 1996 | Relative size | Origin of capital | Industrial sector |
|-----------------------------------|---------------|---------------|-------------------|-------------------|
| FEMSA Empaque | 87 | Large* | Mexico | Intermediate |
| Fabricaciones y Rep. Industriales | 300 | Medium | Mexico | Intermediate |
| Refractarios Mex | 426 | Small | Mexico | Intermediate |

* A conglomerate of medium sized organisation

Companies type III are medium sized, Mexican and attending diverse industrial sectors:

| Company's Name | Position 1996 | Relative size | Origin of capital | Industrial sector |
|--------------------------|------------------|------------------|----------------------|----------------------|
| Ladrillera Monterrey | 177 | Medium | Mexico | Construction |
| Helados Holanda | 206 | Medium | Mexico | Food |
| Valvulas URREA | 225 | Medium | Mexico | Metal |
| Cleaver Brooks de México | 320 | Medium | Foreign | Auto-parts |

Companies type IV tend to be large, all Mexican, and mostly serving end-consumers markets (food, tobacco, beverage, textile):

| Company's Name | Position 1996 | Relative size | Origin of capital | Industrial sector |
|------------------------|------------------|------------------|----------------------|----------------------|
| Grupo Industrial Bimbo | 14 | Large | Mexico | Food |
| Empresas La Moderna | 20 | Large | Mexico | Tobacco |
| Cerveceria Cuauhtemoc | 30 | Large | Mexico | Beverage |
| Grupo IMSA | 32 | Large | Mexico | Auto-parts |
| Grupo CYDSA | 40 | Large | Mexico | Textile |
| Cerrey | 193 | Medium | Mexico | Capital goods |
| Molinos Azteca | 203 (94) | Medium | Mexico | Food |

And companies type C are very large industrial conglomerates, Mexican and producing basic inputs for other companies:

| Company's Name | Position 1996 | Relative size | Origin of capital | Industrial sector |
|-------------------------|------------------|------------------|----------------------|----------------------|
| GRUPO VITRO | 5 | Large | Mexico | Glass |
| GRUPO ALFA | 6 | Large | Mexico | Steel |
| Grupo Industrial Maseca | 59 | Large | Mexico | Food |

After classifying the companies, the next step was to try to determine how other factors, external and internal, could be effecting negatively the profitability of these companies.

The following factors, presented in alphabetical order, were examined:

attitude and lack of co-operation of workers union
 availability of substitute products
 capability of the production process
 competence of top management
 competence of workers
 corporate values
 cost and availability of process technology
 cost of financing
 culture and social habits in the region
 customer value strategy
 development and design of new products
 educational level in the region
 effectiveness of middle management
 effectiveness to prevent and solve problems
 environmental restrictions / regulations
 flexibility to respond quickly to changes
 fringe benefits given to employees
 future perspective of the business
 history and reputation of the company
 income taxes
 infrastructure available to support operations
 internal decision making process
 leadership of top managers
 logistic systems for supply and distribution
 long term strategic planning
 management of financial resources
 management of human resources
 marketing and promotion activities
 maturity / obsolescence of products offered to the market
 morale / enthusiasm of employees
 operation's planning
 organisational culture
 power of competitors
 power of suppliers
 pressures from social groups
 productivity of the production process
 profits re-investment policy
 purchasing power of customers
 quality policies
 rewards and recognition policy
 scarcity of raw materials
 service attitude of employees
 social and political environment
 status of domestic economy
 status of World's economy
 threat of new competitors entering into the market

- a) organisations type I rely on the productivity of their production process, and in excellent planning and leadership
- b) the profitability of organisations type II is supported on the same strategies as in type I (with the exception of productivity), plus a customer orientation and good managerial decisions regarding the use of financial resources
- c) in the case of organisations type IV, their low P index, despite their high DI index, is mainly due to their rigidity and inability to respond fast to market needs, their ineffectiveness to prevent and solve problems, and a decreased purchasing power of consumers during 1995
- d) organisations type III not only had consumers with a low purchasing power during 1995, but they are also supplied by organisations stronger than them, compete in a market where many substitute products are available and easy to enter in, and have high costs of financing.

In summary, profitable organisations know how to manage effectively their own business, while organisations with low profitability are controlled by external factors.

Finally, the recursive approach used for the analyses presented in the present chapter, that went from general aspects to very specific details, allowed the following general conclusions to be made.

1) Although total quality management is a management concept widely adopted by Mexican industry, the programmes analysed concentrate primarily in defining their organisations through a mission statement, and setting-up procedures to assure the quality of the finished products. Other quality management processes are also incorporated; however, most of the processes that must play the role of feeding information back in the sub-systems contained within the system are not receiving proper attention, with the exception perhaps of the quality improvement sub-system (see Figure 6.1). For example, companies do not take care properly on the way the

expectations of other stakeholders than shareholders and customers, are being satisfied. This situation means they may not have a clear policy on how to distribute the benefits generated by the operation. Mexican industrial companies do not have suitable procedures to create and deploy strategic guidelines down to the operation, they only develop generic competitive strategies which are neither totally useful, because normally do not consider the information on competitors' strengths and weaknesses as an input; even and when they assign a considerable amount of resources for education, training and promotion of a quality culture, the loop is not closed with the measurement and analysis of the employees' performance and satisfaction plus a reasonable programme of rewards and recognition; finally, not the production process, neither the administrative process are properly controlled.

2) It is easy to argue that the lack of correlation between the degree of implementation of quality management processes and profitability is due to strong external factors, such as the peso crisis faced by Mexican organisations during 1995 (year from which financial information was gathered). Nevertheless, it is important to highlight that despite those problems, companies with management systems supported on a strong leadership, capable of supplying the operation with competitive strategies and with procedures to improve the quality and productivity of their processes, or perhaps with the ability to switch fast to foreign markets (most companies type I are foreign owned), were able to face successfully the economic crisis of 1995, regardless of their DI indices and the sector in which they compete. Moreover, this study provides useful information on which sub-system a company should put more emphasis according to the experience of successful organisations from its industrial sector.

Table 6.17 shows clearly why companies type I with high DI indices have also high P indices, while companies type III with low DI indices got the worst financial performance. Companies type II have a high P index although their QM system is weak, mainly because their internal strengths, based on the practice of other management techniques, as shown in Figure 6.6; however, companies type IV with a reasonable DI index, showed a financial performance not so good because their management system does not include complimentary management processes in addition to quality improvement and management of operations.

Table 6.17 DI indices by type of company

| | Type I | Type II | Type III | Type IV |
|-------------------------------|--------|---------|----------|---------|
| DI-Leadership | 5.8 | 5.3 | 4.8 | 5.6 |
| DI-Strategic Planning | 5.8 | 3.7 | 4.5 | 5.5 |
| DI-Human Behaviour Management | 5.8 | 4.7 | 3.6 | 5.1 |
| DI-Marketing | 6.0 | 3.8 | 3.4 | 4.7 |
| DI-Operations Management | 6.0 | 4.6 | 4.1 | 5.5 |
| DI-Process Control | 6.0 | 2.5 | 2.3 | 5.1 |
| DI-Management of Suppliers | 6.0 | 3.2 | 4.2 | 5.0 |
| DI-Quality improvement | 5.9 | 4.1 | 2.9 | 5.4 |
| DI-System | 5.9 | 4.3 | 4.0 | 5.3 |
| SS index | 1.4 | 0.7 | 0.9 | 1.5 |
| P index | 0.75 | 0.8 | -0.3 | 0.2 |

3) the implementation of quality management indeed contributes to strengthen the financial position of a company, but only if it is done using a systemic or total approach, as in the proposed system, reinforced with good management practices such as having an effective customer value strategy, good management decisions on the re-invest of the financial surplus resources, a service attitude of employees, a competent logistic system for supply and distribution, marketing and promotion activities, an effective leadership by competent top managers and a productive production process. QM without these elements has proved not to be effective in Mexican industry.

CHAPTER 7

RECOMMENDATIONS FOR THE INCORPORATION OF TQM INTO THE MANAGEMENT SYSTEM

7.1 Introduction

The investigation performed on Mexican labour-intensive organisations and discussed in Chapter 6, confirms the hypothesis that quality management is present in almost every company of this industrial sector. However, its outcome showed a wide variety of implementation and management strategies. This fact proves that the incorporation of quality management processes into a management system should consider the special needs and characteristics not only of each industrial sub-sector, but also of each company.

The four types of companies identified at the end of Chapter 6 provided important information for the design of a quality management system. Perhaps the most important lesson obtained is that using every quality management process available is not an indispensable requirement to achieve good profitability. This does not mean that quality management theory is worthless for the Mexican environment. Depending upon the particular characteristics of each company, some QM processes are more appropriate than others. On the other hand, the implementation of quality management as an isolated programme within the management system proved not to be effective to improve the profitability of a company. The incorporation of a quality management programme into the management system of a company should be performed in a systemic way. A systemic approach requires the consideration of the technical and cultural background, as well as the capacity of the organisation to manage, not only internal, but also external forces.

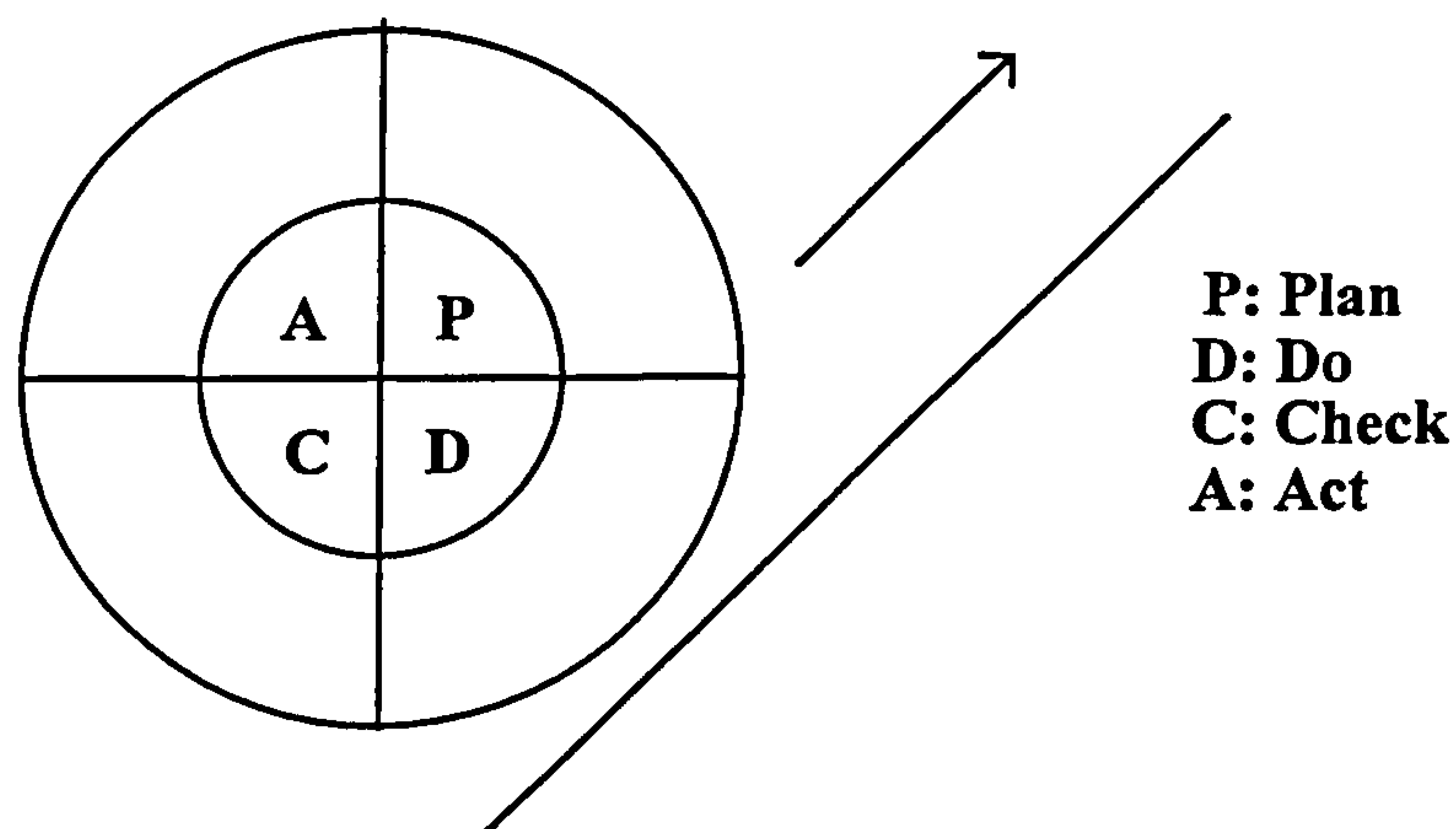
The administrative system of an organisation, the products and services' quality requirements expected by customers, and total quality concepts should interact to integrate a total quality management system.

Company's CEO, its Director, and his or her immediate team is responsible to provide the direction required at the operational level of the organisation. Direction ensures the fulfilment of its mission, and the move towards its vision within the boundaries defined in the corporate values. Top management and middle management play a different role in a TQM system. However, the basic functions used for management are the same.

Top management should do two things to promote effectively the implementation of TQM: 1) participate in activities for product's quality assurance, identifying customers' requirements and making sure to fulfil them, and 2) put in practice a TQM system, establishing corporate quality policies, and promoting their internalisation by respecting them without exemption.

Total quality is an activity that should be performed as an integral part of the normal operation in a company. For this reason, it needs to be managed by the PDCA cycle, as shown in Figure 7.1

Figure 7.1 The PDCA cycle



Under this concept, in the implementation of a total quality system, the PLAN phase focuses on the identification of problems to solve by the implementation of a TQ system; in the DO phase, the organisation develops and implement the total quality processes to include in the system; in the CHECK phase, an audit to the system is performed; and in the ACT phase, the original plan is standardised or modified, depending on the outcome of the auditory.

An important pillar of a quality management system is the continuous improvement of every organisational process assuring the fulfilment of company's mission. Top management provides direction to the organisation defining a mission oriented to fulfil stakeholders' expectations through customers' satisfaction. However, the leadership of top managers will never be effective just because they provide direction. They need to be involved in the continuous improvement required to move organisational processes in the right direction and at the right pace. Despite this clear need of their involvement, the lack of interest in doing so is usually the main obstacle for the implementation of a quality management system. Some of the most important reasons for this behaviour could be:

- 1) Top managers know just a little of total quality management theory.
- 2) They show apathy because do not believe in the benefits of TQM.
- 3) They think are acting in the right way, but they do not know they are not.
- 4) They do not know their role in the implementation and execution of a total quality system.
- 5) The objectives for implementing the system are not clear.
- 6) There are not clear policies for customers' satisfaction (which is only a mere slogan).
- 7) There is a misunderstanding between incorporating quality management into the same administrative system and its redesign under a quality management scope.
- 8) The lack of a clear and adequate implementation plan.
- 9) The implementation plan gives much emphasis to theory and not to ensure the practical learning of TQM techniques.
- 10) A misunderstanding of the role of teamwork, specially at the lower levels where sometimes the quality control circles are conceptualised as a problem-solving mechanism and not as a process for human development.

A quality management system starts with the analysis of the reasons that led to its implementation, defining the goals and objectives pursued. This analysis supports the implementation plan required to achieve these goals and objectives, under a continuous improvement approach. This plan should detail the quality management activities recommended to incorporate into the management system, to improve company's

competitiveness. Additionally, it requires an organisational plan detailing the responsibilities of each team in every process of the value chain.

Companies structured by functions, not by processes, usually create an inter-functional (matrix) structure. Such structures do not contribute to develop a collaborative attitude within the organisation. Inter-functional structures require a global co-ordination from top management. In the absence of a culture of continuous improvement and customers' satisfaction, this co-ordination tends to be an almost impossible task, because of the different interests of the people responsible for each function.

Top management should promote educational activities to reinforce the development of a culture of continuous improvement and an attitude oriented to customers' satisfaction.

Once the quality management system has started, top management should check if the original plan is being effective. Usually, these audits to the system are conducted twice a year, and their outcome should be incorporated into the next plan.

The implementation of total quality requires a change in the behaviour of individuals and teams, but also the set-up of an organisational infrastructure that supports its operation. On the other hand, there is not a system applicable to all companies; each one of them has its own characteristics, and therefore each system requires some modifications to make it more effective. The conceptual model introduced in Chapter 5 is a generic one and needs some adaptations to make it more useful. It is necessary to start with a self-diagnosis to know the company's status regarding the technology, organisational processes, social environment, etc. The guide to perform this self-diagnosis is introduced in the next section of this Chapter.

The model's implementation requires the re-definition of its processes in terms of procedures and techniques, assigning a team responsible for their management. Each team will act as processors, suppliers or customers, depending upon its role in each process of the model.

Additionally, each process should have an indicator to measure its effectiveness in contributing to achieve the expected performance of the organisation. These indicators

are a quantitative index related to each process' outcome, and are used to assess team's performance. Each organisation should define its indicators according to its own characteristics and needs of competitiveness. Organisational performance can be measured by several indicators: the cost of poor quality, financial profitability, market share, employees' satisfaction, the achievement of a quality award, the quality of the finished product, the productivity of its operation, etc. However, the recommendation is to use an index that combines several of those indices just mentioned, in such a way that it measures the fulfilment of company's mission.

An important step at the beginning of the system's implementation is the establishment of a Quality Steering Committee, and the assignment of a co-ordinator. The QSC and its co-ordinator are responsible for planning and executing the implementation process.

This chapter presents a set of recommendations on how to implement a quality management system, integrating it effectively into the management system of the organisation. These recommendations are supported on the findings of the field investigation, and perhaps apply only to companies with similar characteristics to those of the organisations investigated. In the first section, it is introduced a procedure to determine the weaknesses and strengths (technical and cultural) of the organisation. This procedure will be called the "self-diagnosis". The self-diagnosis' outcome is used for selecting the most appropriate quality management processes to be incorporated into the management system that will allow the organisation to improve its financial performance after implementation. The section after presents some strategies to plan the implementation programme, including how, when and who is responsible for the incorporation of the QM processes selected. Once defined the implementation strategy, the next step will be to discuss the involvement of top executives in the leadership for the operation of the quality management system. The following aspects will be presented for this purpose.

- 1) Analysis of company's mission, vision and values regarding their focus on the fulfilment of stakeholders' expectations.
- 2) Analysis of weaknesses and core competence of competitors, through Benchmarking.

- 3) Development of corporate strategies and determination of the quality policy for customers' satisfaction.
- 4) Strategic re-engineering actions for the re-invention of major processes required to assure the fulfilment of company's mission and vision within the corporate values, and in the direction established by the strategies.
- 5) Deployment of the strategic guidelines as an input to the operational planning of products, processes and administrative procedures.
- 6) Assessment, compensation and recognition of human performance under the new managerial concept.
- 7) The role of top and middle management in the quality steering committee.
- 8) Methods to improve the communication and participation of people.
- 9) Characteristics of the educational and training programmes.
- 10) Procedures to manage teamwork for the control and continuous improvement of quality.
- 11) Measurement of mission's fulfilment in direction to the vision within the corporate values and showing respect for the quality policy.
- 12) Suggestions to solve the obstacles presented during the implementation and operation of the system.

Finally, the last section introduces the suggested procedure to perform the audit to the management system by the QSC. Audits allow the tracing of the performance of the system detecting possible obstacles, to assess the convenience to redefine it or to change the strategies being used for its implementation.

7.2 The self-diagnosis

The purpose of the self-diagnosis is to assess the current conditions in which the company is operating. It is recommended to perform a self-diagnosis, not an external one without participation of company's employees and managers. This strategy reinforces the idea that the implementation of the quality management system responds to a need internally recognised for improving the company's competitiveness. This self-diagnosis should covers technological and social aspects, as well as the organisation's managerial capability and the congruency between its culture and the "ideal" cultural environment required for the lowest possible resistance to change.

The self- diagnosis concentrates on the following aspects:

- 1) historical background and reputation of the company
- 2) top management leadership and commitment
- 3) business definition (mission, vision and values)
- 4) influence of stakeholders
- 5) customer needs, expectations and satisfaction
- 6) competitors' strengths and weaknesses
- 7) strategic planning process
- 8) administrative procedures
- 9) process technology and production facilities
- 10) management of suppliers and incoming materials control
- 11) human relations and work environment
- 12) education and training
- 13) product design
- 14) operations management
- 15) innovation, research and development
- 16) production process planning and control
- 17) quality control of the finished product
- 18) product delivery and customer's service
- 19) continuous quality improvement

It is important to notice that the aspects included in the questionnaire are focused on measuring the presence or absence of the processes, activities or techniques suggested in the conceptual model introduced in Chapter 5.

To conduct the self-diagnosis, affirmative phrases covering diverse aspects of each area are presented to different people within the company for its assessment. It is important to include the opinion of at least two people from each organisational level (operational, middle and top management) and from each major organisational process in the assessment of each phrase.

To assess each phrase, it is suggested to use a scale of four grades. The recommended four grades are:

- (1) if his or her opinion is totally opposed to the one in the phrase.
- (2) if he or she disagrees,
- (3) if he or she simply agree, and
- (4) if the respondent totally agrees with the statement of the phrase,

The purpose of using four options (and not five) is to avoid the respondents taking a central tendency. This situation occurs when a person feels that his or her opinion will not be seen well by the bosses, or because a self-critique is involved in the statement under assessment.

The questionnaire to use for the self-diagnosis is presented next. The format shown after the questionnaire in Table 7.1, is suggested for the summary of the responses of each person.

SELF-DIAGNOSIS

The following statements intend to describe “ideal” situations required for quality management implementation. Please grade each condition using this scale: (1) if your opinion is totally opposed to the one presented in the statement, (2) if you disagree, (3) if you simply agree, and (4) if you totally agree.

Position of respondent _____

Date (day/month/year) ____ / ____ / ____

Historical background, reputation and future of the company

1. The company has been long time in the business without any major concerns regarding its external image and reputation.
2. The most important shareholders of the company are well respected persons, and their reputation is without any doubt the best possible.
3. Never, any product associated to the company in the market has been involved in a major quality or liability problem.
4. The CEO or any of the top executives of the company has been never involved in a public scandal that could put in doubt his or her own, or company's reputation and/or image.
5. Any employee of the company has been never involved in a public scandal affecting company's reputation and/or image.
6. Company's future is very promising since its business is in an early stage on the maturity curve, or because technological, social, demographic and/or economic factors indicate so.

Top management leadership and commitment

7. Top management knows clearly and fully understands what each stakeholder expects from the company.
8. Top management measures (at least once a year) the degree of satisfaction achieved on the fulfilment of stakeholders' expectations.
9. Each of the top executives responsible for each major area of the company is totally committed to the success of the quality management system.
10. Top managers, with no exemption, are fully involved in planning, controlling and improving the operation of his or her area towards the satisfaction of their internal and external customers.
11. The company has a formal procedure to perform audits on the quality management system and uses audit's outcome to redirect (if necessary) the total quality programme.

12. The company has a quality steering committee whose responsibilities are to manage the quality improvement projects, to implement procedures and actions to modify the corporate culture, and to promote individuals' innovation and creativity.

Business definition (mission, vision and values)

13. The company has a mission statement supporting the definition of the strategic and operational framework that allows the fulfilment of the stakeholders' expectations.

14. There is also a vision statement, which helps everybody in the organisation to know the desired competitive position in the near future. It is also used to define the strategic and operational framework.

15. The corporate social and cultural values are clearly defined and used as well to set-up the strategic and operational framework of the company.

Influence of stakeholders

16. The group of shareholders is committed to company's future by supporting its competitive position through adequate strategies and policies in search of a world-class organisation.

17. The society in general has a very favourable attitude to the operation and existence of the company.

18. Regulations imposed by the Government to the company do not cause any serious disruption in its operation and fulfilment of its mission.

19. Employees' interests are congruent with company's interests, which assures their collaboration in any effort intended to strengthen the company's competitive position.

20. The best way (if not the only one) to stay in business is by keeping satisfied permanently the customers' expectations on the most important market segments.

21. The expectations and interests of the most important suppliers are congruent with company's own expectations and interests, so it is very feasible to establish a collaborative effort for total quality.

22. The company has an adequate policy for profits and benefits distribution among stakeholders, so their expectations can be accomplished.

Customer needs, expectations and satisfaction

23. The needs and expectations of the customers in each market segment are known and understood. The company is fully capable to include them into the products and services it offers.

24. Customer satisfaction is frequently measured by comparing the product and/or service of the company against competitors' product and/or service.

25. An interdisciplinary team in the company is responsible to study the process followed by customers to decide whom, where, when, how and what to buy.

26. The company's market share is known for each segment market in which it participates.

27. Complaints from the market are quickly attended, restoring in most cases the level of satisfaction of the customer(s) involved.

28. A quality policy is established to make clear the importance for the company of satisfying customers' needs and expectations.

Competitors' strengths and weaknesses

29. Every competitor (direct and indirect), as well as the main products and services they offers are clearly identified.

30. The quality, strengths and weaknesses of competitors' products are fully analysed and compared to company's own products.

31. Benchmarking analysis or another similar technique is used to incorporate to the company's operations the "best processes" used by competitors or other companies.

32. Company's products are strongly positioned (in comparison to competitors' products) in their respective market segments and their brand names are a symbol of quality.

Strategic planning process

33. The generic strategy (cost, differentiation, etc.) is clear and congruent with the mission and vision statements, and oriented to create the core competence of the company.

34. The mid-term and long-term strategic planning process is helping the company to get a competitive position.

35. Goals and objectives, clearly related to company's mission, are defined at all organisational levels.

36. The company's strategic guidelines are defined considering the availability of process technology (soft and hard) as an input variable.

37. The strategic guidelines are defined as well in terms of the capital available for re-investment according to a policy used for this purpose.

38. For the definition of the corporate strategic guidelines, company's mission, vision and the corporate social and cultural values are also taken into consideration.

39. The benchmarking analysis technique is used to support the definition of the strategic guidelines.

40. By using information on company's performance, re-engineering actions are implemented to adjust the strategic planning process.

41. The company has a quality policy, which is extended throughout the organisation, so each administrative and productive process can periodical and congruently define their own goals and objectives.

42. Business process re-engineering or another similar technique is used by the top managers when they realise that the lack of fulfilment to goals and objectives is so strong that a major change is required in the business.

Administrative procedures

43. The administration process supporting the operation allows everybody within the company to make decisions congruent with the total quality management principles.

44. The information system of the company provides data efficiently and on time for decision making at all levels.

45. In congruency with the strategic guidelines, and the goals and objectives of the company, the administrative process is structured as a value chain of processes oriented to satisfy the needs of their internal customer, according to the quality policy.

46. To assure its effectiveness, every process of the administrative process is formally measured and documented.

Process technology and production facilities

47. Process technology used for production, as well the respective machinery and equipment, provide the capability required to satisfy the customer needs today and in the future.

48. Actual production facilities (machinery, equipment, building, etc. for production and materials handling) are in a very good shape and constitute one the core competence of the company.

49. There is an efficient maintenance programme that helps to keep the machinery and production equipment in good shape and capable to meet operational requirements. So, the production programme does never suffer unexpected breakdowns.

50. The production capacity is larger enough than demand from the market. So, there is no risk of being motivated to force the process to produce beyond its capacity, increasing the probability of delivering low quality product to the market.

51. The risk of a shortage in electricity or other type of energy supply is so low that it is almost impossible to deliver late, or in poor quality conditions, the finished product to the market because of this cause.

52. There is an efficient off-time programme for preventive maintenance.

53. The plant has the most adequate equipment for materials handling to perform this operation in the most efficient way and to avoid product damage during transportation.

54. Work-stations are ergonomically designed in such a way that production workers operate in the best possible environment.

Management of suppliers and incoming materials control

55. There are efficient procedures within the company to assess the potential capability of new and current suppliers.

56. Delivery time from suppliers is reliable and has never delayed a delivery of finished product to the market.

57. Suppliers always become paid on time and the risk for a shortage in supply because of a late payment is very low.

58. The raw materials inventory policy is adequate and in any way contributes to diminish the quality of the finished product or the delivery time.

59. There are documented procedures for the reception, sampling and inspection of incoming materials.

60. The areas set aside for non-quality products (quarantine), are clearly apart from those assigned to quality products ready for next process.

61. The specifications for raw materials are in a written and actualised form, and always available for everybody within the production process and the laboratories.

62. There is a formal programme for the calibration of precision measurement instruments.

63. The company requires to its suppliers the implementation of a statistical process control programme, so they can provide statistical evidence of the conditions in which each lot was produced.

64. There are formal procedures, fully documented to assure the quality of inputs from suppliers.

65. The company has a programme to select suppliers, and to audit and improve the quality of inputs.

66. In general, the suppliers of the most important incoming materials are capable to operate on a "just-in-time" basis.

67. The logistics system for procurement of raw materials is capable to supply them on-time and in the variety and volume required for production.

Human relations and work environment

68. The workers' union is collaborative and does not interfere the operation affecting the quality of the finished product or its on-time delivery.

69. The expertise of the administrative staff is at least the one required to manage adequately the operation.

70. The personnel's turnover rate at the administration staff level is so low that the company's operation is not affected by it.

71. The hiring policy and its associated procedures are appropriate for the total quality management system and congruent with its principles.

72. Skills of production workers contribute to provide the capability needed for a competitive production process.

73. The personnel's turnover rate in the production staff is so low that the company's operation is not affected by it.

74. Employees' compensation is competitive, and in any case a source of dissatisfaction.

75. Top management and/or the quality steering committee (qsc) monitor the employees' performance and satisfaction to define or modify the way in which quality concepts are promoted among them.

76. Top management and/or the quality steering committee measure the performance and degree of satisfaction of employees to define or modify the training and educational programmes on quality.

77. Top management and/or the quality steering committee, rewards and recognises those employees achieving an outstanding quality performance, to reinforce their satisfaction and performance.

78. There is a formal procedure to measure the employees' degree of job satisfaction.

79. The company has a formal procedure to measure the employees' on the job performance.

80. Top management and/or the quality steering committee frequently take action to adjust or modify the corporate culture as necessary.

81. The morale prevailing among the employees at all levels is high and is the source of their motivation for a quality performance.

82. Employees, specially those attending directly customers, observe a high "service attitude", and are always willing to satisfy customers' requirements.

83. The labour climate is good and appropriate for the collaborative effort required for teamwork in the quality management system.

84. The employees, specially those who directly attend customers, always observe a quality service attitude.

Education and training

85. The company's training and induction programmes are adequate and provide support for the quality management system.

86. There is a formal training programme assuring the development of the production workers' skills.

87. There is a formal educational programme supporting the human development of employees at all levels and helping to develop the collaborative attitude required in the total quality system.

88. Every production worker is effectively trained in statistical process control.

89. All production workers are formally trained to use the same methodology to analyse and solve problems through teamwork.

90. The company has a policy for the promotion of the educational development of its employees at all levels.

91. The promotion and compensation systems used in the company consider as an important factor the progress and interest of the employees in training and education.

Product design

92. Company's products and related services are designed only after a wide analysis of the market needs and expectations, and every specification is intended to satisfy them.

93. In the event of a trade-off between a product specification and its manufacturing cost, the prevailing criteria is always the satisfaction of customers' needs and expectations.

94. The (re)design of new products and services is always congruent with the mission statement.

95. Company's products and related services are designed in congruency with the goals and objectives determined in the quality policy.

96. To design new products or to review the existing ones, the company has a formal procedure based on the use of the "quality function deployment" technique.

Operations management

97. There are formal information systems that link the production operation to the administration process.

98. To assess the effectiveness of the production operation, the productivity of the production process is formally measured and documented.

99. To assess the effectiveness of the operation, the quality of the finished product is formally measured and documented.

100. The manufacturing system can be considered a "lean" process in which the production follows a smooth sequence of activities without unnecessary waste of time.

101. There is an effective system to forecast the sales level that helps to manage the operation in an optimal way.

102. The production scheduling system is capable to manage in an effective way the facilities available in relation to the volume, variety of products and delivery time demanded by customers.

103. The facilities and procedures available for inventory management allows the optimisation of the production process in terms of quality, cost and customer service.

104. Actual layout is congruent with the production and inventory systems required for an effective management of the operation.

105. There are formal methods and work standards, as well as material handling procedures and production control devices to optimise the production process.

106. Company's operation is as flexible as required to respond quickly to changes coming from the market.

Innovation, research and development

107. The actual technological level of the manufacturing process is the most appropriate to support a competitive position.

108. A department of technology research and development is established or hired to support the company's competitive position.

109. The company is technological independent assuring the development of new products and services.

110. The research and development department receives support from external research institutions to improve its performance.

111. It is a company's policy to stay ahead of competitors in technology research and development.

112. The employees at the research and development department are very competent.

113. The laboratory where the company's technology is developed is high tech.

114. The company has established agreements with the most important suppliers for technology development, assuring confidentiality.

Production process planning and control

115. The current design of the production process is the most appropriate to meet the customer needs and expectations.

116. The production process is planned in congruency with the goals and objectives defined in the quality policy.

117. Every production operation and its respective control items are formally documented, and these procedures are available without restrictions for all those involved.

118. There is an efficient system to trace back any quality problem during the production process.

119. Statistical Process Control (SPC) is effectively applied to control all the relevant process variables.

120. The procedure used to define the relevant process variables follows the general principles of the process control theory.

121. The SPC system is linked to a decision making process capable to re-establish any out-of-control situation and to support the continuous improvement effort.

122. The most important production processes are capable to produce the specifications required by customers according to the SPC "6 σ " criteria.

123. There is a formal programme for the frequent calibration of the equipment for measurement.

124. Different procedures and techniques, in addition to SPC, are used to exercise process control actions.

Quality control of the finished product

125. If there is a quality problem in the finished product, a team of top level executives analyses the consequences of sending it to the market. Customer satisfaction gets a very high priority in this analysis.

126. All the criteria to determine the acceptability of the finished product are defined, documented and available to the personnel involved in the production process.

127. In the event of a non-conformance lot of finished product, the team involved in determining its "fitness for use" is totally aware and respectable of the customer needs and expectations.

128. There are formal and strict procedures to ensure that never a non-conformance lot of finished product will be sent to the customer.

129. It is a company's policy to attach a "certificate of quality" to every lot of finished product. On it, statistical evidence of the conditions that prevailed during the production process is included.

Product delivery and customer service

130. The delivery system of finished products to the customer is capable to operate on a "just-in-time" basis, providing the required quantity and quality where and when the customer needs them.

131. The warehousing facilities (in the plant and at the distribution centres) provide the environmental conditions to avoid the deterioration of the quality of the finished product.

132. The service department has high quality facilities and competent people to support a quick and effective response to every complaint coming from the market.

133. There is statistical evidence about the opinion of the customers regarding the service provided to attend their complaints and enquires.

134. The logistics system for the distribution of finished products is fully capable to deliver them on-time and in the amount and variety demanded by the customers.

Continuous quality improvement

135. There is an appropriate programme for the continuous improvement of process capability.

136. A programme for continuous improvement of quality and productivity is implemented and in operation.

137. There is a formal process fully documented for the management of quality improvement projects.

138. Teamwork is used to carry out quality improvement projects with the objective of improving the manufacturing operation, quality of inputs, and to modify the corporate culture.

139. The PDCA cycle is internalised by every employee, who fully use it for the continuous improvement of his or her daily routine work.

140. In general, the company counts on effective procedures to solve and prevent problems.

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| Past, reputation, future | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 2 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 43 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Mission, vision, values | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 127 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Stakeholders | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 16 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 18 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

It is recommended to apply the questionnaire to 31 persons within the company as follows: to the company's Director; to the top managers responsible for each of the six major processes in the value chain (procurement, manufacturing, product design, marketing, operation's technical support and operation's administrative support); to two middle managers, and to two operational employees of each major organisational processes. In this way, the opinion of more people from different organisational levels will provide a stronger assessment of the real situation of every aspect involved in the diagnosis.

Before accepting as valid the average opinion of the 31 people involved in the self-diagnosis, it is suggested to perform a statistical analysis to check for consistency in the two organisational directions involved: hierarchical level and process of the value chain. There are two statistical tests recommended for this purpose. In both cases, it is suggested to use confidence level of 95%.

- 1) An Analysis-of-Variance (ANOVA) (Montgomery 1991) using as “treatments” the answers supplied by people from different hierarchical levels (upper, middle and lower). If the analysis shows an inconsistency for one or more process, a further investigation will be required until consistency is reached.
- 2) An estimate of the “confidence interval” for the means obtained on each process of the value chain. If one or more means were out of the confidence interval, a further investigation will be required until all means are within the interval.

To ease the statistical analysis, the 31 data obtained for each question can be summarised on Table 7.2

Table 7.2 Summary of answers by question

Question number

| Process in the value chain | | | | | | | | | | | | | Operation's Support | | | | | | |
|----------------------------|-------------|---|-------|---------------|---|-------|----------------|---|-------|-----------|---|-------|---------------------|---|-------|----------------|---|-------|---------|
| Sample | Procurement | | | Manufacturing | | | Product Design | | | Marketing | | | Technical | | | Administrative | | | μ_T |
| | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | |
| Upper management * | | | | | | | | | | | | | | | | | | | |
| Middle management ** | | | | | | | | | | | | | | | | | | | |
| Operational personnel ** | | | | | | | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | | | | | | | |

* At this level, sample 1 is the answer of Company's Director, and sample 2 the answer of the person in charge of the process involved.

** Respondents should be selected randomly

The purpose of both statistical analyses is to validate the answers. If for every organisational level, and every major process all answers are statistically the same, the mean obtained represents strong enough evidence to make conclusions on that question. If not, the team in charge of the self-diagnosis will have to use other tools, such as observation and the analysis of past information, before reaching a conclusion. Three examples can help to understand this concept.

Example 7.1 Analysis of answers for a given question showing consistency

Question number 24. Customer satisfaction is frequently measured by comparing the product and/or service of the company against competitors' product and/or service.

| Sample | Process in the value chain | | | | | | | | | | | | Operation's Support | | | | | | μ_T |
|-----------------------|----------------------------|---|-------|---------------|---|-------|----------------|---|-------|-----------|---|-------|---------------------|---|-------|----------------|---|-------|---------|
| | Procurement | | | Manufacturing | | | Product Design | | | Marketing | | | Technical | | | Administrative | | | |
| | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | |
| Upper management | 2 | 3 | 2.5 | 2 | 1 | 1.5 | 2 | 3 | 2.5 | 2 | 3 | 2.5 | 2 | 2 | 2.0 | 2 | 4 | 3.0 | 3.5 |
| Middle management | 2 | 3 | 2.5 | 3 | 2 | 2.5 | 3 | 2 | 2.5 | 3 | 4 | 3.5 | 4 | 3 | 3.5 | 3 | 3 | 3.0 | 3.0 |
| Operational personnel | 3 | 2 | 2.5 | 4 | 3 | 3.5 | 2 | 3 | 2.5 | 3 | 2 | 2.5 | 1 | 4 | 2.5 | 3 | 1 | 2.0 | 1.5 |
| Average | | | 2.5 | | | 2.5 | | | 2.5 | | | 2.8 | | | 2.7 | | | 2.7 | 2.7 |

ANOVA considering organisational levels as treatments

$F_{0.05,2,3} = 9.55$

| Procurement | | | Manufacturing | | | Product Design | | | Marketing | | | Technical | | | Administrative | | |
|-------------|---|-----|---------------|---|-----|----------------|---|-----|------------|---|-----|------------|---|-----|----------------|---|-----|
| SS_T | = | 1.5 | SS_T | = | 5.5 | SS_T | = | 1.5 | SS_T | = | 2.8 | SS_T | = | 7.3 | SS_T | = | 5.3 |
| SS_{Tr} | = | 0.0 | SS_{Tr} | = | 4.0 | SS_{Tr} | = | 0.0 | SS_{Tr} | = | 1.3 | SS_{Tr} | = | 2.3 | SS_{Tr} | = | 1.3 |
| SS_E | = | 1.5 | SS_E | = | 1.5 | SS_E | = | 1.5 | SS_E | = | 1.5 | SS_E | = | 5.0 | SS_E | = | 4.0 |
| F_0 | = | 0.0 | F_0 | = | 4.0 | F_0 | = | 0.0 | F_0 | = | 1.3 | F_0 | = | 0.7 | F_0 | = | 0.5 |
| Consistent | | | Consistent | | | Consistent | | | Consistent | | | Consistent | | | Consistent | | |

Analysis on the means of the chain value processes

| | UM | MM | OP | μ |
|------------------------|-----|-----|-----|-------|
| Procurement | 2.5 | 2.5 | 2.5 | 2.5 |
| Manufacturing | 1.5 | 2.5 | 3.5 | 2.5 |
| Product Design | 2.5 | 2.5 | 2.5 | 2.5 |
| Marketing | 2.5 | 3.5 | 2.5 | 2.8 |
| Technical support | 2.0 | 3.5 | 2.5 | 2.7 |
| Administrative support | 3.0 | 3.0 | 2.0 | 2.7 |
| Mean | | | | 2.61 |
| Std Dev | | | | 0.84 |

Confidence Interval: 2.41 to 2.81

Conclusion:

ANOVA shows a consistency on the opinion at different organisational levels. The individual means of each process are within the confidence interval. It is statistically valid to consider a grade of 2.61 for this question.

| Total Sample | |
|--------------|--------|
| SS_T | = 8.00 |
| SS_{Tr} | = 2.17 |
| SS_E | = 5.83 |
| F_0 | = 0.6 |
| Consistent | |

Example 7.2 Analysis of answers for a given question showing inconsistency among the organisational levels.

Question number 80. Top management and/or the quality steering committee frequently take action to adjust or modify the corporate culture as necessary.

| Sample | Process in the value chain | | | | | | | | | | | | Operation's Support | | | | | | |
|-----------------------|----------------------------|---|-------|---------------|---|-------|----------------|---|-------|-----------|---|-------|---------------------|---|-------|----------------|---|-------|---------|
| | Procurement | | | Manufacturing | | | Product Design | | | Marketing | | | Technical | | | Administrative | | | |
| | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | μ_T |
| Upper management | 1 | 2 | 1.5 | 1 | 1 | 1.0 | 1 | 2 | 1.5 | 1 | 3 | 2.0 | 1 | 1 | 1.0 | 1 | 1 | 1.0 | 1.0 |
| Middle management | 4 | 3 | 3.5 | 3 | 4 | 3.5 | 3 | 4 | 3.5 | 3 | 4 | 3.5 | 4 | 3 | 3.5 | 4 | 3 | 3.5 | 3.3 |
| Operational personnel | 3 | 2 | 2.5 | 3 | 4 | 3.5 | 4 | 3 | 3.5 | 3 | 3 | 3.0 | 2 | 4 | 3.0 | 3 | 3 | 3.0 | 3.0 |
| Average | | | 2.5 | | | 2.7 | | | 2.8 | | | 2.8 | | | 2.5 | | | 2.5 | 2.4 |

If organisational levels are considered as treatments:

$F_{0.05,2,3} = 9.55$

| Procurement | Manufacturing | Product Design | Marketing | Technical | Administrative |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| $SS_T = 5.5$ | $SS_T = 9.3$ | $SS_T = 6.8$ | $SS_T = 4.8$ | $SS_T = 9.5$ | $SS_T = 7.5$ |
| $SS_{Tr} = 4.0$ | $SS_{Tr} = 8.3$ | $SS_{Tr} = 5.3$ | $SS_{Tr} = 2.3$ | $SS_{Tr} = 7.0$ | $SS_{Tr} = 7.0$ |
| $SS_E = 1.5$ | $SS_E = 1.0$ | $SS_E = 1.5$ | $SS_E = 2.5$ | $SS_E = 2.5$ | $SS_E = 0.5$ |
| $F_0 = 4.0$ | $F_0 = 12.5$ | $F_0 = 5.3$ | $F_0 = 1.4$ | $F_0 = 4.2$ | $F_0 = 21.0$ |
| Consistent | Inconsistent | Consistent | Consistent | Consistent | Inconsistent |

If processes in the value chain are considered as treatments

| Procurement | UM | MM | OP | μ |
|------------------------|---------|-----|-----|-------|
| Manufacturing | 1.5 | 3.5 | 2.5 | 2.5 |
| Product Design | 1.0 | 3.5 | 3.5 | 2.7 |
| Marketing | 1.5 | 3.5 | 3.5 | 2.8 |
| Technical support | 2.0 | 3.5 | 3.0 | 2.8 |
| Administrative support | 1.0 | 3.5 | 3.0 | 2.5 |
| | 1.0 | 3.5 | 3.0 | 2.5 |
| | Mean | | | 2.6 |
| | Std Dev | | | 1.13 |

Confidence Interval: 2.37 to 2.90

Conclusion:

ANOVA shows an inconsistent opinion among the organisational level in the processes of manufacturing and administrative support, but very consistent among other processes. The recommendation is to have further discussions with people of these processes until getting consistency.

| Total Sample |
|------------------|
| $SS_T = 18.75$ |
| $SS_{Tr} = 3.04$ |
| $SS_E = 15.71$ |
| $F_0 = 0.3$ |
| Consistent |

Example 7.3 Analysis of answers for a given question showing inconsistency among the organisational processes.

Question number 61. The specifications for raw materials are in a written and actualised form, and always available for everybody within the production process and the laboratories.

| Sample | Process in the value chain | | | | | | | | | | | | Operation's Support | | | | | | |
|-----------------------|----------------------------|---|-------|---------------|---|-------|----------------|---|-------|-----------|---|-------|---------------------|---|-------|----------------|---|-------|---------|
| | Procurement | | | Manufacturing | | | Product Design | | | Marketing | | | Technical | | | Administrative | | | |
| | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | a | b | μ | μ_T |
| Upper management | 2 | 1 | 1.5 | 3 | 4 | 3.5 | 4 | 3 | 3.5 | 4 | 4 | 4.0 | 2 | 3 | 2.5 | 1 | 3 | 2.0 | 2.5 |
| Middle management | 1 | 3 | 2.0 | 2 | 3 | 2.5 | 2 | 4 | 3.0 | 4 | 4 | 4.0 | 4 | 4 | 4.0 | 2 | 1 | 1.5 | 1.3 |
| Operational personnel | 1 | 1 | 1.0 | 4 | 4 | 4.0 | 4 | 4 | 4.0 | 2 | 3 | 2.5 | 3 | 4 | 3.5 | 1 | 1 | 1.0 | 1.0 |
| Average | | | 1.5 | | | 3.3 | | | 3.5 | | | 3.5 | | | 3.3 | | | 1.5 | 1.6 |

If organisational levels are considered as treatments:

$F_{0.05,2,3} = 9.55$

| Procurement | Manufacturing | Product Design | Marketing | Technical | Administrative |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| $SS_T = 3.5$ | $SS_T = 3.3$ | $SS_T = 3.5$ | $SS_T = 3.5$ | $SS_T = 3.3$ | $SS_T = 3.5$ |
| $SS_{Tr} = 1.0$ | $SS_{Tr} = 2.3$ | $SS_{Tr} = 1.0$ | $SS_{Tr} = 3.0$ | $SS_{Tr} = 2.3$ | $SS_{Tr} = 1.0$ |
| $SS_E = 2.5$ | $SS_E = 1.0$ | $SS_E = 2.5$ | $SS_E = 0.5$ | $SS_E = 1.0$ | $SS_E = 2.5$ |
| $F_0 = 0.6$ | $F_0 = 3.5$ | $F_0 = 0.6$ | $F_0 = 9.0$ | $F_0 = 3.5$ | $F_0 = 0.6$ |
| Consistent | Consistent | Consistent | Consistent | Consistent | Consistent |

If processes in the value chain are considered as treatments

| | UM | MM | OP | μ |
|------------------------|---------|-----|-----|-------|
| Procurement | 1.5 | 2.0 | 1.0 | 1.5 |
| Manufacturing | 3.5 | 2.5 | 4.0 | 3.3 |
| Product Design | 3.5 | 3.0 | 4.0 | 3.5 |
| Marketing | 4.0 | 4.0 | 2.5 | 3.5 |
| Technical support | 2.5 | 4.0 | 3.5 | 3.3 |
| Administrative support | 2.0 | 1.5 | 1.0 | 1.5 |
| | Mean | | | 2.78 |
| | Std Dev | | | 1.2 |

Confidence Interval: 2.5 to 3.06

Conclusion:

ANOVA shows a consistent opinion among the different organisational levels and among all processes. However, the means of all processes are out of the confidence interval, which represent a general inconsistency. It is necessary to make a further analysis on this question before using its actual overall average.

| Total Sample |
|-----------------|
| $SS_T = 32.4$ |
| $SS_{Tr} = 1.3$ |
| $SS_E = 31.1$ |
| $F_0 = 0.1$ |
| Consistent |

Once we have a consistent opinion average for each question, the next step is to estimate an average for each section of the questionnaire. The form presented in Table 7.3 can be used for summarise this information. This summary provides a solid basis to assess the actual state of the potential quality management system.

Table 7.3 Self-diagnosis summary of answers format

| SELF-DIAGNOSIS SUMMARY OF ANSWERS | | | | | | | | | |
|-----------------------------------|--|--------------------|--|-----------------|--|----------------------|--|------------------|--|
| Reputation, future | | Competition | | Suppliers | | Education / training | | Prod. control | |
| 1 | | 29 | | 55 | | 83 | | 112 | |
| 2 | | 30 | | 56 | | 84 | | 113 | |
| 3 | | 31 | | 57 | | 85 | | 114 | |
| 4 | | 32 | | 58 | | 86 | | 115 | |
| 5 | | μ | | 59 | | 87 | | 116 | |
| 6 | | | | 60 | | 88 | | 117 | |
| μ | | | | 61 | | 89 | | 118 | |
| Leadership | | Strategic planning | | | | | | | |
| 7 | | 33 | | 62 | | Product design | | 119 | |
| 8 | | 34 | | 63 | | 90 | | 120 | |
| 9 | | 35 | | 64 | | 91 | | 121 | |
| 10 | | 36 | | 65 | | 92 | | μ | |
| 11 | | 37 | | 66 | | 93 | | Quality control | |
| 12 | | 38 | | μ | | 94 | | 122 | |
| μ | | 39 | | Human relations | | μ | | 123 | |
| Mission, vision | | 40 | | 67 | | Operations mgt. | | 124 | |
| 13 | | 41 | | 68 | | 95 | | 125 | |
| 14 | | 42 | | 69 | | 96 | | 126 | |
| 15 | | μ | | 70 | | 97 | | μ | |
| μ | | | | 71 | | 98 | | Customer service | |
| Stakeholders | | Administration | | 72 | | 99 | | 127 | |
| 16 | | 43 | | 73 | | 100 | | 128 | |
| 17 | | 44 | | 74 | | 101 | | 129 | |
| 18 | | 45 | | 75 | | 102 | | 130 | |
| 19 | | 46 | | 76 | | 103 | | μ | |
| 20 | | μ | | 77 | | μ | | C. Improvement | |
| | | Process capability | | 78 | | Innovation | | 131 | |
| 21 | | 47 | | 79 | | 104 | | 132 | |
| 22 | | 48 | | 80 | | 105 | | 133 | |
| μ | | 49 | | 81 | | 106 | | 134 | |
| Customers' satisf. | | 50 | | 82 | | 107 | | 135 | |
| 23 | | 51 | | μ | | 108 | | μ | |
| 24 | | 52 | | | | 109 | | | |
| 25 | | 53 | | | | 110 | | | |
| 26 | | 54 | | | | 111 | | | |
| 27 | | μ | | | | μ | | | |
| 28 | | | | | | | | | |
| μ | | | | | | | | | |

7.3 System’s Design: selection of quality management processes

The outcome of the self-diagnosis supports the selection of the most appropriate QM processes and techniques to improve the organisation’s performance. Information provided by the self-diagnosis must be interpreted in terms of the quality management processes contained in the conceptual model introduced in Chapter 6. For this purpose, each individual item of the questionnaire is re-classified according to the corresponding quality management process as presented in the conceptual model. This information can be summarised in the format provided in Table 7.4, where each group has as an identification the same code use in Chapter 6 to identify the QM processes of the conceptual system.

As concluded in Chapter 6, different industrial sub-sectors put more emphasis on different sub-systems and QM processes to succeed as an organisation. However, while looking for more specific conclusions, a correlation analysis performed on the individual DI indices of each QM process versus the SS and/or the P indices generated some interesting conclusion. Depending upon the industrial sub-sector in which a given company participates, its quality management system should assign a higher priority to certain QM processes according to Table 7.5 (Note.- Processes with higher priority are represented by a shadowed square). In this table, the notation used to identify the industrial sub-sectors is:

| Set | Sub-sector | Set | Sub-sector |
|-----|--------------------------------|-----|--------------------|
| 11 | Durable + Capital Goods | 31 | Metal |
| 12 | Non-durable goods | 32 | Plastic / Glass |
| 13 | Intermediate goods (metal) | 33 | Food / Agriculture |
| 14 | Intermediate goods (non-metal) | 34 | Miscellaneous |
| 15 | Intermediate goods | 41 | Auto industry |
| 21 | High Volume Intermediate | 51 | Mexican Capital |
| 22 | High Volume Non-Intermediate | 52 | Foreign Capital |
| 23 | Low Volume Intermediate | | |
| 24 | Low Volume Non-Intermediate | | |
| 25 | High Volume | | |
| 26 | Low Volume | | |

Table 7.4 Self-diagnosis summary of answers (classified by QM process)

SELF-DIAGNOSIS SUMMARY OF ANSWERS
(CLASSIFIED BY QM PROCESS)

| | | | | | | | | | |
|-----|--|----|--|-----|--|-----|--|-----|--|
| L1 | | S4 | | H5 | | O2 | | C2 | |
| 2 | | 35 | | 5 | | 47 | | 121 | |
| 4 | | 38 | | 69 | | 49 | | 122 | |
| 7 | | μ | | 72 | | 50 | | 124 | |
| 9 | | | | 79 | | 51 | | μ | |
| 16 | | S5 | | 82 | | 52 | | | |
| 17 | | 40 | | μ | | 106 | | C3 | |
| 18 | | | | | | 115 | | 119 | |
| 19 | | S6 | | H6 | | 116 | | 120 | |
| 21 | | 28 | | 80 | | 117 | | μ | |
| 23 | | 41 | | | | μ | | | |
| μ | | μ | | M1 | | | | P1 | |
| | | | | 3 | | O3 | | 58 | |
| L2 | | S7 | | 24 | | 43 | | 60 | |
| 8 | | 31 | | 25 | | 45 | | 61 | |
| 20 | | 39 | | 27 | | μ | | 62 | |
| μ | | μ | | 93 | | | | 63 | |
| | | | | 130 | | O4 | | 64 | |
| L3 | | S8 | | 132 | | 94 | | μ | |
| 1 | | 42 | | 133 | | | | | |
| 6 | | | | 134 | | O5 | | P2 | |
| 13 | | H1 | | μ | | 44 | | 55 | |
| 14 | | 71 | | | | 97 | | 56 | |
| μ | | 75 | | M2 | | μ | | 57 | |
| | | 83 | | 22 | | | | 59 | |
| L4 | | 84 | | | | O6 | | 65 | |
| 15 | | 90 | | M3 | | 46 | | 66 | |
| | | μ | | 29 | | | | 67 | |
| S1 | | | | 30 | | O7 | | μ | |
| 36 | | H2 | | μ | | 98 | | | |
| 107 | | 76 | | | | | | Q1 | |
| 108 | | 85 | | M4 | | O8 | | 135 | |
| 111 | | 86 | | 26 | | 99 | | 136 | |
| 112 | | 87 | | 32 | | 118 | | 137 | |
| 113 | | 88 | | μ | | 123 | | 139 | |
| 114 | | 89 | | | | 125 | | 140 | |
| μ | | 91 | | O1 | | 126 | | μ | |
| | | μ | | 92 | | 127 | | | |
| S2 | | H3 | | 95 | | 128 | | Q2 | |
| 37 | | 77 | | 96 | | 129 | | 11 | |
| | | | | 109 | | 131 | | | |
| S3 | | H4 | | 110 | | μ | | Q3 | |
| 10 | | 68 | | μ | | | | 12 | |
| 33 | | 70 | | | | C1 | | | |
| 34 | | 73 | | | | 48 | | Q4 | |
| μ | | 74 | | | | 53 | | 138 | |
| | | 78 | | | | 54 | | | |
| | | 81 | | | | 100 | | | |
| | | μ | | | | 101 | | | |
| | | | | | | 102 | | | |
| | | | | | | 103 | | | |
| | | | | | | 104 | | | |
| | | | | | | 105 | | | |
| | | | | | | μ | | | |

Table 7.5 Matrix of QM process emphasis by sub-sector

| Set | 11 | 12 | 13 | 14 | 15 | 21 | 22 | 23 | 24 | 25 | 26 | 31 | 32 | 33 | 34 | 41 | 51 | 52 | All |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| L1 | | | | | | | | | | | | | | | | | | | |
| L2 | | | | | | | | | | | | | | | | | | | |
| L3 | | | | | | | | | | | | | | | | | | | |
| L4 | | | | | | | | | | | | | | | | | | | |
| S1 | | | | | | | | | | | | | | | | | | | |
| S2 | | | | | | | | | | | | | | | | | | | |
| S3 | | | | | | | | | | | | | | | | | | | |
| S4 | | | | | | | | | | | | | | | | | | | |
| S5 | | | | | | | | | | | | | | | | | | | |
| S6 | | | | | | | | | | | | | | | | | | | |
| S7 | | | | | | | | | | | | | | | | | | | |
| S8 | | | | | | | | | | | | | | | | | | | |
| H1 | | | | | | | | | | | | | | | | | | | |
| H2 | | | | | | | | | | | | | | | | | | | |
| H3 | | | | | | | | | | | | | | | | | | | |
| H4 | | | | | | | | | | | | | | | | | | | |
| H5 | | | | | | | | | | | | | | | | | | | |
| H6 | | | | | | | | | | | | | | | | | | | |
| M1 | | | | | | | | | | | | | | | | | | | |
| M2 | | | | | | | | | | | | | | | | | | | |
| M3 | | | | | | | | | | | | | | | | | | | |
| M4 | | | | | | | | | | | | | | | | | | | |
| O1 | | | | | | | | | | | | | | | | | | | |
| O2 | | | | | | | | | | | | | | | | | | | |
| O3 | | | | | | | | | | | | | | | | | | | |
| O4 | | | | | | | | | | | | | | | | | | | |
| O5 | | | | | | | | | | | | | | | | | | | |
| O6 | | | | | | | | | | | | | | | | | | | |
| O7 | | | | | | | | | | | | | | | | | | | |
| O8 | | | | | | | | | | | | | | | | | | | |
| C1 | | | | | | | | | | | | | | | | | | | |
| C2 | | | | | | | | | | | | | | | | | | | |
| C3 | | | | | | | | | | | | | | | | | | | |
| P1 | | | | | | | | | | | | | | | | | | | |
| P2 | | | | | | | | | | | | | | | | | | | |
| Q1 | | | | | | | | | | | | | | | | | | | |
| Q2 | | | | | | | | | | | | | | | | | | | |
| Q3 | | | | | | | | | | | | | | | | | | | |
| Q4 | | | | | | | | | | | | | | | | | | | |

With this information on hand, the strategy to design the quality management system for a given company should follow this procedure.

STEP 1

Identify four industrial sub-sectors associated to the company under analysis (by type of market, volume, main component and origin or capital).

STEP 2

Using Table 7.5, count how many times each QM process is considered of higher priority in those sub-sectors. This count will be called the “emphasis index” (E index).

STEP 3

For each QM process compare the E index to the figure obtained in the self-diagnosis, which will be called the SD index. This comparison should be performed by deducting the SD index from the E index.

STEP 4

Select the QM processes to be strengthened and those that currently represent a strength of the actual management system. If the difference obtained in STEP 3 is positive, that particular QM process should be strengthened during the implementation process. On the other hand, if the difference is negative that particular QM process currently represents a strength of the actual management system of the company.

STEP 5

According to the current classification of the company under analysis (refer to Section 6.6 “Detailed analysis of external factors”, and more specifically to Figure 6.6), determine which other management processes should be included into the system and how to manage externalities. This step will increase the possibilities of moving the company to a more profitable status when the TQM system becomes more mature.

This procedure is now explained through an example.

Example 7.4 Procedure to design the quality management of a company

Let us assume a Mexican company actually experiencing a hard situation in terms of its financial performance, although there have been some efforts to implement Quality Management processes and techniques. This company is in the auto-parts business, operating a high volume process of intermediate metallic products.

The outcome of the self-diagnosis of this company is presented in next table.

SELF-DIAGNOSIS SUMMARY OF ANSWERS
(Company example 4)

| | |
|----|-----|
| L1 | |
| 2 | 2.9 |
| 4 | 3.6 |
| 7 | 3.5 |
| 9 | 2.7 |
| 16 | 1.5 |
| 17 | 3.9 |
| 18 | 3.8 |
| 19 | 2.3 |
| 21 | 2.4 |
| 23 | 1.9 |
| μ | 2.9 |

| | |
|----|-----|
| L2 | |
| 8 | 1.4 |
| 20 | 2.1 |
| μ | 1.8 |

| | |
|----|-----|
| L3 | |
| 1 | 1.4 |
| 6 | 1.7 |
| 13 | 3.1 |
| 14 | 2.6 |
| μ | 2.2 |

| | |
|----|-----|
| L4 | |
| 15 | 2.0 |

| | |
|-----|-----|
| S1 | |
| 36 | 3.8 |
| 107 | 3.7 |
| 108 | 2.4 |
| 111 | 2.5 |
| 112 | 1.9 |
| 113 | 2.3 |
| 114 | 1.5 |
| μ | 2.6 |

| | |
|----|-----|
| S2 | |
| 37 | 3.3 |

| | |
|----|-----|
| S3 | |
| 10 | 1.2 |
| 33 | 1.7 |
| 34 | 1.4 |
| μ | 1.4 |

| | |
|----|-----|
| S4 | |
| 35 | 1.2 |
| 38 | 1.9 |
| μ | 1.6 |

| | |
|----|-----|
| S5 | |
| 40 | 2.4 |

| | |
|----|-----|
| S6 | |
| 28 | 3.2 |
| 41 | 2.6 |
| μ | 2.9 |

| | |
|----|-----|
| S7 | |
| 31 | 3.4 |
| 39 | 2.7 |
| μ | 3.1 |

| | |
|----|-----|
| S8 | |
| 42 | 2.7 |

| | |
|----|-----|
| H1 | |
| 71 | 2.9 |
| 75 | 3.8 |
| 83 | 1.4 |
| 84 | 1.9 |
| 90 | 3.5 |
| μ | 2.7 |

| | |
|----|-----|
| H2 | |
| 76 | 3.2 |
| 85 | 2.6 |
| 86 | 3.3 |
| 87 | 2.9 |
| 88 | 3.7 |
| 89 | 3.7 |
| 91 | 3.4 |
| μ | 3.3 |

| | |
|----|-----|
| H3 | |
| 77 | 2.3 |

| | |
|----|-----|
| H4 | |
| 68 | 3.4 |
| 70 | 3.6 |
| 73 | 2.3 |
| 74 | 2.1 |
| 78 | 2.0 |
| 81 | 1.9 |
| μ | 2.6 |

| | |
|----|-----|
| H5 | |
| 5 | 1.3 |
| 69 | 1.4 |
| 72 | 1.1 |
| 79 | 1.8 |
| 82 | 1.9 |
| μ | 1.5 |

| | |
|----|-----|
| H6 | |
| 80 | 3.9 |

| | |
|-----|-----|
| M1 | |
| 3 | 3.7 |
| 24 | 3.5 |
| 25 | 3.6 |
| 27 | 3.1 |
| 93 | 2.9 |
| 130 | 3.7 |
| 132 | 3.5 |
| 133 | 2.5 |
| 134 | 2.8 |
| μ | 3.3 |

| | |
|----|-----|
| M2 | |
| 22 | 3.6 |

| | |
|----|-----|
| M3 | |
| 29 | 3.1 |
| 30 | 2.9 |
| μ | 3.0 |

| | |
|----|-----|
| M4 | |
| 26 | 3.1 |
| 32 | 3.1 |
| μ | 3.1 |

| | |
|-----|-----|
| O1 | |
| 92 | 2.1 |
| 95 | 2.2 |
| 96 | 2.5 |
| 109 | 3.1 |
| 110 | 2.1 |
| μ | 2.4 |

| | |
|-----|-----|
| O2 | |
| 47 | 3.1 |
| 49 | 3.5 |
| 50 | 3.6 |
| 51 | 3.4 |
| 52 | 2.2 |
| 106 | 2.1 |
| 115 | 1.9 |
| 116 | 1.7 |
| 117 | 3.5 |
| μ | 2.8 |

| | |
|----|-----|
| O3 | |
| 43 | 1.2 |
| 45 | 1.8 |
| μ | 1.5 |

| | |
|----|-----|
| O4 | |
| 94 | 2.7 |

| | |
|----|-----|
| O5 | |
| 44 | 2.2 |
| 97 | 1.9 |
| μ | 2.1 |

| | |
|----|-----|
| O6 | |
| 46 | 3.9 |

| | |
|----|-----|
| O7 | |
| 98 | 2.3 |

| | |
|-----|-----|
| O8 | |
| 99 | 1.3 |
| 118 | 1.6 |
| 123 | 1.3 |
| 125 | 1.5 |
| 126 | 2.1 |
| 127 | 1.9 |
| 128 | 2.0 |
| 129 | 1.4 |
| 131 | 1.7 |
| μ | 1.6 |

| | |
|-----|-----|
| C1 | |
| 48 | 3.2 |
| 53 | 3.2 |
| 54 | 3.8 |
| 100 | 2.1 |
| 101 | 3.7 |
| 102 | 2.5 |
| 103 | 1.5 |
| 104 | 2.5 |
| 105 | 3.7 |
| μ | 2.9 |

| | |
|-----|-----|
| C2 | |
| 121 | 1.2 |
| 122 | 1.2 |
| 124 | 1.5 |
| μ | 1.3 |

| | |
|-----|-----|
| C3 | |
| 119 | 3.7 |
| 120 | 1.5 |
| μ | 2.6 |

| | |
|----|-----|
| P1 | |
| 58 | 2.1 |
| 60 | 2.5 |
| 61 | 3.1 |
| 62 | 2.1 |
| 63 | 1.9 |
| 64 | 3.5 |
| μ | 2.5 |

| | |
|----|-----|
| P2 | |
| 55 | 1.2 |
| 56 | 2.1 |
| 57 | 1.3 |
| 59 | 1.3 |
| 65 | 1.7 |
| 66 | 2.3 |
| 67 | 2.1 |
| μ | 1.7 |

| | |
|-----|-----|
| Q1 | |
| 135 | 2.3 |
| 136 | 3.1 |
| 137 | 2.7 |
| 139 | 1.9 |
| 140 | 2.1 |
| μ | 2.4 |

| | |
|----|-----|
| Q2 | |
| 11 | 2.4 |

| | |
|----|-----|
| Q3 | |
| 12 | 1.3 |

| | |
|-----|-----|
| Q4 | |
| 138 | 1.9 |

With this information on hand, the procedure to design the TQM system for this company is as follows.

STEP 1

The four sub-sectors more related to this company are: 21) high volume intermediate, 31) metal, 41) auto industry and 51) Mexican capital.

STEP 2

In this case, the E index is estimated as follows:

| QM Process | L1 | L2 | L3 | L4 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | H1 |
|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Sub-sector 21 | | | | | | | | | | | | | |
| Sub-sector 31 | | | | | | | | | | | | | |
| Sub-sector 41 | | | | | | | | | | | | | |
| Sub-sector 51 | | | | | | | | | | | | | |
| Emphasis Index | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 3 | 2 | 0 | 4 |
| QM Process | H2 | H3 | H4 | H5 | H6 | M1 | M2 | M3 | M4 | O1 | O2 | O3 | O4 |
| Sub-sector 21 | | | | | | | | | | | | | |
| Sub-sector 31 | | | | | | | | | | | | | |
| Sub-sector 41 | | | | | | | | | | | | | |
| Sub-sector 51 | | | | | | | | | | | | | |
| Emphasis Index | 2 | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 0 |
| QM Process | O5 | O6 | O7 | O8 | C1 | C2 | C3 | P1 | P2 | Q1 | Q2 | Q3 | Q4 |
| Sub-sector 21 | | | | | | | | | | | | | |
| Sub-sector 31 | | | | | | | | | | | | | |
| Sub-sector 41 | | | | | | | | | | | | | |
| Sub-sector 51 | | | | | | | | | | | | | |
| Emphasis Index | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 2 | 4 | 3 | 4 | 4 |

STEP 3

| | | | | | | | | | | | | | |
|----------------|-----|-----|------|-----|------|------|-----|------|-----|-----|------|------|-----|
| QM Process | L1 | L2 | L3 | L4 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | H1 |
| Emphasis Index | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 3 | 2 | 0 | 4 |
| Self-diagnosis | 2.9 | 1.8 | 2.2 | 2.0 | 2.6 | 3.3 | 1.4 | 1.6 | 2.4 | 2.9 | 3.1 | 2.7 | 2.7 |
| Difference | 0.2 | 0.3 | -1.2 | 0.0 | -0.6 | -1.3 | 0.6 | -0.6 | 0.6 | 0.1 | -1.1 | -2.7 | 1.3 |

| | | | | | | | | | | | | | |
|----------------|------|-----|------|-----|------|------|------|------|------|------|------|-----|------|
| QM Process | H2 | H3 | H4 | H5 | H6 | M1 | M2 | M3 | M4 | O1 | O2 | O3 | O4 |
| Emphasis Index | 2 | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 0 |
| Self-diagnosis | 3.3 | 2.3 | 2.6 | 1.5 | 3.9 | 3.3 | 3.6 | 3.0 | 3.1 | 2.4 | 2.8 | 1.5 | 2.7 |
| Difference | -1.3 | 0.7 | -1.6 | 0.5 | -1.9 | -1.3 | -2.6 | -2.0 | -1.1 | -0.4 | -1.8 | 0.5 | -2.7 |

| | | | | | | | | | | | | | | |
|----------------|------|------|------|------|------|-----|------|------|-----|-----|-----|-----|-----|------|
| QM Process | O5 | O6 | O7 | O8 | C1 | C2 | C3 | P1 | P2 | Q1 | Q2 | Q3 | Q4 | Syst |
| Emphasis Index | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 2 | 4 | 3 | 4 | 4 | 1.9 |
| Self-diagnosis | 2.1 | 3.9 | 2.3 | 1.6 | 2.9 | 1.5 | 2.6 | 2.5 | 1.7 | 2.4 | 2.4 | 1.3 | 1.9 | 2.5 |
| Difference | -1.1 | -2.9 | -1.3 | -0.6 | -0.9 | 0.5 | -1.6 | -2.5 | 0.3 | 1.6 | 0.6 | 2.7 | 2.1 | -0.6 |

STEP 4

| | Current strengths | Processes to strengthen |
|--|-------------------|-------------------------|
| L1) Stakeholders and customer expectations | | |
| L2) Stakeholders' satisfaction | | |
| L3) Mission and vision | | |
| L4) Social and cultural values | | |
| S1) Technology availability | | |
| S2) Capital available for re-investment | | |
| S3) Strategic planning | | |
| S4) Strategic guidelines | | |
| S5) Re-engineering strategic actions | | |
| S6) Quality policies | | |
| S7) Benchmarking analysis | | |
| S8) Business process reengineering | | |
| H1) Promotion of a quality culture | | |
| H2) Training and educational programs | | |
| H3) Rewards and recognition | | |
| H4) Employees' satisfaction | | |
| H5) Employees' performance | | |
| H6) Influence on the quality culture | | |
| M1) Customer satisfaction | | |
| M2) Profits distribution policy | | |
| M3) Competitors' Operation | | |
| M4) Market share | | |
| O1) Product and/or service design | | |
| O2) Production process planning | | |
| O3) Administration process planning | | |
| O4) Review of products design | | |
| O5) Information systems | | |
| O6) Administration process performance | | |
| O7) Productivity | | |
| O8) Quality Control of finished product | | |
| C1) Production control | | |
| C2) Process control actions | | |
| C3) Statistical Process Control | | |
| P1) Quality assurance of inputs | | |
| P2) Management of suppliers | | |
| Q1) Quality improvement projects | | |
| Q2) Audits to the quality system | | |
| Q3) Quality steering committee | | |
| Q4) Teamwork | | |

In this table it is possible to conclude that although the current system is relatively rich in terms of the amount of processes already implemented (the difference between E and SD is negative), this company is missing very important QM processes.

The company under analysis has to put more emphasis and increase its efforts to be more effective in the implementation and execution for the following actions:

- a) establish a Quality Steering Committee (or perhaps review its operation if the company already has one);
- b) the auditory system is not working properly and it should be re-defined (this could be the reason why the whole system is not operating properly)
- c) make a more detailed analysis of its stakeholders' expectations and measurement of their satisfaction;
- d) improve its strategic planning process, considering the possibility of using BPR with strategic purposes;
- e) define and spread throughout the organisations more adequate quality policies;
- f) start a programme to improve the activities performed with the purpose of promoting a culture of quality among employees at all levels;
- g) design and implement a programme to reward and recognise the achievements in quality and productivity improvement;
- h) assign to the QSC the responsibility of measuring the employees' performance as a way of giving more direction to "Management of Human Behaviour" sub-system,
- i) re-plan or totally redefine the administration process (this could be a good opportunity to assess the possibility of moving the company to an administration based on processes instead of the actual functional administration;

- j) make sure that SPC be used to execute actions for process control;
- k) review and define a different strategy to make more effective the teamwork activities carried-out for quality improvement through the analysis of improvement projects.

STEP 5

Since this company is one with an actual TQM system with a relatively high DI index, but experiencing a poor financial performance, it can be classified as Type IV organisation (Section 6.6). However, the main purpose of this study should be to take this company from its actual position to convert it in a Type I organisation (one with an even better TQM system and good financial performance).

On the basis of the conclusions of Section 6.6, companies Type IV in the Mexican industrial sector do not have the flexibility required to respond quickly to changes. Additionally, they usually are ineffective to prevent and solve problems. On the other hand, they usually do business with customers who have a stronger purchasing power. In fact, this is the case of the company of our example. Its quality improvement sub-system is not working well, and in the auto-parts business, assembly plants (their customers) are without any doubt a stronger force to negotiate with.

This company should concentrate its efforts in making more effective its quality improvement sub-system. The competence of top managers in leading this change towards a more productive and flexible operation is a key element in getting a better position in terms of profitability. Additionally, this company should improve its capacity of innovation for the development of new products. Finally, a long-term strategic plan accompanied with appropriate quality policies will give the direction required by the operation to focus the improvement actions.

The procedure just presented supports the analysis of the current state of the TQM system, and contributes to identify the QM processes that require more attention. In fact, the QSC should repeat it frequently (perhaps once a year) to audit if the TQM

system is operating correctly and giving direction to the company towards a more profitable status.

The audit to the system allows the tracing of its performance to detect possible obstacles that suggest its redefinition, or to change the strategies being used for implementation. The audit to the system is performed basically following the same procedure presented in this section, but it should incorporate the previous experiences had since the first attempts to incorporate QM processes into the management system of the company.

A detailed analysis of the main causes of resistance to change can be very useful. The findings of this research indicate that the most important resistance to change is observed in top and middle management. For this reason, it is recommended to perform the audit with the support of an external agency (a consultant firm) to assure more objectivity on this analysis.

7.4 Recommendations for the implementation and operation of the TQM system.

After the analysis and selection of the QM processes in which the implementation should concentrate, the next step is to comment something on the programmes used to support the system.

This section includes recommendations on the training and education programmes required to support the change, management of improvement projects through teamwork, reward and recognition systems, measurement of customers' satisfaction, sequence of implementation, and the recommended protocol to start up system's implementation.

7.4.1 Training and educational programmes

One of the QSC's responsibilities is the continuous monitoring of the effect of the performance and satisfaction of employees on the productivity and overall performance of the operation. As a result of this monitoring, the QSC should define training and educational programmes for the development and promotion of a culture of quality throughout the organisation.

The quality system requires a very strong educational support. Education is needed to get a change in mentality in all personnel, from operational workers to top managers. The main purpose of the educational programme should be to contribute in the creation of a culture of quality. The most important characteristic of this culture is the service attitude observed by all employees; an attitude of competitiveness and of fulfilment of the internal customers' requirements.

On the other hand, in a total quality system, as in any other system, the people involved require to learn to perform on it. People need to develop certain intellectual skills such as problem analysis and solving, the use of statistical tools, etc. These skills are needed for an appropriate execution of continuous improvement actions.

The training and educational programme should covers the 3 phases of the Juran's Trilogy, since every employee must have skills to contribute in the whole cycle within the managerial process in which he or she is involved. Depending upon the specific responsibilities of each person, he or she has to define his or her own educational plan.

The global educational objective for each stage of Juran's Trilogy is:

1. Quality planning: to know how to use the QFD (quality function deployment) techniques and experimental design (ED) for the analysis and development of the quality characteristics of a product or service.
2. Quality control: to know how to use control charts to detect abnormal situations (out of control), how to create quality standards, and how to decide where in the production or administrative process to locate items of control.
3. Quality improvement: to know how to use the "7 basic tools" for the analysis and improvement of the production process, as well as to know how to use the "new 7 management tools" for planning and improvement of the administrative process.

7.4.2 Education by type of responsibility

Top management. – Education of top managers is not an easy task. However, the most important factor to succeed in TQM implementation is the attitude and commitment observed by them towards total quality. For this reason, education at this level plays an important role.

Although the people of the top team are usually very busy with not much time for quality control activities, their contribution to quality planning and improvement is fundamental because of their experience and level of authority within the organisation. The education of top managers should follow these recommendations: a) conduct it through short seminars, b) base it on the analysis of practical problems of the company (not from other companies), c) motivate top managers to participate in exhibitions and congresses inside and outside the company, and d) provide them appropriate reading material.

The objectives of top management education should be:

- 1) To make them conscious on the importance of total quality for the improvement of company's profitability by the elimination of processes that do not contribute to it.
- 2) To convince them that the improvement in profits can be done without increasing company's capacity.
- 3) To keep them informed and involved in the analysis and solution of the most important obstacles for TQM implementation.
- 4) To demonstrate them that total quality concepts have been applied successfully to real life situation all over the world (there is an enormous amount of published articles to support this statement).
- 5) To provide top managers the skills required for leading the TQM system in their company.

Middle management and staff personnel. – It is undeniable that operational personnel require to know how to apply the statistical tools. However, it is important not to put an over emphasis on this subject. Only few people within the organisation need to do sophisticated analyses to solve their problems. Because middle management could represent the strongest opposition to the implementation of the TQM system, middle managers should be trained in the following aspects: a) quality management theory, b) control charts, c) basic statistical tools, and d) the implementation aspects of the system.

Technicians, engineers and some production workers should go deeper in the following aspects: a) more sophisticated statistical tools such as hypothesis testing, statistical inference, correlation analysis and analysis of probability distributions; and b) test methods and metrology. It is recommended the use of software to support the education in statistics.

Production workers. – Training for production workers needs to be adapted to their educational level. It is important to notice that in Mexico the average years of formal education are between 5 and 6; although for the companies investigated in this study, this indicator must be at least 9 years or even higher in the case of the youngest population. It could be stressing to try to offer them sophisticated training in quality control at the beginning.

The most important skills for production workers are to be able to follow the work methods and standards, and know how to apply control charts for the improvement of their own process.

On the other hand, line supervisors deserve special attention in the educational programme. It is important to take care of the following aspects in training line supervisors.

1. Supervisors need to know how to take advantage of their accumulated talent through the years of practical experience they normally have.

2. Because, nobody like to worker or longer, the first step when educating supervisors should be to demonstrate them how inefficient are sometimes the traditional methods they use, and how total quality can make them easier and more productive.
3. Supervisors should understand the importance of their role for achieving quality and productivity improvement goals.
4. Most supervisors are not used to think in statistical terms.
5. Training in total quality for supervisor should be more than giving them a set of simple instructions.
6. It is important to understand the importance of work standards and their relation to quality.
7. Supervisor should exchange ideas and experience on TQM implementation with other supervisors from other organisations.
8. A clear, direct and simple language should be used to train supervisors in total quality.
9. Supervisors must be convinced that the company and top managers are taken seriously the implementation of the TQM system.

A typical training programme in total quality. – As an example, a typical training programme in total quality is now presented. This programme focuses on all the organisational levels of production and administration, from top managers to production workers. Contents and duration of every seminar or workshop could vary depending upon the organisational level to which it is focused. Training should be partly theoretical, partly practical. Practice should include real situations the company is now experiencing, so people can start using the techniques and procedures for problem solving they are learning.

Table 7.6 shows how many hours of training are recommended for a given organisational level and a given topic. However, this is only an example and the appropriate time and emphasis on each topic should be determined according to needs observed in the self-diagnosis and on the basis of the QM process that have a higher priority for implementation.

Table 7.6 Recommended educational programme

| TOPIC \ ORG. LEVEL | CEO and Top Management | Middle Management (all processes) | Administrative Staff (white collar) | Supervisors, Quality Assistants and Lab personnel | Production Staff (blue collar) |
|---|-------------------------------|--|--|--|---------------------------------------|
| Leadership for Competitiveness through TQM | 24 | 12 | ----- | ----- | ----- |
| Customer service and satisfaction | 16 | 24 | 16 | 16 | 8 |
| Quality strategic planning and policy deployment | 24 | 12 | 8 | 8 | ----- |
| Quality Function Deployment and product design | 8 | 16 | 16 | 16 | ----- |
| Benchmarking and Business Process Re-engineering | 16 | 24 | ----- | ----- | ----- |
| TQM philosophy and basic theory | 24 | 24 | 16 | 16 | 8 |
| Procedures and techniques for problem solving | 8 | 16 | 24 | 24 | 24 |
| Statistical Process Control (control charts) | 4 | 16 | 24 | 24 | 24 |
| Design of Experiments and Statistical Inference | 4 | 8 | 16 | 16 | ----- |
| Teamwork for continuous improvement | 8 | 16 | 16 | 16 | 16 |
| Human relations, motivation and communication | 8 | 16 | 16 | 8 | 8 |
| Mathematics and introduction to statistics | ----- | ----- | ----- | 16 | 16 |

7.4.3 Management of improvement projects through teamwork

To put in practice a management system for teamwork is crucial element in any total quality management system. Projects usually focus on the improvement of

manufacturing operations, the quality of incoming materials, and in influencing the development and promotion of a culture of total quality.

Improvement projects are executed to allow the organisation to solve the most significant problems that are obstructing it in getting its goals. Because of the different organisational levels and the responsibilities associated to each one of them, improvement projects vary from level to level. Middle managers and their personnel are usually involved in problems related to the deployment of strategic guidelines and quality policies into the operation. However, the administrative staff, supervisors, quality assistants, lab personnel and production workers are responsible to focus on operational problems. But in both cases, the methods used for problem solving are the same.

Top managers' responsibilities usually include the analysis and solution of problems related with the definition of strategic guidelines in congruency with company's mission and vision. They are responsible for giving direction to the organisation. However, it is common to see top managers solving strategic and policy operational problems and middle managers solving production problems, while workers are not allowed to participate in problems solving. If this situation is happening, supervisors and workers' talent is wasted and what is even worst, nobody is taking care of giving direction to the company.

Teamwork for improvement has two main purposes: 1) to contribute to improve company's performance, and 2) to ease people's intellectual growth allowing them to use their creativity in doing their work. An effective implementation and operation of teamwork requires of the following conditions: 1) individuals' interest to learn new concepts and skills, 2) freedom to participate voluntarily, 3) to give the same rights and responsibilities to all members of one team, 4) a balanced participation of all members, and 5) discipline in the use of techniques and procedures for problem solving.

Teamwork will be incorporated into company's culture if its role is clear and does not take-over the responsibilities and authority of the formal organisational structure.

Topics discussed by team members should be compatible with company's policies and related to their job and responsibilities. Additionally, the analysis and solution of the problem under study should take no longer than 3 to 6 months.

It is recommended to assign a room fully equipped for teams' activities. Meetings' frequency can vary from one hour per week to one hour per month, but it is very important that team members decide it. The Japanese recommend to manage teams' meetings outside working hours; however, in Mexico most companies use 50/50 rule (half time in working hours, half time after work).

Typically, the process to manage teamwork in many organisations in Mexico is as follows.

1. The QSC invites everybody to form teams to participate in a quality improvement contest.
2. The invitation includes an explanation of the rules of the contest:
 - One month after the invitation, teams should register their projects. Projects have to contribute to company's quality goals set in the strategic plan.
 - During the next 3.5 months, projects will be analysed following the established procedure for problem solving. At the end of this period, the analysis and solution process should be documented and sent to the organising committee (QSC) for evaluation.
 - Projects' evaluation is done by an evaluation committee composed of QSC members. Every member has to select one winner team, one second place and one third place on each category.
 - The most common categories are: innovation, process optimisation, product's quality improvement, improvement of the working area, etc.
 - The criteria for the judgement of each project are: problem selection, teamwork, creativity in the proposal of the solution, the use of standard methods for problem solving and benefits (not only monetary benefits) of the solution.
 - One month after the projects are collected for evaluation, the evaluation committee will dictate a verdict.

- At the time of the invitation, the QSC has to communicate the reward offered to the winners on each category. Non-winner teams will receive a recognition prize for their participation.

4. Winner projects will be automatically recommended for implementation if the QSC considers it is feasible to do so. If not, they are asked to justify the reasons that caused them to reject project's implementation.

5. The reward and recognition ceremony is not only the end of the quality improvement contest, but the beginning of a new one. At this point, it is important to incorporate the experience acquire to improve the management of teamwork in the company.

7.4.4 Reward and recognition

Top management, through the QSC, should offer rewards and recognition to those employees achieving their quality objectives and observing a culture of quality. The main purpose of rewards and recognition is to strength people's satisfaction and performance.

Reward-recognition systems should take into account that to be more effective, they have to consider that each person has different needs. Any external force that contributes to satisfy his or her needs for sure will have an influence on his or her behaviour. An interesting reward-recognition system used in Mexico for this purpose is presented next.

The system gives people being rewarded some kind of tickets or bonuses that can be exchanged for household goods. Each team member receives the same amount of tickets according to place got on an improvement contest. For example, members of the team that got the first place receive 1000 points, the second place gets 750 and third place 500 points each. An individual can exchange his or her points for goods according to his or her own needs. In this way, a married person would like to exchange them for a small appliance or save them to be used later for a larger one; a single person would prefer to save his or her points to exchange them later for a bus ticket to the beach during his or her vacations.

Individuals' needs are as varied as people themselves. Any mechanism used for regulation of human behaviour should be as flexible as required to satisfy this wide variety of human needs. This is just an example and many more ideas can be used to design a flexible and effective reward and recognition system. However, it is important to mention that although money meets the characteristic of flexibility, it has proved to be effective only for a short period of time.

On the other hand, some organisations recommend to promote the participation of employees' families in the recognition ceremony. This idea works in two directions: employees increase their satisfaction for the achievement obtained and family member become interested in total quality concepts. This last element contributes to promote a culture of quality among society member, and also it works for the future of the company since in Mexico most companies encourage their employees to invite their relatives to work for them.

Rewards and recognition should be a way of keeping employees involved in problem solving through teamwork. However, they should never be the most important means to fulfil employees' basic needs. Salary and their share in the distribution of profits (an enforced 10% in Mexico) should be the best recognition for the performance of each employee. Extra reward and recognition in a quality system are only an external stimulus to motivate the change in culture required for people involvement and decision making; which is a pre-requisite of empowerment as mentioned in Chapter 4.

Teamwork is only the mechanism to strengthen employees' responsibility and make them proud of what they are doing. In fact, it is incorrect to expect a significant improvement coming from projects executed through the different forms of teamwork such as quality circles, etc. The real improvement comes by the indirect effects of teamwork. Teamwork contributes to create a culture of quality and to establish a discipline of productivity and continuous improvement; these are the real consequences of teamwork.

Finally, the most important objective of recognition should be the promotion of the fundamental human and work values for TQM. Values such as respect to others' ideas

and opinions, decision making through consensus, creativity, punctuality, responsibility, discipline in the use of techniques for the analysis and solution of problems, etc.

7.4.5 Customers' satisfaction

A key element of a TQM system is the measurement of customers' satisfaction. However, an important characteristic of this process is that it should be done in a relative form, comparing own quality level to the competitors' quality in relation to how it is perceived by customers according to their expectations.

It is important to remember that customers' satisfaction does not come only from product's attributes, but also from the service activities associated to it from the point in which the order is generated up to the situation when the product requires service, maintenance or even replacement for obsolescence. To support total customers' satisfaction it is recommended to implement the following activities as part of the marketing sub-system.

1. The analysis of consumers to define adequate policies in relation to the management of prices, product return and claims, advertising, environmental impact, public critiques, governmental regulations and company's relation with social groups.
2. A system capable to offer a fast response to consumers' claims, to public critiques and to governmental regulations. The main purpose of this system is to contribute to keep a good external image of the company. A good external image has a favourable impact on the perception of quality by customers.
3. The establishment of communication channels to make public the efforts carried out by the company to manufacture safe, quality and environment friendly products.
4. To keep a close contact with community and social leaders who can have a favourable effect on the image of the company and its products and services (researchers, social and opinion leaders, etc.)

5. To offer seminars to the community or to participate in congresses in which the company let know the society about its social responsibility and how it is achieved.

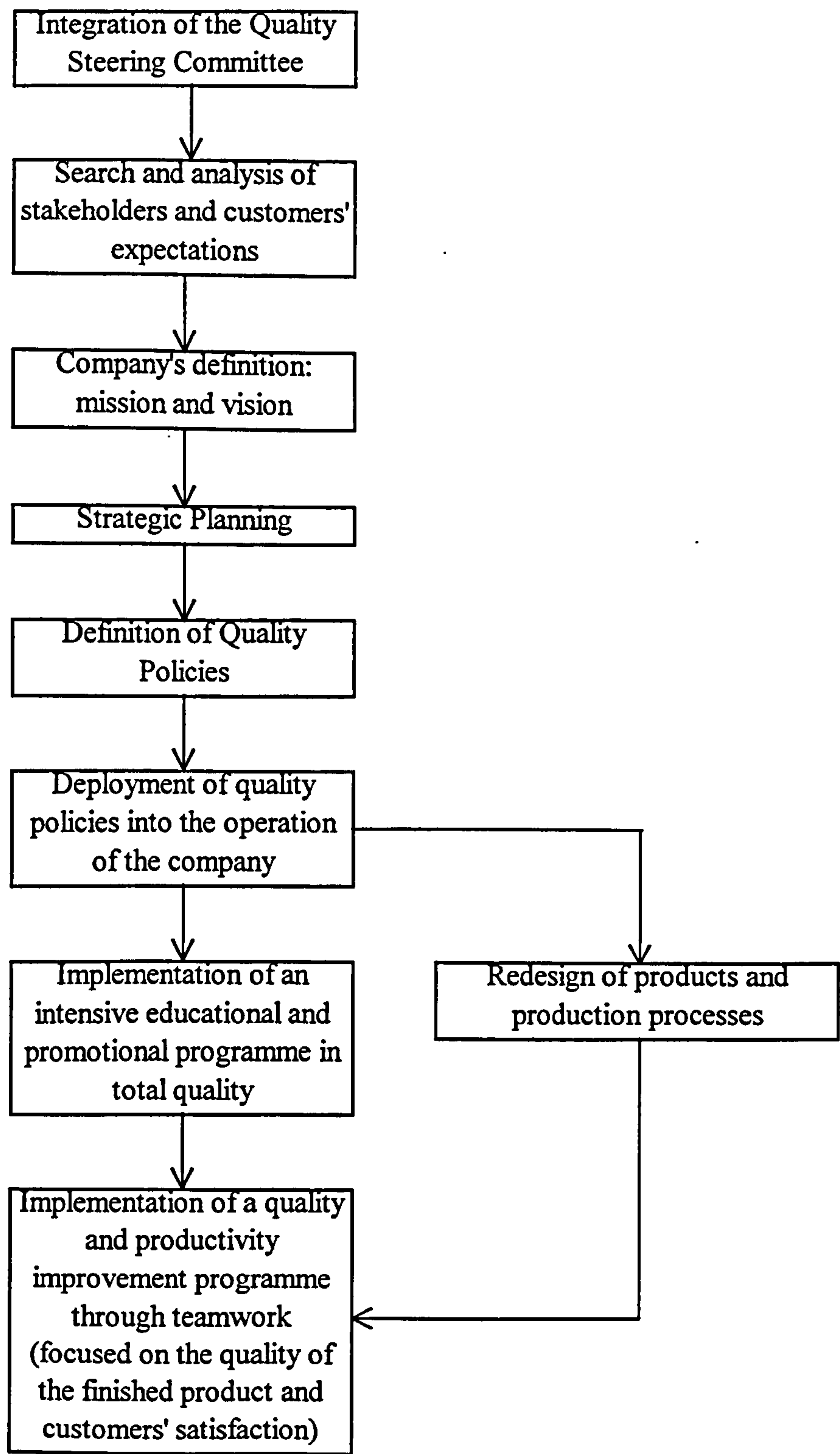
To achieve total satisfaction of consumers, manufacturers should have an effective communication channel to inform them about how the product can fulfil their needs, now and in the future.

The development of a reputation of quality is the most valuable asset of any organisation. However, a permanent reputation can not be built only with advertising. Only a quality product and service can do it. Even world-class manufacturers offer a quality guarantee policy to support the image of their products.

7.4.6 Recommended sequence of implementation

The outcome of the practical research indicates that the recommended sequence of implementation seems to be appropriate. However, this section of the questionnaire was interpreted by respondents in terms of the implementation steps needed to implement the system at its operational level (quality improvement, operational planning, management of human behaviour, management of suppliers and quality control subsystem. In general, the implementation sequence followed by the majority of Mexican industrial organisations is presented in Figure 7.2.

Figure 7.2 Recommended sequence of implementation



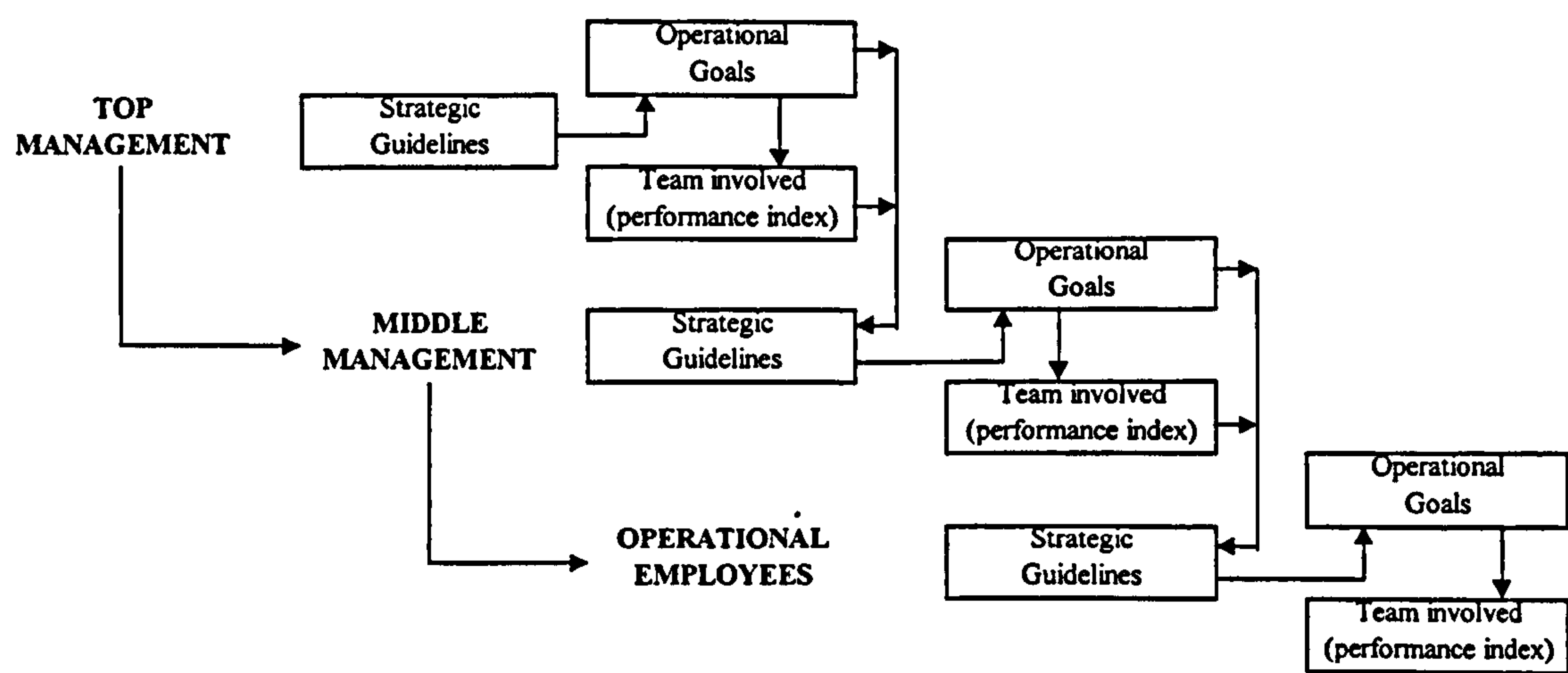
It is important to notice that the investigation could not find a strong evidence to support a recommendation for the sequence of implementation of these QM processes: distribution of the benefits among stakeholders, business process re-engineering, rewards and recognition, definition and promotion of corporate values, measurement of stakeholders' satisfaction, employees' performance and satisfaction, planning of the administrative process and the measurement of its performance, analysis of competitors and benchmarking. For their implementation sequence, it is suggested to follow the theoretical flow proposed in Chapter 5 for these processes. The QSC should give special attention to the appropriateness of these recommendation.

Another significant recommendation at this point is to make sure that mission and vision statements, as well as the definition of corporate values serve to provide an effective direction to company's operation. Real leadership for a company's success consists in defining and making sure all employees understand the direction towards the organisation should move, and have the means and ability to contribute to this purpose. This kind of leadership is only possible if the following conditions are met:

1. The Mission statement is created around the generic strategy of the company and the expectations of customers and stakeholders. Company's top executives should choose the strategy of offering a differentiated product or service, or to be cost leaders. This statement should declare what the company is actually offering into each market segment, the technological level used for this purpose and who and how it intends to benefit.
2. The Vision Statement should communicate the intended competitive position for the company in the future.
3. Corporate values should be congruent with company's main shareholders and top executives own values and principles, but also with those values socially accepted.
4. Quality policies have to inform in simple words the benefits, in terms of value added, that the company is committed to transfer to customers through its mission fulfilment.

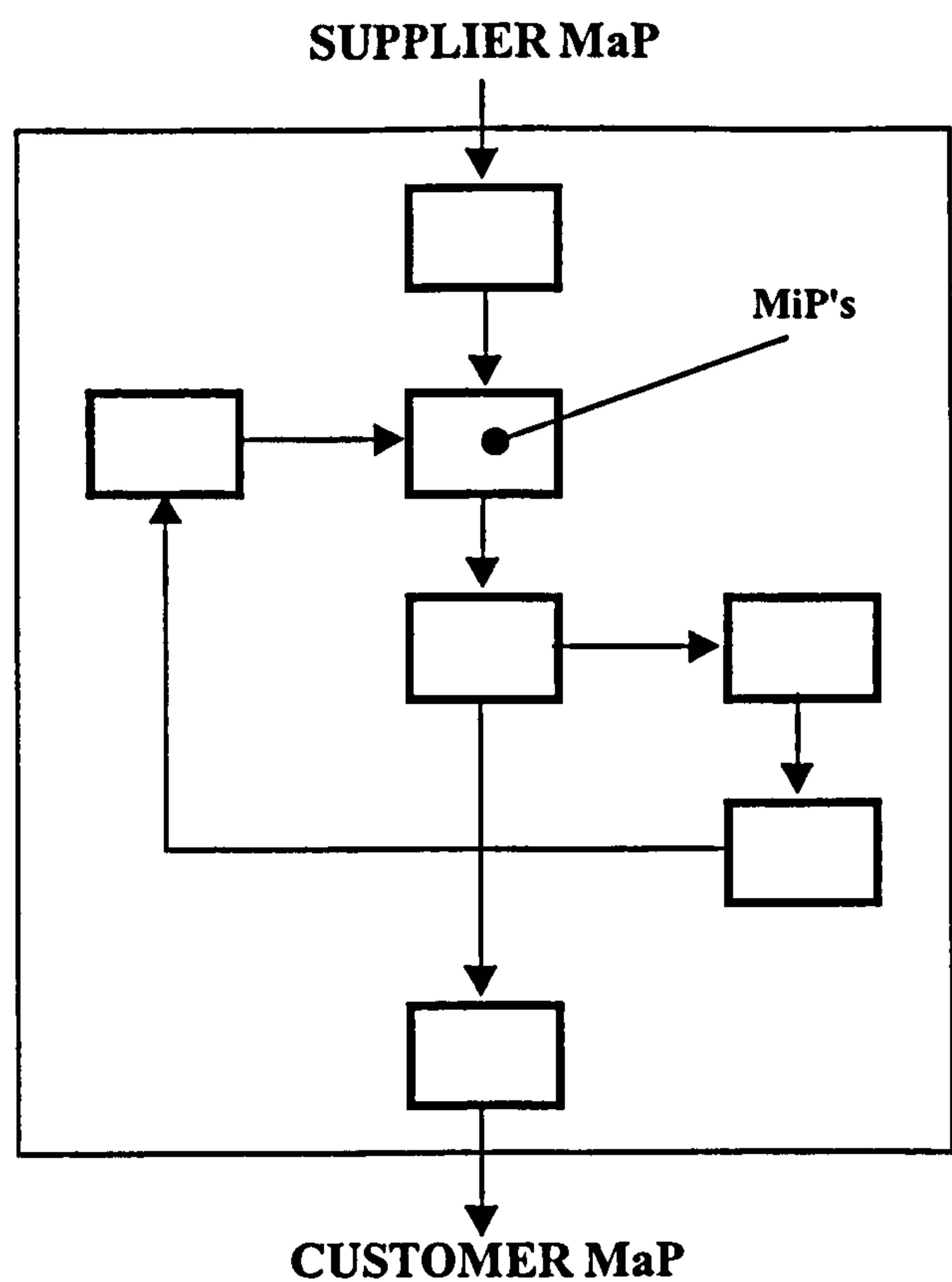
5. The proper identification of customers (in each market segment), as well as their requirements and expectations (tangible and intangible), are required.
6. Strategies should answer the question: what should we do to ensure the fulfilment of company's mission and to direct it towards the point indicated in its vision?
7. Strategies must be congruent with the generic strategy and placed within the framework provided by corporate values and the quality policies.
8. The definition of competitive strategies requires the full understanding of the decision making process followed by the customers / consumers at the time of buying.
9. There should be at least one strategy for each stage on the value chain: procurement, production, design, distribution, marketing, financial management, operation management, information management and human resources management.
10. From each strategy, the QSC should develop strategic guidelines. Figure 7.3 shows the form in which the strategic guidelines are spread throughout the organisations, from top management to the operational level.

Figure 7.3 Spread of strategic guidelines



11. These actions constitute the basis for creating the “macro management process” or MaP, needed to fulfil company’s mission and to move it towards its vision.
12. The MaP should be integrated and interconnected to form the organisational management system. Each one has its inputs (which are the outputs of other MaPs), internal activities to process inputs, and its outputs (which are the inputs of other MaPs).
13. Each macro management process is composed of a set of also interrelated more specific “Micro Management Processes”. A MiP is a set of specific management actions executed by a permanent team assigned for this purpose. Each MiP team is responsible for the satisfaction of its customers’ needs and expectations.

Figure 7.4 Macro and micro-management processes



14. At this point, the PDCA cycle becomes a key element for the Quality Improvement and Quality Control Sub-systems. MiP's' planning is the result of the procedure just

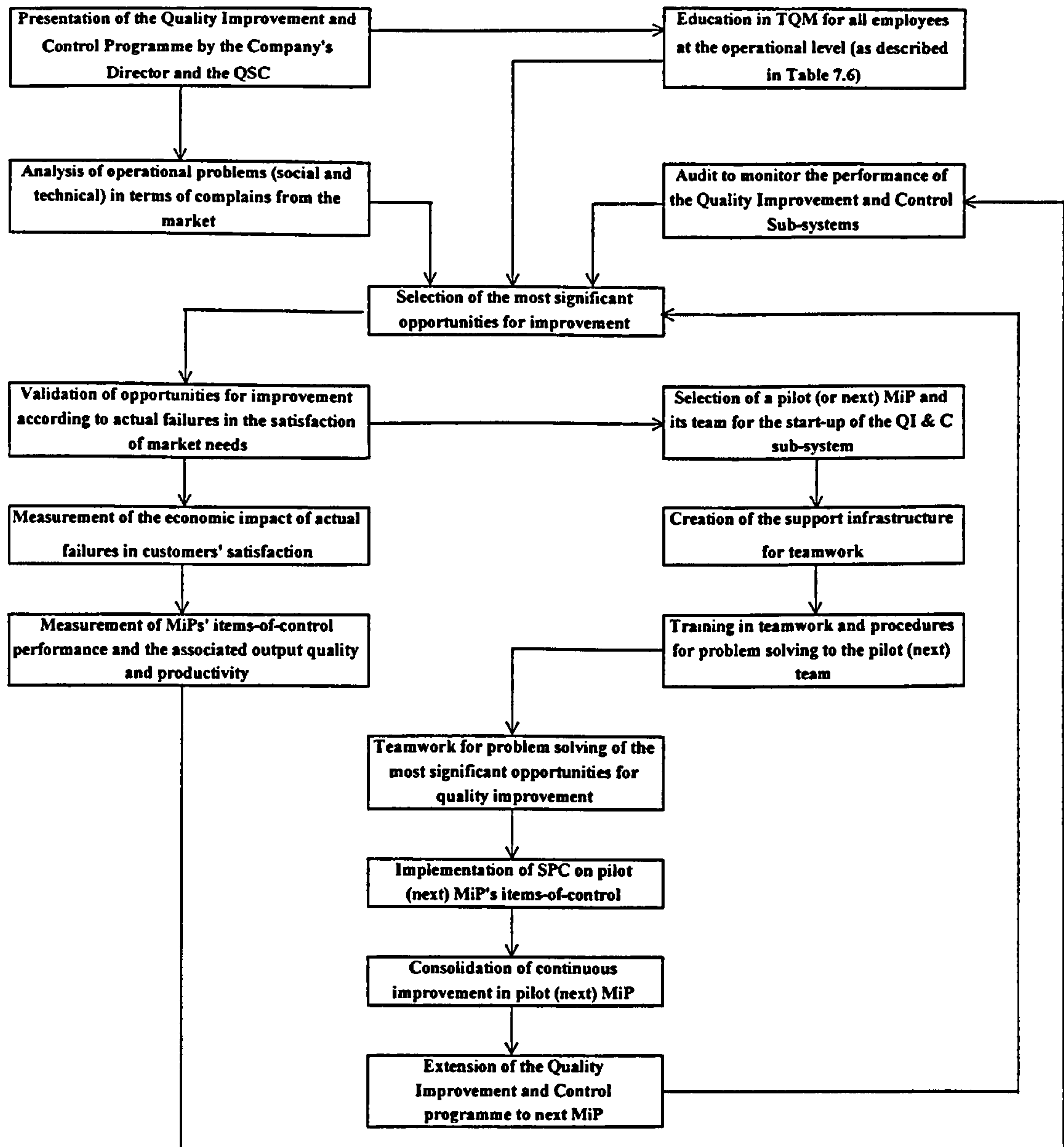
described in this section. However, to complete the cycle, each MiP should have defined an item of control. So, the team in charge of its execution can exercise the verification and the action steps as frequently as needed to make the necessary adjustments to assure the satisfaction of its internal customer. MiP teams using the PDCA for this purpose is the real essence of continuous improvement. The performance assessment of individuals for reward and recognition purposes should be based on their contribution to continuous improvement.

Continuous improvement is as effective as the effectiveness achieved by company's leaders in providing the direction required by operational employees to focus their efforts towards the fulfilment of mission and vision.

7.4.7 The protocol for the start-up of the Quality Improvement Sub-system

For people at the operational level, the Quality Improvement and Control sub-systems are the part of the system they can feel more closer to their own work. For this reason, it is important to follow an independent procedure for the start-up of the operation of these sub-systems. This procedure will be called “the protocol for the start-up of the Quality Improvement and Control Sub-systems”, which is better explained through the diagram presented in Figure 7.5

Figure 7.5 Protocol for the start-up of the quality control and improvement sub-systems



7.5 Leadership for the operation of the TQM system: the role of the Quality Steering Committee and its co-ordinator

The outcome of the practical research showed that some of the most important obstacles faced by Mexican industrial companies during TQM implementation are related to the natural resistance to change. There is resistance to change in top managers as well as in middle managers. This resistance can be explained from a cultural perspective. As discussed in Chapter 4, Hofstede found that Mexico's culture has a high distance power, a relatively high uncertainty evasion and tends to be more collective than individualistic. As a consequence of these characteristics, an average Mexican tends to follow his or her formal leader without questioning anything, and expects from him or her an order before making any movement. This kind of attitude is stronger at the lower organisational levels, but as a complement, top leaders expect such behaviour from their subordinates and are not very prone to assume risky strategies. Additionally, the collectivist characteristic of the Mexican culture also suppresses the innovation required to stay ahead of competitors. In summary, there are too many followers and not enough real leaders.

Obviously there is not a simple solution for the problem just explained. However, industrial leaders should make the first movement to change the culture of their organisations towards a more aggressive one. They should be willing to work closer to operational employees and to encourage them to participate in the continuous improvement process. Top leaders are responsible as well of providing direction and focus to the operation (according to company's mission, vision and values), and to let natural leaders at this level to use their talent in conducting teamwork activities in that direction.

Top management should have an active participation in the Quality Steering Committee. The QSC is usually integrated by top managers and a full time co-ordinator. It is responsible for monitoring the performance of the TQM system and its effect on the fulfilment of the expectations of stakeholders and customers. This monitoring process should be done by the frequent analysis of the performance of the QM process that act as feedback elements within the sub-systems and in their interconnection. The QM processes that act as feedback and / or interconnection elements are:

1. Stakeholders' satisfaction
2. Customers' satisfaction
3. Effectiveness on the spread throughout the organisation of strategic guidelines and quality policies
4. Employees' performance and satisfaction
5. Productivity of the operation
6. Quality of the finished product
7. Performance of the administration process
8. Benchmarking of competitors and best practices
9. Audits to the quality system
10. Quality of incoming materials

Other important responsibilities and activities performed by the SQC are:

- The analysis of company's mission, vision and values regarding their focus on the fulfilment of stakeholders' expectations.
- The analysis of weaknesses and core competence of competitors, through Benchmarking.
- To develop corporate strategies and to determine the quality policy for customers' satisfaction.
- To conduct strategic re-engineering actions for the re-invention of major processes required to assure the fulfilment of company's mission and vision within the corporate values, and in the direction established by the strategies.
- To spread throughout the organisation the strategic guidelines as an input to the operational planning of products, processes and administrative procedures.
- To assess, compensate and recognise human performance under the new managerial concept.

- To manage the implementation of the TQM system.
- To participate in the training and educational programme especially designed for them.
- Directors or Managers having the highest responsibility on each major management process of the company must be the most enthusiastic promoters of the system's implementation and success within their own areas. They should assess the performance of their subordinates in terms of contribution to quality achievements.

SQC should meet as frequent as possible (at least every 15 days at the beginning of the implementation process). A typical agenda of these meeting could be:

- a. Monitoring of the implementation process for detection of obstacles or problems being faced. The most important difficulties to look at are those related to the cultural change such as the movements towards a collaborative decision making, employees' interest for teamwork participation, the effectiveness of the reward and recognition system, the competence and effects of the training and educational programme, the increase in innovation throughout the company, etc.
- b. Checking of progress achieved in the build-up of the managerial infrastructure (sub-systems, techniques, procedures, etc.) required for the operation of the system.
- c. Monitoring of the 10 performance indices mentioned at the beginning of this section.

Meetings are usually conducted by the QSC co-ordinator, who should procure a balanced participation of all QSC members.

It is important to mention that the QSC co-ordinator needs full support of the top management team, so he or she can have free access to every organisational process throughout the company.

7.5.1 The QSC co-ordinator

Organisational position

QSC co-ordinator should be a full time position, and it is not recommended to combine with other responsibility within the company. It has to be a different position to the quality manager, who normally is responsible for auditing and support to the quality of the finished product. QSC co-ordinator reports directly to company's Director, who in fact should hold the highest responsibility for the success of the company. The TQM system is expect to be the most important support for this purpose.

The QSC co-ordinator usually has the following responsibilities:

1. To promote and procure the growth of the TQM system within the company.
2. To co-ordinate, supported by QSC members, the development of the quality policies.
3. To supervise the elaboration of the operational plan of each organisational process. This plan should contain their commitment for quality.
4. To make sure that all employees have received a basic training in problem solving and quality/productivity improvement.
5. Work as an internal consultant for the implementation of the PDCA cycle and the definition of the items of control in every major organisational process. This activity includes the determination of the most appropriate technique to be used for controlling such items.

6. Design of the information system required for measuring the 10 performance indices that the QSC is responsible to monitor periodically.
7. To select the organisational process in which to start the pilot test for the implementation of the quality improvement sub-system, and the subsequent processes to continue it.
8. To monitor the progress achieved on quality and productivity improvement in each organisational process.
9. To design a training programme for new employees so they can participate as soon as possible in the activities of the quality improvement sub-system.
10. Design and implement the reward-recognition programme, and later he or she should monitor how it is working.
11. To monitor the evolution from the actual decision making and leadership style to a one more supported on consensus, collaboration and participation.
12. To promote and manage the implementation and execution of the concept of teamwork for quality improvement.
13. To organise meetings to exchange and share experiences with people from other companies. If the company is part of a large conglomerate, this activity is relatively easy. If not, the QSC co-ordinator must find the appropriate place and opportunity to expose company's achievements in the implementation of TQM.
14. To co-ordinate the QSC meetings, supporting company's Director to conduct them and contributing to assure the execution of the strategies issued by the committee in relation to the implementation and operation of the system.

It is recommended to select QSC co-ordinator among the personnel who has been long time in the company. It is important to make sure that he or she has a good reputation as a person fully committed to quality.

It is meaningful to mention that TQM implementation needs the total consideration of the outcome of the self-diagnosis and a detailed analysis of the strategy required for achieving the change towards a culture of quality. By doing this, it would possible the correct selection of the most appropriate QM processes and an adequate planning of the strategy for implementation and operation of the system.

A final and important suggestion is to make sure that the incorporation of TQM into the current management system will not be an unmanageable disturbance for company's direction and operation. This situation usually occurs when a management system is deeply rooted into an organisational culture opposed to total quality fundamentals. In this case, TQM implementation has to be slower because a change in culture is always a very slow process, especially if it is not motivated by a crisis. The company's direction and the SQC have to be patient. If the implementation process were inappropriately accelerated, it for sure would constitute a waste of money and time, and what is even worse, the organisation would get "inoculated" against TQM.

CHAPTER 8

DISCUSSION AND CONCLUSIONS

8.1 Summary and originality of the research

Business management literature has given a strong emphasis to TQM during the last 10 or 15 years. However, this is not a surprise. Companies throughout the world are really worried about their future. They have realised that to get the preference of the market, they should offer a product or service that provides a value-added much larger than the efforts made by the consumer to acquire it. This seems to be an easy and logical idea; however, it is a hard one to make it real, especially in countries where the word “competition” was an unknown term until recently. Suddenly, not only Mexican companies, but Mexican people have to face very strong domestic competition because of the changes in trade regulations, as explained in Chapter 1. This Chapter also addresses the economic turbulence prevailing in Mexico due to the obsolescence of the previous macro-economic model based on an import-substituting policy. The most significant consequence of this problem has been the reduction, despite the increase in population, of the domestic demand. So, the problem of Mexican companies has been not only to face a stronger internal competition inside the country, but also to turn to go outside in search of markets where to distribute their products. In summary, Mexican organisations are not any more in a privileged situation; they have to be competitive or disappear.

When the change started in the mid 1980s, only some industrial sectors reacted and immediately started to search for process and management technology that would help them to become more competitive. The sector that did this with most success was the auto industry; assembly plants first, suppliers later at their request. Other sectors started making some efforts to implement quality management techniques (not systems), but not very

successfully. This situation was clearly demonstrated in this research. The only industrial sector that could be considered as Type I (high DI and high profitability) was the auto industry; the two assembly plants investigated and one of their suppliers.

An important factor for the success of auto-assembly plants in incorporating total quality management into their management system is their unquestionable need for being world-wide competitive. Mexican assembly plants are the best chance for American auto companies (because of the cost of labour in Mexico and the attitude of unions in the USA) to compete against the Japanese in their own domestic market. American auto manufacturers decided, at the beginning of the 1980s, to do their best in improving the quality and productivity of their operation in Mexico. Now, the auto industry in Mexico is the most important contributor to the export of manufactured products. In fact, this industry could easily adjust its operation focusing on exports after the problems occurred to the Mexican “peso” at the beginning of 1995. This adjustment was only possible due to the consolidation of the TQM systems implemented by these companies. On the other hand, not only the automobile sector has become more competitive because of TQM implementation, other individual Mexican companies (not whole sectors) have succeeded in this effort. This research identified the strategies followed by successful companies (in terms of profitability) in incorporating TQM into their management systems. Based on this identification, it also proposes a methodology for the selection of the most adequate quality management processes for a given industrial company with similar characteristics to those of the companies investigated.

After justifying the importance of using TQM as a strategy to improve the competitiveness of the Mexican industry, the next big problem faced by this research was to define TQM itself. Many people talk about it as if it was a clearly defined term. However, when they start to describe it, it is easy to notice that each person is talking about something different. Perhaps the only commonality is that everybody considers TQM as a managerial concept for quality and productivity improvement. Because of this situation, it was very important to define TQM before going into its measurement and analysis in the Mexican

environment. In order to avoid the use of others' interpretation of the original concepts of total quality management, it was decided to start from the ideas provided by the so called "quality gurus". These ideas were listed, classified and interrelated to develop a TQM conceptual model, which was the foundation for the field investigation performed on the Mexican labour-intensive industrial sector. The theoretical framework was enhanced by the research of other managerial topics related to quality management, such as teamwork, decision making, customer value, product development, management of suppliers, process design, benchmarking, continuous improvement versus radical improvement, and systematic approaches to quality improvement (ISO 9000 and Quality Awards). The conceptual model, extended in terms of managerial processes, was then used as the ideal TQM system. The research hypothesis at this point was: the more processes of the model implemented by a company, the more healthy (financially speaking) it should be. The rest of the research concentrated in analysing the validity of this hypothesis in different industrial sectors.

The combination of a theoretical and practical research allowed to get much useful information to ease the implementation of TQM in Mexican industry. The three most significant and original contributions to knowledge provided by this investigation are:

- 1) It introduces a comprehensive TQM model that integrates into one management system most, if not all, of the quality management techniques available in the literature.
- 2) It explores the emphasis given to different quality management process in different industrial sectors, and proposes a methodology to use this information for the design of an adequate TQM system; one that follows the path followed by the "winners".
- 3) On the basis of an extensive literature research and the analysis of the information provided by the organisations investigated, this study presents a complete set of recommended procedures to followed during the implementation and management of the system.

This knowledge was not available in Mexico before; in fact it is not available worldwide. Each company has to create its own strategy for TQM implementation; to apply the strategies followed by those that succeeded can save money and time. Certainly it will contribute to propitiate the appearance of more and more competitive industries in the country.

8.2 Contribution of the research to knowledge.

The theme addressed by this research, the implementation of TQM systems, is one of the most discussed topics on the specialised literature. However, although there are many publications regarding this issue (Tannock 1989), (Gomez-Aguirre 1990), (Griffiths 1990), (Russell 1990), (Weaver 1991), (Persico 1992), (Brocka & Brocka 1992), (Kane 1992), (Raymond 1993), (Spechler 1993), (Steele 1993), (Wellins et al. 1993), (Creech 1994), (Falconi 1994), (Salazar 1994), (Jablonsky 1995), (Weaver 1995), (Barron & Gjerde 1996), (Kanji 1996), (Terziovski et al. 1996), (Liang 1996) just a few of them attempt to provide a systemic approach to the implementation of total quality management. The previous knowledge regarding this topic is very poor. It could be said, and not only for the Mexican case, that none of them provide a systemic approach as the one presented in this study. For this reason, it was decided to start this research from the basic thoughts on TQM; those provided by the so-called “quality gurus”. An analysis on the publications mentioned above could lead this study to a biased conclusion.

However, there are some publications that need to be mentioned at this point because they make some interesting contributions to this field of knowledge. One of them is the study “TQM: Forging ahead or falling behind?”, conducted by Development Dimensions International, the Quality and Productivity Management Association and Industry Week (1993) to identify the specific practices that have contributed to the success of more than 500 organisations in North America (Canada, USA and Mexico). Another study is the one published by C. Carl Pegels (1995) with the title “TQM: a survey of its important aspects”,

which is mostly bibliographical research that integrates most of the quality management techniques available. Both studies are very interesting, but their analyses were made considering the total quality techniques in an isolated way, not from a systemic perspective. Another publication of experiences on TQM implementation is the book "Cases in TQM" from Oakland & Porter (1994). This book contains interesting cases of European companies and its focus is more integrated than others' because it includes not only the implementation of techniques for quality improvement and control, but also the cultural change required for TQM implementation and the incorporation of the business strategies into the quality system. Many other books have tried to provide a guide for TQM implementation since the beginning of this decade; however, there are not many books on the field published recently. Perhaps writers are realising that it is impossible to develop a universal guide for this purpose. Each company, although following general steps, has to create its own strategy for the implementation of TQM systems.

Another characteristic of the literature available for the implementation of TQM is that it is mostly related to the experiences of American or European companies in their participation in Quality Awards, such as the Malcolm Baldrige Award or the European Quality Award. The Japanese are not very keen on publishing their experiences. Magazines such as Quality Progress and the Quality Management Journal of the American Society for Quality, Total Quality Management from Carfax Publishing Company, etc. frequently issue cases and experiences on the implementation of some TQM practices and techniques, but not of the whole system. On the other hand, consulting firms that offer training and advise for the implementation of TQM as part of their services dislike to make public their experiences, perhaps because it is what they sell. The research on the field conducted by universities world-wide has not been as ample as required. One possible reason is that the academicians who consider it just as an application of traditional managerial concepts have misunderstood the topic, and they have not recognised the enhancement given to management theory by the holistic approach of total quality. Boaden (1996) as an example, argues that the principles commonly accepted as defining TQM are not unique to it but are part of other organisational change proposals. This argument is not false, but what this

article does not consider is that TQM is in fact the integration of all those techniques into one system for managing the business. The result is that TQM is promoted more by people from industry and consultants than by academicians. It is only recently that universities are starting research lines on the field. TQM as a Systems theory has faced a similar obstacle, a failure to develop methods for dealing with the forces for the *status quo* (Molander & Sisavic 1994).

Another perspective addressed by this study, usually not considered in research or articles on this field, is the analysis of the economical impact of TQM on the companies that implement it. Chong (1996) in a study conducted in California demonstrated that companies that actively embrace TQM will not guarantee financial success because much of it depends on the rate of their effective adoption vis-a-vis their competition in the market. This kind of approach could have been used in the research conducted in Mexican industry, which only considered a direct relationship between the company's DI index and its financial performance without analysing the interrelation of all competitors seeking the same total sales volume in a given market. In summary, previous knowledge on the field of TQM implementation was enhanced by the results of this research because it provides a systemic Total Quality Management model. This model integrates all the techniques available and introduces a methodology that helps the organisation in defining those that need more emphasis to have a better chance of achieving financial success.

Chapter 1 justifies the importance of TQM for the Mexican economy after the opening of its markets to foreign competition, and how it was immediately adopted by industrial organisations. Despite the interest and commitment of most managers for investing money on this purpose, the study demonstrated that just a few of the companies implementing TQM are really having an acceptable financial performance. Although it is hard to quantify, the total amount of money spent in this country for the implementation of quality management is a huge amount of money. The lack of knowledge available in Mexico on how to incorporate quality management concepts into the management system of a company causes a waste of money, perhaps the scarcest resource in the country.

Usually, the typical recommendation to start a TQM programme (not necessarily a system) that a Director receives from a consultant is to begin with an extensive educational programme. The argument used is that it will contribute to ease the cultural change required for quality and productivity improvement. This argument is not false, but it is incomplete. Culture is more influenced by the system (social and technical) in which it operates than by a given number hours of training. If the social and technical sub-systems change within a company, training will be required to acquire the skills needed to perform well in the new system, and people will ask for it. But training *per se* does not necessarily change a social (less a technical) system. Educational programmes are very expensive and their benefits hard to estimate or quantify. However, they provide a sense of progress in the implementation of the system. This does not mean that this study recommends the elimination of educational programmes in quality, but that they should be introduced just when they are needed, not before. On the other hand, to establish a strategy to decide what, who and when to implement the different elements that conform the sub-systems of a TQM model is not an easy task and progress seems to be slow; however, it is the foundation of the system. To build a system with a solid base will be eventually more cost and time effective.

The findings of this study, which derived into the methodology introduced in Chapter 7, could help industrial organisations with similar characteristics than those investigated to save money and time in TQM implementation. This knowledge was not previously available in Mexico, and now large (and medium) sized organisations can use it to facilitate the incorporation of a TQM system into their management system.

8.3 Limitations and applicability of the results.

Due to its own subjective and in some sense intangible nature, this investigation has some limitations and its conclusions and recommendations regarding its applicability are not universal. The most significant ones are listed and commented next.

1. As commented in Chapter 3, Total Quality Management is a concept without a precise definition. However, this lack of precision has not been an obstacle for the popularisation of the term all over the world, but it is important to recognise that its wide and relative meaning involved some risks for this research. Before analysing a proposal regarding TQM implementation it is important to know how the author defines TQM. Most definitions do not have a systemic approach, and usually refers to only three of the sub-systems contained in the system proposed in this study: management of suppliers, quality improvement and process control. An important limitation of this study is that its conclusions and recommendations refer only to the TQM practices and techniques contained in the conceptual system supporting this study, and in the form they are interrelated. In this way, a company using the methodology proposed by this study has to consider the implementation of the whole system, giving the recommended emphasis to different management processes according the its own classification (see Example 7.4).

2. Although the investigation focused on labour-intensive large industrial organisations, its application could be extended to other industrial sectors such as medium sized or capital intensive companies. This recommendation is feasible only if the audits to the system are conducted more frequently, monitoring its impact in improving company's financial performance, and correcting the implementation strategy as needed. However, it is not recommended to extend its use to micro and small organisations. Due to their own nature, this kind of organisation usually concentrate many managerial processes, decisions and responsibilities in one person, which gives him or her a very high level of authority and power. The concentration of power makes difficult to practice effectively basic TQM concepts such as participation, delegation, consensus, teamwork, empowerment, etc. This does not mean that TQM is not applicable to micro and small organisations, but that more research on this topic is needed, especially for the Mexican case where most of these companies operate very informally and outside fiscal regulations. On the other hand, the applicability of this research can not be either extended to service organisations, or any other type of organisation (government, education, etc.). Such organisations, due to their

nature, need definitely a much stronger emphasis on the management of human behaviour and the marketing sub-systems than an industrial organisation. In industry, blue-collar employees normally do not face directly the customers, while in service organisations these employees have the responsibility to provide them a direct service. The TQM system has to be very effective to develop a strong service attitude and good manners among all employees because these elements are the most important factor in quality perception in the service sector. The proposed model in this thesis does not make a significant contribution on this matter.

3. Because of the limited budget available to conduct this research, the process utilised to gather information from the selected companies was not the ideal one. Although the persons interviewed demonstrated to be people very informed and with so many hours of training in the field, the whole study is based on the opinion they have about the performance of the quality system they created, manage and are responsible for. The ideal situation would have been to conduct a more detailed audit to the quality system of the companies involved in the study, perhaps to apply a more extensive questionnaire such as the one proposed for the self-diagnosis in Chapter 7, which involves more people's opinion. However, doing so in 82 companies would have consumed a huge amount of resources, and not many organisations would have been willing to collaborate.

4. At the time when most of the information was gathered, during the period 1995-96, the companies investigated were operating under a very hard economic situation because of the severe crisis of the Mexican economy, and their financial performance was experiencing a strong pressure because of this situation. This condition necessarily altered their individual implementation programmes, and the emphasis given to each element on the system could be responding to a particular need of that moment, and not as part of the original or the most appropriate strategy. It is important to mention, however, that for some companies Mexico's economic crisis represented a good opportunity for improving their financial performance. Some companies with an operation requiring a low level of working capital and having a low debt had the opportunity to take a financial advantage by managing the

cash surplus. On the other hand, companies that were surprised by the peso crisis at the end of 1994 having a debt in dollars (that suddenly doubled in less than 24 hours) or a high debt in pesos (interest rates in pesos went from 18% to around 60%), had to face an unmanageable problem that, without any doubt, affected their financial performance. This “noise” contained in the information used in Section 6.6 could have altered the conclusions of the analysis of externalities and the classification of companies as Type I, II, III, IV or C.

5. The study was conducted in companies located in the 3 largest cities of the country, and although 90% of the sales volume of the 500 Expansion list is concentrated in these 3 places, the conclusions of the research do not necessarily extend to the rest of Mexico. Perhaps a more precise title for this research could be “analysis of the TQM implementation strategies followed by industrial organisations located in Mexico’s 3 largest cities”. Many factors of all types are different in these cities than the rest of the country. The availability of infrastructure, human resources, financial resources, raw materials, health services, education and consulting services, communications, entertainment, customers and almost everything required to run a business is much better in these 3 metropolitan areas than in other places, not to mention that most transactions and decisions related to government have to take place in country’s capital. So companies prefer to be close to where the action is. In summary, because organisations operating outside these 3 geographical zones face other difficulties in form and intensity, the emphasis they should give to the QM processes of the proposed model must be different.

6. Changes in process and information technology combined with the consolidation itself of the open-economy policy in Mexico as well as in other countries and in general of the globalisation process, will require organisations to develop new capabilities to succeed in a more competitive and interrelated world. To know how to foresee and manage effectively externalities, such as the frequent financial crisis provoked by political or economical decisions made at the other side of the globe, will constitute the best asset for any company and the most important skill of top managers in the future. Because of this, the conclusions of the research are valid only for a relatively short period of time and will need to be

constantly updated. Research centres on the field in Mexico and everywhere need to be committed to permanently conduct investigations like this one.

This investigation has many more limitations, but those addressed in this section are the most important since they cover the dimensions of content, information used, availability of resources, and geographical and time applicability.

8.4 Suggestions for future research on the topic.

Due to its scope and limitations, this research provides an sound answer to the starting question, but left many more questions unanswered. The list of further studies that can be done in the area based on the questions not answered by this research because of its scope and limitations, and the new questions appeared as a consequence of this study, is presented now.

1. The effect of TQM on the profit of a company considering the efforts of competitors to capture market share. A company's profit is the consequence of two elements: the productivity of its operation and the acceptance of its product in the market. It could be interesting to analyse and quantify how TQM contributes to improve customers' preference in relation to the effectiveness achieved by competitors with the same purpose.
2. Organisations are evolving from a functional structure to one based on a management system structured as a set of interrelated processes congruent with company's strategies for the fulfilment of its mission. It is said in literature that TQM would be more effective in process organisations. However, this hypothesis has not been proved yet because most organisations still operate on functional structure. As companies evolve from a functional to a process structure, it will be necessary to investigate if current TQM principles perform better or if they need a dramatic adaptation.

3. In general a TQM system is composed of a technical and a social sub-system. However, depending upon the particular characteristics and conditions of competition of each organisation, which sub-system is more critical (technical or social) to contribute to company's mission fulfilment? The analysis of this topic would provide interesting information on the cultural aspects of TQM, which is a factor mentioned frequently but poorly investigated.
4. Since the outcome of this research easily becomes obsolete, it is recommended to investigate its use, and to review and adapt it in case of detecting it is not being useful to design a management system that effectively contributes to companies' competitiveness.
5. A management system like the one proposed in this research work implies radical changes in the skills required by people to perform effectively. On the other hand, the frequent changes on the conditions for competitiveness requires the organisation to keep learning how to stay competitive. For this reason, it is recommended an investigation on the processes to follow to assure human as well as organisational learning for TQM implementation.
6. Another recommendation is to perform a study like the one presented here, but focused on the implementation of TQM in micro and small organisations. As mentioned before, these organisations have unique characteristics that make inappropriate to just adopt the strategies followed by larger companies for this purpose. The adaption of this strategies to their own charactersitics is an important and interesting opportunity for future research.
7. Because of the globalisation of world economy, companies are frequently exposed to external factors (out of their control) that necessarily affect their performance. However, how effective is TQM to protect a company against the frequent macro-economical

turbulence? The analysis of this topic would contribute to provide the knowledge required “protecting” or anticipating the effect of such externalities.

8. Since this study focused on the industrial sector, it would be appropriate to conduct other similar studies but for the service sector and for institutions dedicated to education. These sectors are becoming more important for any economy and the impact they have even in industry is much stronger than before. The analysis of TQM implementation on these sectors would provide more answers related to the cultural aspects of this field.
9. The study of the relevant cultural aspects involved in TQM implementation, analysing how the current culture can evolve to a culture more appropriate for TQM, how the individual's culture interacts with corporate culture and the importance of having some degree of congruency on both. The results of a research on this topic could be very interesting and useful, but at the same time, it could be rather difficult to conduct it. The key point for getting good results in a study like this is to create a good method to measure the characteristics of the current and the ideal culture.
10. Because TQM implementation involves a dramatic organisational change, another topic for future research is the analysis of the available models for change management, to define how should the change management process be executed to be more effective in the implementation of TQM. In relation to this change, it would be interesting to investigate if the change should be dramatic or by a slow adaptation, and if situations of crisis are more adequate for this purpose, and if so, if it would be recommended to create a crisis intentionally.
11. The area of leadership is another good opportunity for research on the field. There is not much information to define, given the own characteristics and needs of a company, which leadership styles are more appropriate for TQM, the role of leadership in a TQM system, the most adequate leadership styles in middle and lower levels, what do people

expect from their formal and informal leaders in a quality management system, and how leaders become committed to lead their organisations under a TQM system.

12. One more area for future reserach is the analysis of the importance of strategic planning for the effectiveness of a TQM system, how to define appropriate strategies to improve the competitiveness of the organisation and how strategic guidelines should be incorporated into the organisation's operation.
13. Because modern organisations tend to be structured in processes as a value chain, their information systems should have different characteristics providing on time data on the quality of the internal products or services to the teams responsible for the operation of each process. Additionally, a process management structure requires a different accounting system, which involves another financial approach. A research on this topic would contribute to improve the effectiveness of a TQM system reducing the problems associated with the lack of congruency between modern management concepts and old management structures.
14. The sub-system of management of human behaviour needs a lot of research work, some topics on which the investigation in this field can focus are:
 - Employees' motivation to work and the pride developed by doing the work that copes better with their needs, competencies, expectations, etc.
 - The characteristics of production jobs in an organisation that operates with a TQM system (from a full division of labour to enriched jobs with responsibilities shared by team members).
 - The form in which middle and lower level employees learn and develop a commitment to quality planning, improvement and control.

- The procedures to develop an employee's ownership attitude to work (stock option plans, net revenues sharing, etc.).
- The large difference in salary levels between top executives and lower level employees as one of the main reasons for dissatisfaction and lack of commitment to the company's goals on the last group.
- What procedures for reward and recognition are more adequate for a given organisation.
- The establishment of empowerment under different leadership and decision making styles, and if this concept contribute to make a worker more motivated and proud.
- The type of training required during TQM implementation and the most appropriate timing for conducting it.
- The analysis of how to develop the communication skills, trust and confidence required to motivate every employee to participate more actively in operational and strategic decisions.
- Does teamwork (self managed teams, quality circles, etc.) cope with individuals' culture in Mexico?, is it a requirement for quality improvement?
- How traditional performance assessment procedures should evolve to be congruent with total quality ideas and how they influence on people's performance?
- The congruency between individuals' goals and company's goals as a requirement to succeed in TQM implementation.

- Analysis of the main fears suffered by employees in Mexican organisations and how do they influence on company's performance.
- A study on the human values considered as sacred by Mexicans and how they should be taken into account for TQM implementation.

15. The marketing process of the company usually creates customers' expectations. Sometimes the marketing strategies used are not congruent with the total quality principles. These two facts constitute a handicap for the rest of the operation when the expectations of customers surpass the ability of the company to satisfy them. The operation of a company should be designed with the capacity to satisfy customers' expectations, but marketing strategies should take care of not developing expectations that the operation is not capable to satisfy. The relation between marketing strategies and customers' satisfaction given the quality potential of the company's operations is another opportunity for future research.

16. Another field not sufficiently investigated yet is the relation between ethics and quality or customer satisfaction. Despite the approach used on this research work (TQM implementation for profitability improvement), quality should be more than a money related matter because there are other non-monetary factors involve on it. On decision making for customer satisfaction, the ethics code that a person has internalised in his or her mind should be stronger than the pressure exerted by the most powerful stakeholder or a law or rule that regulates that decision. The ethics code of an individual is something that TQM can change. Honesty and respect for others' rights are cultural values required by a TQM system.

APPENDIX A

QUESTIONNAIRE FORMAT

QUESTIONNAIRE

Number _____
Date _____

1. Information on the company

Company's name _____
City where it is located _____
Industrial Sector _____
Products / Services _____

2. Involvement in Total Quality Management (TQM)

Has your company been involved in any type of Total Quality programme during the last 10 years?

☐ Yes. Please go to section 3.

☐ No. Please comment what techniques or management strategies have been used to maintain and improve the competitiveness of your company.

_____ **End of questionnaire.**

3. Degree of utilisation of Total Quality procedures and techniques.

The attachment 1 of this questionnaire presents a list of procedures and techniques commonly used in a TQM programme, please indicate in the appropriate row in what degree each of them is used in your company according to the following criteria:

- A. The process is widely used as described, and presented in a manual
- B. The process is widely used as described, but in an informal manner
- C. The process is used, but with minor changes and informally
- D. The process is used, but with significant changes and informally
- E. The process is used occasionally and informally
- F. The process is never used

| | | | | | | | | | | | | | | | | | | | | |
|----|---|---|---|---|---|---|----|---|---|---|---|---|---|----|---|---|---|---|---|---|
| L1 | A | B | C | D | E | F | H2 | A | B | C | D | E | F | O5 | A | B | C | D | E | F |
| L2 | A | B | C | D | E | F | H3 | A | B | C | D | E | F | O6 | A | B | C | D | E | F |
| L3 | A | B | C | D | E | F | H4 | A | B | C | D | E | F | O7 | A | B | C | D | E | F |
| L4 | A | B | C | D | E | F | H5 | A | B | C | D | E | F | O8 | A | B | C | D | E | F |
| S1 | A | B | C | D | E | F | H6 | A | B | C | D | E | F | C1 | A | B | C | D | E | F |
| S2 | A | B | C | D | E | F | M1 | A | B | C | D | E | F | C2 | A | B | C | D | E | F |
| S3 | A | B | C | D | E | F | M2 | A | B | C | D | E | F | C3 | A | B | C | D | E | F |
| S4 | A | B | C | D | E | F | M3 | A | B | C | D | E | F | P1 | A | B | C | D | E | F |
| S5 | A | B | C | D | E | F | M4 | A | B | C | D | E | F | P2 | A | B | C | D | E | F |
| S6 | A | B | C | D | E | F | O1 | A | B | C | D | E | F | Q1 | A | B | C | D | E | F |
| S7 | A | B | C | D | E | F | O2 | A | B | C | D | E | F | Q2 | A | B | C | D | E | F |
| S8 | A | B | C | D | E | F | O3 | A | B | C | D | E | F | Q3 | A | B | C | D | E | F |
| H1 | A | B | C | D | E | F | O4 | A | B | C | D | E | F | Q4 | A | B | C | D | E | F |

4. Critical sub-systems to have a successful implementation of a TQM programme
 The following list includes the sub-systems that are normally part of a TQM system (for a better understanding of each, please review the list in attachment 1 of this questionnaire):

- a. Leadership
- b. Strategic planning
- c. Marketing
- d. Management of human behaviour
- e. Operation’s management
- f. Process control
- g. Suppliers management
- h. Quality improvement

Please indicate in the square at the left of each of the following sentences, the appropriate letter corresponding to the sub-system that better fits each one of them:

- ☐ critical sub-system for company's competitiveness
- ☐ hardest sub-system to implement due to change resistance
- ☐ sub-system that used more human/financial resources

5. Difficulties faced during implementation of the TQM programme
 Please assign an order of importance to the following difficulties that could have been present during implementation of the programme. Assign a grade from 1 to 8 (or 9 if another difficulty is added), where 1 is for the hardest difficulty and 8 (or 9) for the easiest one.

- | | |
|--|---|
| <input type="checkbox"/> Top management involvement | <input type="checkbox"/> Opposition from middle management |
| <input type="checkbox"/> Low educational level of workers and supervisors | <input type="checkbox"/> Low technological level |
| <input type="checkbox"/> Lack of quality suppliers | <input type="checkbox"/> Customers do not demand quality |
| <input type="checkbox"/> Lack of working methods (process standardisation) | <input type="checkbox"/> Lack of financial resources to implement the TQM programme |
| <input type="checkbox"/> Other (indicate) | |
-

6. Time required for programme's implementation

On the basis of your experience, how long it took (or will take) to implement the TQM programme from planning up to the point in which all procedures and techniques were in operation (even if not in optimal conditions)?

- | | | |
|--------------------------------------|--------------------------------------|--|
| <input type="checkbox"/> 0 - 1 year | <input type="checkbox"/> 1 - 2 years | <input type="checkbox"/> 2 - 4 years |
| <input type="checkbox"/> 4 - 6 years | <input type="checkbox"/> 6 - 8 years | <input type="checkbox"/> 8 or more years |

7. TQM procedures implementation sequence

The attachment 2 of this questionnaire shows in alphabetical order the list of procedures normally followed during the implementation of a TQM programme, please indicate the sequence in which you consider each procedure should be implemented (none of them in parallel) to "maximise" the probability of success. The sequence asked is the ideal from your point of view, and not necessarily the one followed by your company. Please write the sequential position for each procedure in the square at the left by giving a number from 1 to 25, where 1 is for the procedure you suggest to implement first.

- | | | | |
|----------------------------|----------------------------|----------------------------|----------------------------|
| <input type="checkbox"/> a | <input type="checkbox"/> g | <input type="checkbox"/> m | <input type="checkbox"/> s |
| <input type="checkbox"/> b | <input type="checkbox"/> h | <input type="checkbox"/> n | <input type="checkbox"/> t |
| <input type="checkbox"/> c | <input type="checkbox"/> i | <input type="checkbox"/> o | <input type="checkbox"/> u |
| <input type="checkbox"/> d | <input type="checkbox"/> j | <input type="checkbox"/> p | <input type="checkbox"/> v |
| <input type="checkbox"/> e | <input type="checkbox"/> k | <input type="checkbox"/> q | <input type="checkbox"/> w |
| <input type="checkbox"/> f | <input type="checkbox"/> l | <input type="checkbox"/> r | <input type="checkbox"/> x |
| | | | <input type="checkbox"/> y |

8. Quality management effectiveness

Please assign an order of importance from 1 (the one used more) to 3 (the one used less) to the 3 indicators that are used more to measure the effectiveness of the TQM programme (assign a 4 to all others).

| | |
|---|---|
| <input type="checkbox"/> Cost of poor quality | <input type="checkbox"/> Financial profitability |
| <input type="checkbox"/> Market share | <input type="checkbox"/> Employees' satisfaction |
| <input type="checkbox"/> Quality awards | <input type="checkbox"/> Quality & Productivity indexes |
| <input type="checkbox"/> Other (indicate) _____ | |

9. Effect of TQM implementation on stakeholders' satisfaction

Please asses the effect your quality management programme is having on the fulfilment of the expectations of stakeholders.

| | | | | | | |
|----------------|-----------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------|
| Shareholders | Decreased | <input type="checkbox"/> -1 | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | Increased |
| Top management | Decreased | <input type="checkbox"/> -1 | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | Increased |
| Employees | Decreased | <input type="checkbox"/> -1 | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | Increased |
| Suppliers | Decreased | <input type="checkbox"/> -1 | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | Increased |
| Customers | Decreased | <input type="checkbox"/> -1 | <input type="checkbox"/> 0 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | Increased |

10. Information of respondent

Name _____

Approximate number of hours of training in TQM _____

Position _____

Position to which you report _____

Phone _____ FAX _____

ATTACHMENT 1
List of procedures and techniques
commonly used in a TQM programme

Leadership

L1) Top management knows clearly and fully understands what each stakeholder expects from the company.

L2) Top management measures (at least once a year) the degree of satisfaction achieved on the fulfilment of stakeholders' expectations.

L3) The mission and vision statements are defined to aim the organisation towards the fulfilment of stakeholders' expectations and are the foundation of the company's strategic and operational framework.

L4) The corporate social and cultural values are clearly defined and used as well to set-up the strategic and operational framework of the company.

Strategic Planning

S1) The company's strategic guidelines are defined considering the availability of process technology (soft and hard) as an input variable.

S2) The strategic guidelines are defined as well in terms of the capital available for re-investment, according to a policy for the distribution of benefits.

S3) For the definition of the corporate strategic guidelines, company's mission, vision and the corporate social and cultural values are also taken into consideration.

S4) A benchmarking analysis is executed to support the determination of the strategic guidelines.

S5) By using information on company's performance, re-engineering actions are implemented to adjust the strategic planning process.

S6) The company has a quality policy, which is deployed throughout the organisation, so each administrative and productive process can periodical and congruently define their own goals and objectives.

S7) Benchmarking analysis or another similar technique is used to incorporate to the company's operations the "best processes" used by competitors or other companies.

S8) Business process re-engineering or another similar technique is used by top management when they realise that the lack of fulfilment to goals and objectives is so strong that a major change is required in the business.

Management of Human Behaviour

H1) Top management and/or the quality steering committee (qsc) monitor the employees' performance and satisfaction to define or modify the way in which quality concepts are promoted among them.

H2) Top management and/or the quality steering committee measure the performance and degree of satisfaction of employees to define or modify the training and educational programmes on quality.

H3) Top management and/or the quality steering committee, rewards and recognises those employees achieving an outstanding quality performance, to reinforce their satisfaction and performance.

H4) There is a formal procedure to measure the employees' degree of job satisfaction.

H5) The company has a formal procedure to measure the employees' on the job performance.

H6) Top management and/or quality steering committee frequently take action to adjust or modify the corporate culture as necessary.

Marketing

M1) Customer satisfaction is frequently measured by comparing the product and/or service of the company against competitors' product and/or service.

M2) The company has an adequate policy for profits and benefits distribution among stakeholders, so their expectations can be accomplished.

M3) Somebody within the company has the responsibility to study competitors' quality, strengths and weaknesses.

M4) The company's market share is known for each segment market in which it participates.

Operation's Management

O1) Company's products and services are designed in congruency with the goals and objectives deployed from the quality policy.

O2) The production process is planned in congruency with the goals and objectives deployed from the quality policy.

O3) The internal supplier - customer chain concept is the base to design the administrative process, which is done in congruency with the goals and objectives deployed from the quality policy.

O4) To design new products or to review the existing ones, the company has a formal procedure based on the quality function deployment technique.

O5) There are formal information systems to link the production operation to the administration process.

O6) To assess the effectiveness of the operation, the performance of the administrative process is formally measured and documented.

O7) To assess the effectiveness of the operation, the productivity of the production process is formally measured and documented.

O8) To assess the effectiveness of the operation, the quality of the finished product is formally measured and documented.

Process Control

C1) There are formal methods and work standards, as well as material handling procedures and production control devices to optimise the production process.

C2) Different procedures and techniques are used to exercise process control actions.

C3) Statistical process control is used as a technique to control the manufacturing process.

Management of suppliers

P1) There are formal procedures, fully documented to assure the quality of inputs from suppliers.

P2) The company has a programme to select suppliers, and to audit and improve quality of inputs.

Quality improvement

Q1) There is a formal process fully documented for the management of quality improvement projects.

Q2) The company has a formal procedure to perform quality audits on the management system and uses audit's outcome to redirect (if necessary) the total quality programme.

Q3) The company has a quality steering committee whose responsibilities are to manage the quality improvement projects, to implement procedures and actions to modify the corporate culture, and to promote individuals' innovation and creativity.

Q4) Teamwork is used to carry out quality improvement projects with the objective of improving the manufacturing operation, quality of inputs, and to modify the corporate culture.

ATTACHMENT 2
Procedures and techniques commonly used in a TQM
(alphabetical order in Spanish)

- a. Audits to the quality system:** Implement an auditing procedure for the quality system, using the company's operation outcome.
- b. Benchmarking:** Use of benchmarking or some other similar technique to incorporate to company's own operation the "best processes" from competitors or similar industries.
- c. Competitors' quality:** Conduct studies to know competitors' product and service quality, as well as their strengths and weaknesses.
- d. Quality steering committee:** Install a quality steering committee with the responsibility of managing quality improvement projects for the product and the production process, as well as to put in action procedures to modify the quality culture among all employees.
- e. Management of suppliers:** Design and implement a programme to select suppliers, and to improve quality of inputs.
- f. Process control:** Implement a statistical process control programme as a tool to control the manufacturing operation and improve its capability.
- g. Fulfilment of stakeholders' expectations:** Top management should measure, at least once a year, the degree of stakeholders' satisfaction on fulfilment of their expectations from company's operation.
- h. Profits distribution:** Design and implement a policy that helps to define the way to distribute the financial resources generated from the operation, to accomplish the expectations of each stakeholder.
- i. Stakeholders expectations:** Top management should know and understand what each stakeholder expect from the company.
- j. Mission and vision:** Mission and vision statements should be created on the basis of the expectations of stakeholders customers.
- k. Management of operation:** To manage the operation of the business, formally document the following procedures: a) assurance of the quality of inputs from suppliers, b) design of new products and review the actual ones, c) design of the production process (layout, methods and work standards, material handling, etc.), d) management of the internal supplier - customer chain and the administration process to support the operation, e) how top management and/or the quality steering committee should take actions to modify the quality culture among all employees, f) management of the quality improvement projects and g) definition and implementation of process control actions.
- l. Market share:** The knowledge of market share for each of the segment market in which company participates.

- m. Production process planning:** Plan (design) the production process in congruency with the goals and objectives derived from deployment of quality policies.
- n. Product/service planning:** Plan (design) products and/or services in congruency with the goals and objectives derived from deployment of quality policies.
- o. Quality policies:** Develop and deploy the quality policy throughout the organisation to enable each department to define periodically congruent goals and objectives.
- p. Strategic planning process:** Definition of strategic guidelines in the strategic planning process by the use of the following input variables: a) technology available, b) the corporate social and cultural values, c) company's mission and vision, d) benchmarking outcome, e) re-engineering strategic actions.
- q. Training and educational programmes:** Top management and/or the quality steering committee should monitor employees' satisfaction and performance to define or modify the training and educational programmes on quality.
- r. Promotion of a culture of quality:** Top management and/or the quality steering committee should monitor employees' satisfaction and performance to define or modify the way in which quality concepts are promoted among them.
- s. Quality improvement projects:** Implement a procedure to carry out quality improvement projects with the objective of improving the manufacturing operation, the quality of raw materials and other inputs, and to modify the quality culture.
- t. Re-engineering management:** Top Management should start using business process re-engineering or some other similar technique when they realise that the lack of fulfilment to goals and objectives is so strong that a major change is required.
- u. Rewards and recognition:** Top management and/or the quality steering committee should give rewards and recognition to employees with outstanding achievements in quality, to reinforce their satisfaction and performance.
- v. Administrative process design:** Design and plan the administration process in congruency with the goals and objectives derived from the quality policy using the concept of the "internal supplier - customer chain".
- w. Business operation outcome:** Develop and implement formal procedures to measure the effectiveness of the operation through the following variables: a) performance of the administration process, b) productivity, c) employees' satisfaction, d) employees' performance, e) quality of the finished product.
- x. Customer satisfaction:** Develop a system to measure the degree of customers' satisfaction based on the comparison of the quality of own company's products and/or services against competitors' in relation to fulfilment of customer expectations.
- y. Social and cultural values:** Define the company's strategic and operational framework on the basis of the stakeholders' expectations and the corporate social and cultural values.

APPENDIX B
INFORMATION GATHERED BY COMPANY

Company No. 1

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Glass and glass products |
| Products / Services | Glass containers |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| H1) Quality promotion |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| O3) Administration process planning |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |

Processes used in a modified way and documented

| |
|--|
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O4) Redesign of products and services |
| C3) Statistical process control |

Processes used in a modified way but not documented

| |
|---|
| H2) Training and educational programmes |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| O5) Production / administration information systems |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of Quality Assurance |
| Reports to: | Quality Manager |
| Education in TQM (# hours) | na |

5. Difficulties during implementation

| | |
|--|---|
| Low educational level | 1 |
| Lack of working methods | 2 |
| Poor understanding of quality management | 3 |
| Opposition of middle management | 4 |
| Lack of quality suppliers | 5 |
| Lack of financial resources | 6 |
| Low technological level | 7 |
| Customer do not demand quality | 8 |
| Top management involvement | 9 |

6. Time for implementation (years)

6 to 8

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| i. Stakeholders expectations | 2 |
| q. Training and educational programmes | 3 |
| b. Benchmarking | 4 |
| l. Market share | 5 |
| j. Mission and vision | 6 |
| o. Quality policies | 7 |
| r. Promotion of a culture of quality | 8 |
| y. Social and cultural values | 9 |
| p. Strategic planning process | 10 |
| a. Audits for the quality system | 11 |
| c. Competitors' quality | 12 |
| m. Production process planning | 13 |
| n. Product/service planning | 14 |
| v. Internal supplier - customer chain | 15 |
| k. Management of operation | 16 |
| e. Management of suppliers | 17 |
| f. Process control | 18 |
| g. Fulfilment of stakeholders' expectations | 19 |
| x. Customer satisfaction | 20 |
| s. Quality improvement projects | 21 |
| w. Business operation outcome | 22 |
| h. Profits distribution | 23 |
| u. Rewards and recognition | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| No. of customers' complains | 1 |
| Quality & Productivity indexes | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|------|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.20 |

11. Estimated profitability index

| | |
|---------|------|
| P Index | 1 00 |
|---------|------|

Company No. 2

1. General Information

| | |
|---------------------|--------------------|
| Industrial Sector | Tobacco |
| Products / Services | Cigarettes/Filters |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| S8) Business process re-engineering |
| H6) Modification of the corporate culture |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| Q1) Quality improvement projects. |

Processes used in a modified way and documented

| |
|--|
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| M1) Customer satisfaction |
| O3) Administration process planning |

Processes used in a modified way but not documented

| |
|---|
| H1) Quality promotion |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| Q2) Audits to the management system |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Strategic Planning |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality Assurance Manager |
| Reports to: | Plant Manager |
| Education in TQM (# hours) | 200 |

5. Difficulties during implementation

| | |
|---------------------------------------|---|
| Top management involvement | 1 |
| Poor production process documentation | 2 |
| Lack of working methods | 3 |
| Lack of quality suppliers | 4 |
| Customer do not demand quality | 5 |
| Opposition of middle management | 6 |
| Lack of financial resources | 7 |
| Low technological level | 8 |
| Low educational level | 9 |

6. Time for implementation (years)

| |
|--------|
| 2 to 4 |
|--------|

7. Recommended implementation sequence

| | |
|--|----|
| i. Stakeholders expectations | 1 |
| l Market share | 2 |
| c Competitors' quality | 3 |
| j. Mission and vision | 4 |
| o. Quality policies | 5 |
| n. Product/service planning | 6 |
| m. Production process planning | 7 |
| w. Business operation outcome | 8 |
| g Fulfilment of stakeholders' expectations | 9 |
| h. Profits distribution | 10 |
| d. Quality steering committee | 11 |
| b. Benchmarking | 12 |
| f Process control | 13 |
| e. Management of suppliers | 14 |
| x. Customer satisfaction | 15 |
| y. Social and cultural values | 16 |
| p. Strategic planning process | 17 |
| q Training and educational programmes | 18 |
| k. Management of operation | 19 |
| r. Promotion of a culture of quality | 20 |
| a. Audits for the quality system | 21 |
| s. Quality improvement projects | 22 |
| u. Rewards and recognition | 23 |
| v. Internal supplier - customer chain | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|------|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1 60 |

11. Estimated profitability index

| | |
|---------|------|
| P Index | 1 00 |
|---------|------|

Company No. 3

1. General Information

| | |
|---------------------|-------------------------|
| Industrial Sector | Publishers and printing |
| Products / Services | Flexible packaging |

2. Involvement in TQM

NO

3. Degree of Implementation of system's processes

Processes widely used and documented

[illegible]

Processes widely used but not documented

Processes widely used but not documented

Processes used in a modified way and documented

| |
|---|
| Processes used in a modified way and documented |
| |
| |
| |

Processes used in a modified way but not documented

Processes used sporadically and not documented

Receipts used sporadically and not documented

Processes never used

| Processes Never Used |
|-----------------------------|
| |

4. Critical sub-systems for:

| | |
|--|--|
| company's competitiveness | |
| implementation due to resistance | |
| utilisation of human/financial resources | |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of Quality Assurance |
| Reports to: | Plant Manager |
| Education in TQM (# hours) | 24 |

5. Difficulties during implementation

[illegible]

6. Time for implementation (years)

7. Recommended implementation sequence

[illegible]

8. Effectiveness measure of the QM programme

| | |
|--|--|
| | |
| | |
| | |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|--|
| Shareholders | |
| Top Management | |
| Employees | |
| Suppliers | |
| Customers | |
| Stakeholders' satisfaction index | |

11. Estimated profitability index

| | |
|--|--|
| 11. Estimated profitability index | |
| P Index | |

Company No. 4

1. General Information

| | |
|---------------------|--------------------------------|
| Industrial Sector | Non electrical machinery |
| Products / Services | Machinery for glass production |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| O5) Production / administration information systems |
| C1) Work methods and standards |
| Q1) Quality improvement projects |

Processes used in a modified way and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| C3) Statistical process control |
| P2) Programme to select suppliers |

Processes used in a modified way but not documented

| |
|---|
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |

Processes used sporadically and not documented

| |
|--|
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |

Processes never used

| |
|---------------------------------------|
| O4) Redesign of products and services |
|---------------------------------------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of Quality Assurance |
| Reports to: | Process engineering |
| Education in TQM (# hours) | 192 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Top management involvement | 2 |
| Opposition of middle management | 3 |
| Customer do not demand quality | 4 |
| Lack of quality suppliers | 5 |
| Low educational level | 7 |
| Low technological level | 8 |
| Lack of financial resources | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 2 to 4 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| r. Promotion of a culture of quality | 1 |
| q. Training and educational programmes | 2 |
| o. Quality policies | 3 |
| s. Quality improvement projects | 4 |
| j. Mission and vision | 5 |
| d. Quality steering committee | 6 |
| k. Management of operation | 7 |
| f. Process control | 8 |
| a. Audits for the quality system | 9 |
| p. Strategic planning process | 10 |
| x. Customer satisfaction | 11 |
| v. Internal supplier - customer chain | 12 |
| m. Production process planning | 13 |
| i. Stakeholders expectations | 14 |
| g. Fulfilment of stakeholders' expectations | 15 |
| y. Social and cultural values | 16 |
| e. Management of suppliers | 17 |
| l. Market share | 18 |
| b. Benchmarking | 19 |
| c. Competitors' quality | 20 |
| w. Business operation outcome | 21 |
| u. Rewards and recognition | 22 |
| h. Profits distribution | 23 |
| t. Re-engineering management | 24 |
| n. Product/service planning | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|------|
| Shareholders | 2 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 1 00 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 5

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Non electrical machinery |
| Products / Services | Construction machinery |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|-------------------------------------|
| O3) Administration process planning |
|-------------------------------------|

Processes used in a modified way and documented

| |
|-------------------------------------|
| S8) Business process re-engineering |
| C3) Statistical process control |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Suppliers Mgt |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------|
| Position | Quality Chief |
| Reports to: | Plant Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Oposition of middle management | 1 |
| Lack of working methods | 2 |
| Lack of quality suppliers | 3 |
| Low educational level | 4 |
| Low technological level | 5 |
| Top management involvement | 6 |
| Customer do not demand quality | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

1 to 2

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| d. Quality steering committee | 2 |
| p. Strategic planning process | 3 |
| j. Mission and vision | 4 |
| q. Training and educational programmes | 5 |
| m. Production process planning | 6 |
| k. Management of operation | 7 |
| n. Product/service planning | 8 |
| g. Fulfilment of stakeholders' expectations | 9 |
| a. Audits for the quality system | 10 |
| v. Internal supplier - customer chain | 11 |
| y. Social and cultural values | 12 |
| f. Process control | 13 |
| w. Business operation outcome | 14 |
| o. Quality policies | 15 |
| r. Promotion of a culture of quality | 16 |
| s. Quality improvement projects | 17 |
| u. Rewards and recognition | 18 |
| x. Customer satisfaction | 19 |
| t. Re-engineering management | 20 |
| c. Competitors' quality | 21 |
| b. Benchmarking | 22 |
| e. Management of suppliers | 23 |
| l. Market share | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Employees' satisfaction | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.8 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 6

1. General Information

| | |
|---------------------|-----------------|
| Industrial Sector | Auto-parts |
| Products / Services | Body parts, nms |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S5) Strategies -re-engineering actions |
| M3) Competitors' quality, strengths & weaknesses |

Processes used in a modified way and documented

| |
|------|
| None |
|------|

Processes used in a modified way but not documented

| |
|------------------------------|
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Q. Improvement |

10. Characteristics of respondent

| | |
|----------------------------|-----------------|
| Position | Quality Manager |
| Reports to: | Plant Manager |
| Education in TQM (# hours) | NA |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Low educational level | 2 |
| Low technological level | 3 |
| Lack of quality suppliers | 4 |
| Opposition of middle management | 5 |
| Lack of financial resources | 6 |
| Lack of working methods | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 2 to 4 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| o. Quality policies | 1 |
| p. Strategic planning process | 2 |
| q. Training and educational programmes | 3 |
| r. Promotion of a culture of quality | 4 |
| k. Management of operation | 5 |
| w. Business operation outcome | 6 |
| m. Production process planning | 7 |
| n. Product/service planning | 8 |
| l. Market share | 9 |
| j. Mission and vision | 10 |
| i. Stakeholders expectations | 11 |
| h. Profits distribution | 12 |
| a. Audits for the quality system | 13 |
| b. Benchmarking | 14 |
| c. Competitors' quality | 15 |
| d. Quality steering committee | 16 |
| f. Process control | 17 |
| e. Management of suppliers | 18 |
| u. Rewards and recognition | 19 |
| v. Internal supplier - customer chain | 20 |
| t. Re-engineering management | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| y. Social and cultural values | 23 |
| s. Quality improvement projects | 24 |
| x. Customer satisfaction | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Market share | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | -1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 7

1. General Information

| | |
|---------------------|-------------------|
| Industrial Sector | Metallic products |
| Products / Services | Metal containers |

2. Involvement in TQM YES

3. Degree of Implementation of system's processes

| | |
|---|--|
| Processes widely used and documented | |
| L1) Understanding of stakeholders' expectations | |
| L3) Mission and vision statements | |
| L4) Corporate social and cultural values | |
| S2) Strategies -capital available | |
| S3) Strategies - mission, vision and corporate values | |
| S6) Quality policy | |
| S7) Benchmarking analysis | |
| H1) Quality promotion | |
| H2) Training and educational programmes | |
| H3) Rewards and recognition | |
| H6) Modification of the corporate culture | |
| M1) Customer satisfaction | |
| M3) Competitors' quality, strengths & weaknesses | |
| M4) Market share | |
| O3) Administration process planning | |
| O5) Production / administration information systems | |
| O6) Performance of the administrative process | |
| O7) Productivity of the production process | |
| O8) Quality of the finished product | |
| C1) Work methods and standards | |
| P1) Assurance of the quality of inputs | |
| P2) Programme to select suppliers | |
| Q1) Quality improvement projects | |
| Q2) Audits to the management system | |
| Q3) Quality steering committee | |
| Q4) Teamwork for quality improvement | |

| | |
|---|--|
| Processes widely used but not documented | |
| L2) Satisfaction of stakeholders' expectations | |
| S1) Strategies -stakeholders' & customers' expectations | |
| M2) Policy for profits and benefits distribution | |
| O2) Production process planning | |

| | |
|--|--|
| Processes used in a modified way and documented | |
| S4) Strategies -benchmarking | |
| H4) Employees' degree of satisfaction on the job | |
| H5) Employees' performance | |
| O1) Design of products and services | |
| C2) Exercise of process control actions | |

| | |
|---|--|
| Processes used in a modified way but not documented | |
| None | |

| | |
|--|--|
| Processes used sporadically and not documented | |
| None | |

| | |
|--|--|
| Processes never used | |
| S5) Strategies -re-engineering actions | |
| S8) Business process re-engineering | |
| O4) Redesign of products and services | |
| C3) Statistical process control | |

| | |
|--|-----------------|
| 4. Critical sub-systems for: | |
| company's competitiveness | Op's Management |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|-----------------------|
| Position | Total Quality Manager |
| Reports to | Director |
| Education in TQM (# hours) | 400 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Lack of working methods | 1 |
| Lack of quality suppliers | 2 |
| Lack of financial resources | 3 |
| Low educational level | 4 |
| Customer do not demand quality | 5 |
| Oposition of middle management | 6 |
| Top management involvement | 7 |
| Low technological level | 8 |
| Other | 9 |

6. Time for implementation (years) 2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| y. Social and cultural values | 4 |
| g. Fulfilment of stakeholders' expectations | 5 |
| x. Customer satisfaction | 6 |
| p. Strategic planning process | 7 |
| d. Quality steering committee | 8 |
| m. Production process planning | 9 |
| n. Product/service planning | 10 |
| k. Management of operation | 11 |
| r. Promotion of a culture of quality | 12 |
| q. Training and educational programmes | 13 |
| f. Process control | 14 |
| b. Benchmarking | 15 |
| s. Quality improvement projects | 16 |
| a. Audits for the quality system | 17 |
| v. Internal supplier - customer chain | 18 |
| c. Competitors' quality | 19 |
| e. Management of suppliers | 20 |
| w. Business operation outcome | 21 |
| l. Market share | 22 |
| u. Rewards and recognition | 23 |
| h. Profits distribution | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Market share | 1 |
| Financial profitability | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 18 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 8

1. General Information

| | |
|---------------------|-------------------------|
| Industrial Sector | Metallic Products |
| Products / Services | Galvanized metal sheets |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| M1) Customer satisfaction |
| M4) Market share |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|--|
| S8) Business process re-engineering |
| M2) Policy for profits and benefits distribution |

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S5) Strategies -re-engineering actions |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| C2) Exercise of process control actions |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|--|
| H5) Employees' performance. |
| M3) Competitors' quality, strengths & weaknesses |

Processes used sporadically and not documented

| |
|---------------------------------|
| H3) Rewards and recognition |
| C3) Statistical process control |

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Op's Management |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of Quality Assurance |
| Reports to: | Operations Manager |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of quality suppliers | 1 |
| Opposition of middle management | 2 |
| Lack of working methods | 3 |
| Lack of financial resources | 4 |
| Customer do not demand quality | 5 |
| Low technological level | 6 |
| Top management involvement | 7 |
| Low educational level | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| g. Fulfilment of stakeholders' expectations | 2 |
| j. Mission and vision | 3 |
| h. Profits distribution | 4 |
| b. Benchmarking | 5 |
| l. Market share | 6 |
| c. Competitors' quality | 7 |
| p. Strategic planning process | 8 |
| a. Audits for the quality system | 9 |
| d. Quality steering committee | 10 |
| k. Management of operation | 11 |
| n. Product/service planning | 12 |
| m. Production process planning | 13 |
| w. Business operation outcome | 14 |
| x. Customer satisfaction | 15 |
| o. Quality policies | 16 |
| e. Management of suppliers | 17 |
| f. Process control | 18 |
| q. Training and educational programmes | 19 |
| s. Quality improvement projects | 20 |
| v. Internal supplier - customer chain | 21 |
| r. Promotion of a culture of quality | 22 |
| t. Re-engineering management | 23 |
| y. Social and cultural values | 24 |
| u. Rewards and recognition | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Financial profitability | 1 |
| Market share | 2 |
| Quality Awards | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 16 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 9

1. General Information

| | |
|---------------------|---------------------|
| Industrial Sector | Auto-parts |
| Products / Services | M450 Ford Chassises |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| L4) Corporate social and cultural values |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| Q2) Audits to the management system |

Processes used in a modified way and documented

| |
|-----------------------|
| H1) Quality promotion |
|-----------------------|

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Marketing |
| implementation due to resistance | Strategic Planning |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------|
| Position | Quality engineering |
| Reports to: | Director |
| Education in TQM (# hours) | 200 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Know-how for implementation | 1 |
| Lack of financial resources | 2 |
| Lack of working methods | 3 |
| Opposition of middle management | 4 |
| Low technological level | 5 |
| Customer do not demand quality | 6 |
| Top management involvement | 7 |
| Low educational level | 8 |
| Lack of quality suppliers | 9 |

6. Time for implementation (years)

1 to 2

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| i. Stakeholders expectations | 2 |
| l. Market share | 3 |
| e. Management of suppliers | 4 |
| f. Process control | 5 |
| o. Quality policies | 6 |
| p. Strategic planning process | 7 |
| q. Training and educational programmes | 8 |
| m. Production process planning | 9 |
| d. Quality steering committee | 10 |
| a. Audits for the quality system | 11 |
| k. Management of operation | 12 |
| r. Promotion of a culture of quality | 13 |
| s. Quality improvement projects | 14 |
| v. Internal supplier - customer chain | 15 |
| u. Rewards and recognition | 16 |
| b. Benchmarking | 17 |
| c. Competitors' quality | 18 |
| n. Product/service planning | 19 |
| y. Social and cultural values | 20 |
| t. Re-engineering management | 21 |
| w. Business operation outcome | 22 |
| g. Fulfilment of stakeholders' expectations | 23 |
| h. Profits distribution | 24 |
| x. Customer satisfaction | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Market share | 2 |
| Quality Awards | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.4 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 10

1. General Information

| | |
|---------------------|------------------|
| Industrial Sector | Office supplies |
| Products / Services | Office furniture |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|------|
| None |
|------|

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| P1) Assurance of the quality of inputs |

Processes used in a modified way and documented

| |
|------|
| None |
|------|

Processes used in a modified way but not documented

| |
|---|
| L4) Corporate social and cultural values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| C3) Statistical process control |
| P2) Programme to select suppliers |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Technical services manager |
| Reports to: | Director |
| Education in TQM (# hours) | 50 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Lack of financial resources | 1 |
| Lack of working methods | 2 |
| Customer do not demand quality | 3 |
| Low educational level | 4 |
| Top management involvement | 5 |
| Lack of quality suppliers | 6 |
| Oposition of middle management | 7 |
| Strategic Plan | 8 |
| Low technological level | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| d. Quality steering committee | 2 |
| g. Fulfilment of stakeholders' expectations | 3 |
| i. Stakeholders expectations | 4 |
| k. Management of operation | 5 |
| n. Product/service planning | 6 |
| m. Production process planning | 7 |
| b. Benchmarking | 8 |
| c. Competitors' quality | 9 |
| o. Quality policies | 10 |
| p. Strategic planning process | 11 |
| r. Promotion of a culture of quality | 12 |
| u. Rewards and recognition | 13 |
| y. Social and cultural values | 14 |
| s. Quality improvement projects | 15 |
| v. Internal supplier - customer chain | 16 |
| x. Customer satisfaction | 17 |
| l. Market share | 18 |
| q. Training and educational programmes | 19 |
| t. Re-engineering management | 20 |
| a. Audits for the quality system | 21 |
| e. Management of suppliers | 22 |
| f. Process control | 23 |
| w. Business operation outcome | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Market share | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.4 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 11

1. General Information

| | |
|---------------------|----------------------------------|
| Industrial Sector | Construction |
| Products / Services | Pre-fabricated wall and ceilings |

2. Involvement in TQM

YES

3. Degree of implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O2) Production process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| S1) Strategies -stakeholders' & customers' expectations |
| M3) Competitors' quality, strengths & weaknesses |

Processes used in a modified way and documented

| |
|---|
| H6) Modification of the corporate culture |
| O3) Administration process planning |
| C1) Work methods and standards |
| Q1) Quality improvement projects |

Processes used in a modified way but not documented

| |
|---|
| S6) Quality policy |
| M1) Customer satisfaction |
| O5) Production / administration information systems |
| C3) Statistical process control |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |

Processes used sporadically and not documented

| |
|---|
| S2) Strategies -capital available |
| H1) Quality promotion |
| H2) Training and educational programmes |

Processes never used

| |
|--|
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M4) Market share |
| O4) Redesign of products and services |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Op's Management |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of Quality Assurance |
| Reports to | Manufacturing Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Lack of financial resources | 2 |
| Opposition of middle management | 3 |
| Lack of working methods | 4 |
| Customer do not demand quality | 5 |
| Lack of quality suppliers | 6 |
| Low educational level | 7 |
| Low technological level | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| p. Strategic planning process | 2 |
| o. Quality policies | 3 |
| n. Product/service planning | 4 |
| m. Production process planning | 5 |
| k. Management of operation | 6 |
| x. Customer satisfaction | 7 |
| c. Competitors' quality | 8 |
| j. Mission and vision | 9 |
| q. Training and educational programmes | 10 |
| r. Promotion of a culture of quality | 11 |
| e. Management of suppliers | 12 |
| f. Process control | 13 |
| s. Quality improvement projects | 14 |
| d. Quality steering committee | 15 |
| v. Internal supplier - customer chain | 16 |
| y. Social and cultural values | 17 |
| b. Benchmarking | 18 |
| l. Market share | 19 |
| a. Audits for the quality system | 20 |
| w. Business operation outcome | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| h. Profits distribution | 23 |
| u. Rewards and recognition | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.6 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

12

| | |
|---------------------|--------------|
| Industrial Sector | Construction |
| Products / Services | Tiles |

NO

[illegible]

| | |
|--|--|
| | |
| | |
| | |

| |
|--|
| |
| |
| |
| |
| |

| | |
|--|--|
| | |
| | |
| | |

| | |
|----------------------------|-------------------|
| Position | Technical Manager |
| Reports to | Quality Director |
| Education in TOM (# hours) | 90 |

| | |
|---------------------------------|--|
| Top management involvement | |
| Low educational level | |
| Lack of quality suppliers | |
| Lack of working methods | |
| Opposition of middle management | |
| Low technological level | |
| Customer do not demand quality | |
| Lack of financial resources | |
| Other | |

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| | |
|---|--|
| a. Audits for the quality system | |
| b. Benchmarking | |
| c. Competitors' quality | |
| d. Quality steering committee | |
| e. Management of suppliers | |
| f. Process control | |
| g. Fulfilment of stakeholders' expectations | |
| h. Profits distribution | |
| i. Stakeholders expectations | |
| j. Mission and vision | |
| k. Management of operation | |
| l. Market share | |
| m. Production process planning | |
| n. Product/service planning | |
| o. Quality policies | |
| p. Strategic planning process | |
| q. Training and educational programmes | |
| r. Promotion of a culture of quality | |
| s. Quality improvement projects | |
| t. Re-engineering management | |
| u. Rewards and recognition | |
| v. Internal supplier - customer chain | |
| w. Business operation outcome | |
| x. Customer satisfaction | |
| y. Social and cultural values | |

| | |
|----------------------|--|
| Cost of poor quality | |
| Market share | |
| Quality Awards | |

| | |
|----------------------------------|--|
| Shareholders | |
| Top Management | |
| Employees | |
| Suppliers | |
| Customers | |
| Stakeholders' satisfaction index | |

| | |
|---------|--|
| P Index | |
|---------|--|

Company No. 13

1. General Information

| | |
|---------------------|---------------|
| Industrial Sector | Auto-parts |
| Products / Services | Battery parts |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|--|
| L4) Corporate social and cultural values |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |

Processes used in a modified way but not documented

| |
|-------------------------------------|
| S8) Business process re-engineering |
|-------------------------------------|

Processes used sporadically and not documented

| |
|---------------------------|
| S7) Benchmarking analysis |
|---------------------------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Strategic planning |
| implementation due to resistance | Process control |
| utilisation of human/financial resources | Process control |

10. Characteristics of respondent

| | |
|----------------------------|---------------|
| Position | Chief of |
| Reports to | Plant Manager |
| Education in TQM (# hours) | 150 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Lack of quality suppliers | 2 |
| Low technological level | 3 |
| Lack of financial resources | 4 |
| Opposition of middle management | 5 |
| Customer do not demand quality | 6 |
| Lack of working methods | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| r. Promotion of a culture of quality | 1 |
| a. Audits for the quality system | 2 |
| l. Market share | 3 |
| m. Production process planning | 4 |
| n. Product/service planning | 5 |
| o. Quality policies | 6 |
| x. Customer satisfaction | 7 |
| v. Internal supplier - customer chain | 8 |
| w. Business operation outcome | 9 |
| b. Benchmarking | 10 |
| s. Quality improvement projects | 11 |
| p. Strategic planning process | 12 |
| q. Training and educational programmes | 13 |
| c. Competitors' quality | 14 |
| d. Quality steering committee | 15 |
| e. Management of suppliers | 16 |
| f. Process control | 17 |
| g. Fulfilment of stakeholders' expectations | 18 |
| y. Social and cultural values | 19 |
| h. Profits distribution | 20 |
| u. Rewards and recognition | 21 |
| t. Re-engineering management | 22 |
| k. Management of operation | 23 |
| i. Stakeholders expectations | 24 |
| j. Mission and vision | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Quality Awards | 1 |
| Financial profitability | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 2.0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 14

1. General Information

| | |
|---------------------|-------------------|
| Industrial Sector | Metallic products |
| Products / Services | Pewter vassels |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|--|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H4) Employees' degree of satisfaction on the job |
| M4) Market share |
| O4) Redesign of products and services |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |

Processes used in a modified way and documented

| |
|---|
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H6) Modification of the corporate culture |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|--------------------------------|
| C1) Work methods and standards |
|--------------------------------|

Processes used sporadically and not documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| H1) Quality promotion |
| H5) Employees' performance. |
| M3) Competitors' quality, strengths & weaknesses |
| C2) Exercise of process control actions |

Processes never used

| |
|---|
| S6) Quality policy |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Process control |
| utilisation of human/financial resources | Quality improvement |

10. Characteristics of respondent

| | |
|----------------------------|--------------------------|
| Position | Chief of Quality Control |
| Reports to: | Manufacturing Manager |
| Education in TQM (# hours) | 48 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Opposition of middle management | 1 |
| Lack of working methods | 2 |
| Other | 3 |
| Low educational level | 4 |
| Low technological level | 5 |
| Customer do not demand quality | 6 |
| Lack of quality suppliers | 7 |
| Lack of financial resources | 8 |
| Top management involvement | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| a. Audits for the quality system | 3 |
| o. Quality policies | 4 |
| q. Training and educational programmes | 5 |
| r. Promotion of a culture of quality | 6 |
| y. Social and cultural values | 7 |
| x. Customer satisfaction | 8 |
| b. Benchmarking | 9 |
| c. Competitors' quality | 10 |
| p. Strategic planning process | 11 |
| m. Production process planning | 12 |
| n. Product/service planning | 13 |
| l. Market share | 14 |
| s. Quality improvement projects | 15 |
| t. Re-engineering management | 16 |
| f. Process control | 17 |
| e. Management of suppliers | 18 |
| i. Stakeholders expectations | 19 |
| g. Fulfilment of stakeholders' expectations | 20 |
| v. Internal supplier - customer chain | 21 |
| u. Rewards and recognition | 22 |
| w. Business operation outcome | 23 |
| h. Profits distribution | 24 |
| k. Management of operation | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0.8 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 15

1. General Information

| | |
|---------------------|---------------------------|
| Industrial Sector | Electrical machinery |
| Products / Services | Refrigeration compressors |

2. Involvement in TQM YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| H2) Training and educational programmes |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| P1) Assurance of the quality of inputs |

Processes widely used but not documented

| |
|---------------------------------------|
| H1) Quality promotion |
| H3) Rewards and recognition |
| M4) Market share |
| O4) Redesign of products and services |
| O8) Quality of the finished product |

Processes used in a modified way and documented

| |
|---|
| S8) Business process re-engineering |
| O1) Design of products and services |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| C3) Statistical process control |

Processes used in a modified way but not documented

| |
|---|
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O2) Production process planning |
| O3) Administration process planning |
| C2) Exercise of process control actions |
| Q4) Teamwork for quality improvement |

Processes used sporadically and not documented

| |
|--|
| H4) Employees' degree of satisfaction on the job |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of Quality Assurance |
| Reports to: | General Manager |
| Education in TQM (# hours) | 300 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Lack of financial resources | 2 |
| Opposition of middle management | 3 |
| Low educational level | 4 |
| Lack of quality suppliers | 5 |
| Low technological level | 6 |
| Lack of working methods | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years) 2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| q. Training and educational programmes | 2 |
| i. Stakeholders expectations | 3 |
| j. Mission and vision | 4 |
| o. Quality policies | 5 |
| k. Management of operation | 6 |
| m. Production process planning | 7 |
| n. Product/service planning | 8 |
| e. Management of suppliers | 9 |
| x. Customer satisfaction | 10 |
| s. Quality improvement projects | 11 |
| w. Business operation outcome | 12 |
| b. Benchmarking | 13 |
| p. Strategic planning process | 14 |
| t. Re-engineering management | 15 |
| v. Internal supplier - customer chain | 16 |
| f. Process control | 17 |
| a. Audits for the quality system | 18 |
| r. Promotion of a culture of quality | 19 |
| u. Rewards and recognition | 20 |
| l. Market share | 21 |
| c. Competitors' quality | 22 |
| g. Fulfilment of stakeholders' expectations | 23 |
| y. Social and cultural values | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Financial profitability | 1 |
| Employees' satisfaction | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 14 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 16

1. General Information

| | |
|---------------------|---------------------|
| Industrial Sector | Other manufacturing |
| Products / Services | Refractory |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| H6) Modification of the corporate culture |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|--|
| S5) Strategies -re-engineering actions |
|--|

Processes used in a modified way and documented

| |
|--|
| M2) Policy for profits and benefits distribution |
| O2) Production process planning |
| O3) Administration process planning |
| C3) Statistical process control |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|--|
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| M1) Customer satisfaction |
| O4) Redesign of products and services |

Processes used sporadically and not documented

| |
|---|
| O5) Production / administration information systems |
|---|

Processes never used

| |
|------------------------------|
| S4) Strategies -benchmarking |
|------------------------------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Process Control |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|-----------------|
| Position | Quality Manager |
| Reports to: | Director |
| Education in TQM (# hours) | 300 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Low technological level | 2 |
| Top management involvement | 3 |
| Opposition of middle management | 4 |
| Lack of financial resources | 5 |
| Lack of quality suppliers | 6 |
| Low educational level | 8 |
| Customer do not demand quality | 9 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 4 to 6 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| d. Quality steering committee | 2 |
| o. Quality policies | 3 |
| p. Strategic planning process | 4 |
| x. Customer satisfaction | 5 |
| j. Mission and vision | 6 |
| r. Promotion of a culture of quality | 7 |
| q. Training and educational programmes | 8 |
| k. Management of operation | 9 |
| g. Fulfilment of stakeholders' expectations | 10 |
| b. Benchmarking | 11 |
| w. Business operation outcome | 12 |
| v. Internal supplier - customer chain | 13 |
| f. Process control | 14 |
| a. Audits for the quality system | 15 |
| m. Production process planning | 16 |
| n. Product/service planning | 17 |
| l. Market share | 18 |
| c. Competitors' quality | 19 |
| e. Management of suppliers | 20 |
| h. Profits distribution | 21 |
| u. Rewards and recognition | 22 |
| s. Quality improvement projects | 23 |
| t. Re-engineering management | 24 |
| y. Social and cultural values | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 2 |
| Suppliers | 0 |
| Customers | 2 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No.

17

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Non-electrical machinery |
| Products / Services | Steam generators |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| M2) Policy for profits and benefits distribution |
|--|

Processes used in a modified way and documented

| |
|--|
| L4) Corporate social and cultural values |
| M3) Competitors' quality, strengths & weaknesses |
| O2) Production process planning |
| Q3) Quality steering committee |

Processes used in a modified way but not documented

| |
|-----------------------------|
| H3) Rewards and recognition |
|-----------------------------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|---------------------------|
| M1) Customer satisfaction |
| M4) Market share |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Strategic Planning |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|-----------------------|
| Position | Total Quality Manager |
| Reports to: | Operations Manager |
| Education in TQM (# hours) | 320 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Opposition of middle management | 2 |
| Low educational level | 3 |
| Lack of working methods | 4 |
| Lack of quality suppliers | 5 |
| Customer do not demand quality | 6 |
| Low technological level | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

4 to 6

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| p. Strategic planning process | 2 |
| d. Quality steering committee | 3 |
| l. Market share | 4 |
| y. Social and cultural values | 5 |
| o. Quality policies | 6 |
| r. Promotion of a culture of quality | 7 |
| k. Management of operation | 8 |
| s. Quality improvement projects | 9 |
| t. Re-engineering management | 10 |
| b. Benchmarking | 11 |
| m. Production process planning | 12 |
| n. Product/service planning | 13 |
| v. Internal supplier - customer chain | 14 |
| w. Business operation outcome | 15 |
| x. Customer satisfaction | 16 |
| c. Competitors' quality | 17 |
| h. Profits distribution | 18 |
| i. Stakeholders expectations | 19 |
| g. Fulfilment of stakeholders' expectations | 20 |
| f. Process control | 21 |
| e. Management of suppliers | 22 |
| a. Audits for the quality system | 23 |
| q. Training and educational programmes | 24 |
| u. Rewards and recognition | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Financial profitability | 1 |
| Market share | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 1.2 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 18

1. General Information

| | |
|---------------------|--------------|
| Industrial Sector | Steel |
| Products / Services | Steel sheets |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| L4) Corporate social and cultural values |
| S7) Benchmarking analysis |
| M1) Customer satisfaction |

Processes used in a modified way and documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| S4) Strategies -benchmarking |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| H5) Employees' performance |

Processes used in a modified way but not documented

| |
|-----------------------------------|
| S2) Strategies -capital available |
|-----------------------------------|

Processes used sporadically and not documented

| |
|-------------------------------------|
| Q2) Audits to the management system |
|-------------------------------------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Suppliers Mgt |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|--------------------------|
| Position | Quality Planning Manager |
| Reports to: | Human Resources Manager |
| Education in TQM (# hours) | 2000 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of financial resources | 1 |
| Lack of working methods | 2 |
| Low technological level | 3 |
| Lack of quality suppliers | 4 |
| Opposition of middle management | 5 |
| Low educational level | 6 |
| Customer do not demand quality | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

4 to 6

7. Recommended implementation sequence

| | |
|---|----|
| p. Strategic planning process | 1 |
| y. Social and cultural values | 2 |
| o. Quality policies | 3 |
| r. Promotion of a culture of quality | 4 |
| b. Benchmarking | 5 |
| d. Quality steering committee | 6 |
| j. Mission and vision | 7 |
| m. Production process planning | 8 |
| n. Product/service planning | 9 |
| q. Training and educational programmes | 10 |
| e. Management of suppliers | 11 |
| f. Process control | 12 |
| k. Management of operation | 13 |
| x. Customer satisfaction | 14 |
| l. Market share | 15 |
| g. Fulfilment of stakeholders' expectations | 16 |
| u. Rewards and recognition | 17 |
| v. Internal supplier - customer chain | 18 |
| a. Audits for the quality system | 19 |
| w. Business operation outcome | 20 |
| h. Profits distribution | 21 |
| i. Stakeholders expectations | 22 |
| s. Quality improvement projects | 23 |
| t. Re-engineering management | 24 |
| c. Competitors' quality | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.4 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 19

1. General Information

| | |
|---------------------|---------------|
| Industrial Sector | Construction |
| Products / Services | Ceramic Tiles |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| P1) Assurance of the quality of inputs |

Processes widely used but not documented

| |
|---|
| L3) Mission and vision statements |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S8) Business process re-engineering |
| H1) Quality promotion |
| M4) Market share |
| O2) Production process planning |
| O4) Redesign of products and services |
| Q1) Quality improvement projects |

Processes used in a modified way and documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| M1) Customer satisfaction |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| Q2) Audits to the management system |

Processes used in a modified way but not documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H5) Employees' performance. |
| M2) Policy for profits and benefits distribution |
| O3) Administration process planning |
| C2) Exercise of process control actions |
| P2) Programme to select suppliers |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used sporadically and not documented

| |
|--|
| M3) Competitors' quality, strengths & weaknesses |
| C3) Statistical process control |

Processes never used

| |
|--|
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------------------|
| Position | Chief of finished products auditing |
| Reports to: | Sales Manager |
| Education in TQM (# hours) | 200 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Lack of quality suppliers | 2 |
| Opposition of middle management | 3 |
| Low educational level | 4 |
| Customer do not demand quality | 5 |
| Lack of financial resources | 6 |
| Low technological level | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 2 to 4 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| i. Stakeholders expectations | 2 |
| o. Quality policies | 3 |
| d. Quality steering committee | 4 |
| e. Management of suppliers | 5 |
| l. Market share | 6 |
| c. Competitors' quality | 7 |
| m. Production process planning | 8 |
| k. Management of operation | 9 |
| n. Product/service planning | 10 |
| r. Promotion of a culture of quality | 11 |
| b. Benchmarking | 12 |
| f. Process control | 13 |
| p. Strategic planning process | 14 |
| y. Social and cultural values | 15 |
| s. Quality improvement projects | 16 |
| v. Internal supplier - customer chain | 17 |
| w. Business operation outcome | 18 |
| x. Customer satisfaction | 19 |
| a. Audits for the quality system | 20 |
| g. Fulfilment of stakeholders' expectations | 21 |
| t. Re-engineering management | 22 |
| q. Training and educational programmes | 23 |
| u. Rewards and recognition | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Market share | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0.8 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 20

1. General Information

| | |
|---------------------|----------|
| Industrial Sector | Beverage |
| Products / Services | Beer |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| M1) Customer satisfaction |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |

Processes used in a modified way and documented

| |
|---|
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| O5) Production / administration information systems |
| C3) Statistical process control |
| P2) Programme to select suppliers |

Processes used in a modified way but not documented

| |
|-----------------------|
| H1) Quality promotion |
|-----------------------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|-------------------------------------|
| Q2) Audits to the management system |
|-------------------------------------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Suppliers Mgt |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | OD and quality manager |
| Reports to | Human Resources Manager |
| Education in TQM (# hours) | 200 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Opposition of middle management | 2 |
| Lack of working methods | 3 |
| Customer do not demand quality | 4 |
| Low educational level | 5 |
| Low technological level | 6 |
| Lack of financial resources | 7 |
| Lack of quality suppliers | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| q. Training and educational programmes | 4 |
| k. Management of operation | 5 |
| f. Process control | 6 |
| e. Management of suppliers | 7 |
| x. Customer satisfaction | 8 |
| w. Business operation outcome | 9 |
| v. Internal supplier - customer chain | 10 |
| m. Production process planning | 11 |
| n. Product/service planning | 12 |
| p. Strategic planning process | 13 |
| c. Competitors' quality | 14 |
| i. Stakeholders expectations | 15 |
| l. Market share | 16 |
| a. Audits for the quality system | 17 |
| g. Fulfilment of stakeholders' expectations | 18 |
| u. Rewards and recognition | 19 |
| s. Quality improvement projects | 20 |
| r. Promotion of a culture of quality | 21 |
| h. Profits distribution | 22 |
| b. Benchmarking | 23 |
| t. Re-engineering management | 24 |
| y. Social and cultural values | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Quality & Productivity indexes | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 1.2 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 21

1. General Information

| | |
|---------------------|---------------------|
| Industrial Sector | Electric appliances |
| Products / Services | Refrigerators |

2. Involvement in TQM

NO

3. Degree of Implementation of system's processes

Processes widely used and documented

[illegible]

Processes widely used but not documented

[illegible]

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality assurance manager |
| Reports to: | General Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Opposition of middle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

6. Time for implementation (years)

7. Recommended implementation sequence

| 11. Recommended implementation to quality | |
|---|---|
| a. Audits for the quality system | 0 |
| b. Benchmarking | 0 |
| c. Competitors' quality | 0 |
| d. Quality steering committee | 0 |
| e. Management of suppliers | 0 |
| f. Process control | 0 |
| g. Fulfilment of stakeholders' expectations | 0 |
| h. Profits distribution | 0 |
| i. Stakeholders expectations | 0 |
| j. Mission and vision | 0 |
| k. Management of operation | 0 |
| l. Market share | 0 |
| m. Production process planning | 0 |
| n. Product/service planning | 0 |
| o. Quality policies | 0 |
| p. Strategic planning process | 0 |
| q. Training and educational programmes | 0 |
| r. Promotion of a culture of quality | 0 |
| s. Quality improvement projects | 0 |
| t. Re-engineering management | 0 |
| u. Rewards and recognition | 0 |
| v. Internal supplier - customer chain | 0 |
| w. Business operation outcome | 0 |
| x. Customer satisfaction | 0 |
| y. Social and cultural values | 0 |

8. Effectiveness measure of the QM programme

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No.

22

1. General Information

| | |
|---------------------|----------------------|
| Industrial Sector | Electrical machinery |
| Products / Services | Electric motors |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|--|
| C1) Work methods and standards |
| L2) Satisfaction of stakeholders' expectations |
| M4) Market share |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |

Processes widely used but not documented

| |
|--|
| L4) Corporate social and cultural values |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| O1) Design of products and services |
| S8) Business process re-engineering |

Processes used in a modified way and documented

| |
|---|
| C2) Exercise of process control actions |
| C3) Statistical process control |
| H1) Quality promotion |
| H5) Employees' performance |
| M2) Policy for profits and benefits distribution |
| O2) Production process planning |
| O5) Production / administration information systems |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q4) Teamwork for quality improvement |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |

Processes used in a modified way but not documented

| |
|---|
| H6) Modification of the corporate culture |
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| O3) Administration process planning |
| Q3) Quality steering committee |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |

Processes used sporadically and not documented

| |
|---|
| H2) Training and educational programmes |
| H3) Rewards and recognition |

Processes never used

| |
|--|
| H4) Employees' degree of satisfaction on the job |
|--|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Oper's Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | Quality control manager |
| Reports to | Director |
| Education in TQM (# hours) | 300 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Top management involvement | 1 |
| Oposition of middle management | 2 |
| Low educational level | 3 |
| Lack of working methods | 4 |
| Low technological level | 5 |
| Lack of financial resources | 6 |
| Lack of quality suppliers | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| j. Mission and vision | 2 |
| n. Product/service planning | 3 |
| o. Quality policies | 4 |
| p. Strategic planning process | 5 |
| d. Quality steering committee | 6 |
| y. Social and cultural values | 7 |
| l. Market share | 8 |
| q. Training and educational programmes | 9 |
| v. Internal supplier - customer chain | 10 |
| m. Production process planning | 11 |
| r. Promotion of a culture of quality | 12 |
| k. Management of operation | 13 |
| f. Process control | 14 |
| e. Management of suppliers | 15 |
| a. Audits for the quality system | 16 |
| w. Business operation outcome | 17 |
| x. Customer satisfaction | 18 |
| g. Fulfilment of stakeholders' expectations | 19 |
| s. Quality improvement projects | 20 |
| u. Rewards and recognition | 21 |
| t. Re-engineering management | 22 |
| b. Benchmarking | 23 |
| c. Competitors' quality | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 1 |
| Employees | 0 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 1.0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

1. General Information

| | |
|---------------------|---------------------|
| Industrial Sector | Other manufacturing |
| Products / Services | Bricks for furnaces |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| S6) Quality policy |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|---|
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| O1) Design of products and services |

Processes used in a modified way and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S7) Benchmarking analysis |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| O5) Production / administration information systems |
| O7) Productivity of the production process |
| Q1) Quality improvement projects |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|---|
| H1) Quality promotion |
| H2) Training and educational programmes |

Processes used sporadically and not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| H5) Employees' performance |

Processes never used

| |
|--|
| H5) Employees' performance. |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| C3) Statistical process control |

4. Critical sub-systems for:

| | |
|--|----------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Suppliers Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------|
| Position | Technical Manager |
| Reports to | General Manager |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of quality suppliers | 1 |
| Low educational level | 2 |
| Opposition of middle management | 3 |
| Customer do not demand quality | 4 |
| Lack of financial resources | 5 |
| Top management involvement | 6 |
| Lack of working methods | 7 |
| Other | 8 |
| Low technological level | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 2 to 4 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| o. Quality policies | 2 |
| p. Strategic planning process | 3 |
| q. Training and educational programmes | 4 |
| r. Promotion of a culture of quality | 5 |
| y. Social and cultural values | 6 |
| u. Rewards and recognition | 7 |
| s. Quality improvement projects | 8 |
| c. Competitors' quality | 9 |
| b. Benchmarking | 10 |
| g. Fulfilment of stakeholders' expectations | 11 |
| i. Stakeholders expectations | 12 |
| j. Mission and vision | 13 |
| k. Management of operation | 14 |
| m. Production process planning | 15 |
| n. Product/service planning | 16 |
| w. Business operation outcome | 17 |
| v. Internal supplier - customer chain | 18 |
| x. Customer satisfaction | 19 |
| e. Management of suppliers | 20 |
| f. Process control | 21 |
| l. Market share | 22 |
| a. Audits for the quality system | 23 |
| h. Profits distribution | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Financial profitability | 1 |
| Cost of poor quality | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.6 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

1. General Information

| | |
|---------------------|-------------------------------|
| Industrial Sector | Metallic products |
| Products / Services | Metallic residuals processing |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| H1) Quality promotion |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| M1) Customer satisfaction |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O4) Redesign of products and services |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|-------------------------------------|
| S8) Business process re-engineering |
|-------------------------------------|

Processes never used

| |
|--|
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |

4. Critical sub-systems for:

| | |
|--|----------------------|
| company's competitiveness | Marketing |
| implementation due to resistance | Suppliers Management |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | Quality Control Manager |
| | Operations |
| Reports to: | Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Low educational level | 1 |
| Customer do not demand quality | 2 |
| Lack of financial resources | 3 |
| Oposition of middle management | 4 |
| Lack of working methods | 5 |
| Lack of quality suppliers | 6 |
| Top management involvement | 7 |
| Low technological level | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| m. Production process planning | 1 |
| d. Quality steering committee | 2 |
| k. Management of operation | 3 |
| n. Product/service planning | 4 |
| i. Stakeholders expectations | 5 |
| j. Mission and vision | 6 |
| e. Management of suppliers | 7 |
| f. Process control | 8 |
| o. Quality policies | 9 |
| q. Training and educational programmes | 10 |
| r. Promotion of a culture of quality | 11 |
| a. Audits for the quality system | 12 |
| p. Strategic planning process | 13 |
| s. Quality improvement projects | 14 |
| u. Rewards and recognition | 15 |
| v. Internal supplier - customer chain | 16 |
| t. Re-engineering management | 17 |
| g. Fulfilment of stakeholders' expectations | 18 |
| w. Business operation outcome | 19 |
| x. Customer satisfaction | 20 |
| y. Social and cultural values | 21 |
| b. Benchmarking | 22 |
| l. Market share | 23 |
| c. Competitors' quality | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Market share | 1 |
| Quality Awards | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 25

1. General Information

| | |
|---------------------|----------------------|
| Industrial Sector | Metallic products |
| Products / Services | Aluminium auto-parts |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

None

Processes used in a modified way and documented

| |
|--|
| S5) Strategies -re-engineering actions |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |

Processes used in a modified way but not documented

None

Processes used sporadically and not documented

None

Processes never used

O3) Administration process planning

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Marketing |

10. Characteristics of respondent

| | |
|----------------------------|------------------------|
| Position | Total Quality Director |
| Reports to: | General Director |
| Education in TQM (# hours) | 2000 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Customer do not demand quality | 2 |
| Opposition of middle management | 3 |
| Lack of working methods | 4 |
| Lack of quality suppliers | 5 |
| Lack of financial resources | 6 |
| Low technological level | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

4 to 6

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| o. Quality policies | 2 |
| r. Promotion of a culture of quality | 3 |
| w. Business operation outcome | 4 |
| x. Customer satisfaction | 5 |
| y. Social and cultural values | 6 |
| b. Benchmarking | 7 |
| c. Competitors' quality | 8 |
| m. Production process planning | 9 |
| n. Product/service planning | 10 |
| p. Strategic planning process | 11 |
| v. Internal supplier - customer chain | 12 |
| q. Training and educational programmes | 13 |
| f. Process control | 14 |
| e. Management of suppliers | 15 |
| s. Quality improvement projects | 16 |
| a. Audits for the quality system | 17 |
| d. Quality steering committee | 18 |
| l. Market share | 19 |
| i. Stakeholders expectations | 20 |
| u. Rewards and recognition | 21 |
| t. Re-engineering management | 22 |
| h. Profits distribution | 23 |
| k. Management of operation | 24 |
| g. Fulfilment of stakeholders' expectations | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Other | 1 |
| Financial profitability | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 16 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 26

1. General Information

| | |
|---------------------|------------|
| Industrial Sector | Auto-parts |
| Products / Services | Chassises |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| M1) Customer satisfaction |
| M4) Market share |
| O1) Design of products and services |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| H1) Quality promotion |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O2) Production process planning |
| O3) Administration process planning |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |

Processes used in a modified way and documented

| |
|--|
| H2) Training and educational programmes |
| O7) Productivity of the production process |

Processes used in a modified way but not documented

| |
|---|
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| P2) Programme to select suppliers |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Oper's Management |

10. Characteristics of respondent

| | |
|----------------------------|-----------------|
| Position | Quality Manager |
| Reports to: | Director |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Lack of working methods | 1 |
| Oposition of muddle management | 2 |
| Low technological level | 3 |
| Lack of quality suppliers | 4 |
| Lack of financial resources | 5 |
| Customer do not demand quality | 6 |
| Low educational level | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 6 to 8 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| o. Quality policies | 1 |
| p. Strategic planning process | 2 |
| y. Social and cultural values | 3 |
| f. Process control | 4 |
| j. Mission and vision | 5 |
| c. Competitors' quality | 6 |
| r. Promotion of a culture of quality | 7 |
| q. Training and educational programmes | 8 |
| d. Quality steering committee | 9 |
| i. Stakeholders expectations | 10 |
| m. Production process planning | 11 |
| n. Product/service planning | 12 |
| k. Management of operation | 13 |
| x. Customer satisfaction | 14 |
| l. Market share | 15 |
| b. Benchmarking | 16 |
| s. Quality improvement projects | 17 |
| v. Internal supplier - customer chain | 18 |
| w. Business operation outcome | 19 |
| e. Management of suppliers | 20 |
| a. Audits for the quality system | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| h. Profits distribution | 23 |
| u. Rewards and recognition | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Cost of poor quality | 1 |
| Market share | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 2 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 2 |
|---------|---|

Company No. 27

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Glass and glass products |
| Products / Services | Glass products |

2. Involvement in TQM YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S8) Business process re-engineering |

Processes widely used but not documented

| |
|--|
| S2) Strategies -capital available |
| H2) Training and educational programmes |
| H5) Employees' performance. |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O1) Design of products and services |
| O7) Productivity of the production process |

Processes used in a modified way and documented

| |
|--|
| S5) Strategies -re-engineering actions |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| O2) Production process planning |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q3) Quality steering committee |

Processes used in a modified way but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| H6) Modification of the corporate culture |
| O3) Administration process planning |
| C1) Work methods and standards |
| C3) Statistical process control |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes used sporadically and not documented

| |
|---|
| O5) Production / administration information systems |
| P2) Programme to select suppliers |

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Oper's Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------------|
| Position | Planning & Operations Manager |
| Reports to | Director of Operations |
| Education in TQM (# hours) | 200 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Customer do not demand quality | 2 |
| Top management involvement | 3 |
| Lack of financial resources | 4 |
| Opposition of middle management | 5 |
| Low educational level | 6 |
| Low technological level | 7 |
| Lack of quality suppliers | 8 |
| Other | 9 |

6. Time for implementation (years) 1 to 2

7. Recommended implementation sequence

| | |
|---|----|
| o. Quality policies | 1 |
| d. Quality steering committee | 2 |
| i. Stakeholders expectations | 3 |
| j. Mission and vision | 4 |
| r. Promotion of a culture of quality | 5 |
| q. Training and educational programmes | 6 |
| y. Social and cultural values | 7 |
| x. Customer satisfaction | 8 |
| m. Production process planning | 9 |
| k. Management of operation | 10 |
| n. Product/service planning | 11 |
| e. Management of suppliers | 12 |
| f. Process control | 13 |
| c. Competitors' quality | 14 |
| b. Benchmarking | 15 |
| l. Market share | 16 |
| p. Strategic planning process | 17 |
| v. Internal supplier - customer chain | 18 |
| w. Business operation outcome | 19 |
| a. Audits for the quality system | 20 |
| t. Re-engineering management | 21 |
| s. Quality improvement projects | 22 |
| u. Rewards and recognition | 23 |
| g. Fulfilment of stakeholders' expectations | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Market share | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.4 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 28

1. General Information

| | |
|---------------------|--------------------|
| Industrial Sector | Auto-parts |
| Products / Services | Plastic auto-parts |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H5) Employees' performance |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| H6) Modification of the corporate culture |
|---|

Processes used in a modified way and documented

| |
|--|
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| O3) Administration process planning |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| H3) Rewards and recognition |
| M2) Policy for profits and benefits distribution |

4. Critical sub-systems for:

| | |
|--|----------------------|
| company's competitiveness | Suppliers Management |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Oper's Management |

10. Characteristics of respondent

| | |
|----------------------------|-----------------|
| Position | Quality Manager |
| Reports to: | General Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Top management involvement | 1 |
| Lack of working methods | 2 |
| Low educational level | 3 |
| Oposition of middle management | 4 |
| Low technological level | 5 |
| Lack of quality suppliers | 6 |
| Lack of financial resources | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| p. Strategic planning process | 4 |
| i. Stakeholders expectations | 5 |
| m. Production process planning | 6 |
| s. Quality improvement projects | 7 |
| f. Process control | 8 |
| k. Management of operation | 9 |
| n. Product/service planning | 10 |
| e. Management of suppliers | 11 |
| v. Internal supplier - customer chain | 12 |
| b. Benchmarking | 13 |
| q. Training and educational programmes | 14 |
| r. Promotion of a culture of quality | 15 |
| a. Audits for the quality system | 16 |
| w. Business operation outcome | 17 |
| x. Customer satisfaction | 18 |
| t. Re-engineering management | 19 |
| u. Rewards and recognition | 20 |
| c. Competitors' quality | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| l. Market share | 23 |
| y. Social and cultural values | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 18 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

1. General Information

| | |
|---------------------|------------------------------|
| Industrial Sector | Food |
| Products / Services | Corn flour, tortillas, chips |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| S1) Strategies -stakeholders' & customers' expectations |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O4) Redesign of products and services |
| O8) Quality of the finished product |
| Q1) Quality improvement projects. |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| M2) Policy for profits and benefits distribution |

Processes used in a modified way and documented

| |
|---|
| L4) Corporate social and cultural values |
| S5) Strategies -re-engineering actions |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| Q2) Audits to the management system |

Processes used in a modified way but not documented

| |
|---|
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H5) Employees' performance. |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |

Processes used sporadically and not documented

| |
|------------------------------|
| S4) Strategies -benchmarking |
|------------------------------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Q. & Productivity Manager |
| Reports to | Human Resources Director |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Lack of working methods | 2 |
| Low educational level | 3 |
| Opposition of middle management | 4 |
| Customer do not demand quality | 5 |
| Low technological level | 6 |
| Lack of quality suppliers | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 2 to 4 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| p. Strategic planning process | 1 |
| d. Quality steering committee | 2 |
| j. Mission and vision | 3 |
| o. Quality policies | 4 |
| y. Social and cultural values | 5 |
| q. Training and educational programmes | 6 |
| i. Stakeholders expectations | 7 |
| l. Market share | 8 |
| m. Production process planning | 9 |
| n. Product/service planning | 10 |
| k. Management of operation | 11 |
| v. Internal supplier - customer chain | 12 |
| f. Process control | 13 |
| s. Quality improvement projects | 14 |
| x. Customer satisfaction | 15 |
| r. Promotion of a culture of quality | 16 |
| c. Competitors' quality | 17 |
| a. Audits for the quality system | 18 |
| b. Benchmarking | 19 |
| e. Management of suppliers | 20 |
| u. Rewards and recognition | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| h. Profits distribution | 23 |
| w. Business operation outcome | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Employees' satisfaction | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 2 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0.4 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 30

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Glass and glass products |
| Products / Services | Glass windshields |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| H1) Quality promotion |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M1) Customer satisfaction |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|---|
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O3) Administration process planning |
| O5) Production / administration information systems |

Processes used in a modified way and documented

| |
|---|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| H6) Modification of the corporate culture |
| O2) Production process planning |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |

Processes used in a modified way but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| H2) Training and educational programmes |
| M4) Market share |
| O1) Design of products and services |
| C1) Work methods and standards |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|-----------------|
| company's competitiveness | Op's Management |
| implementation due to resistance | Op's Management |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-----------------|
| Position | Quality Manager |
| Reports to: | Plant Manager |
| Education in TQM (# hours) | 120 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Oposition of muddle management | 1 |
| Top management involvement | 2 |
| Low educational level | 3 |
| Low technological level | 4 |
| Customer do not demand quality | 5 |
| Lack of quality suppliers | 6 |
| Lack of working methods | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 2 to 4 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| y. Social and cultural values | 2 |
| o. Quality policies | 3 |
| x. Customer satisfaction | 4 |
| d. Quality steering committee | 5 |
| h. Profits distribution | 6 |
| m. Production process planning | 7 |
| n. Product/service planning | 8 |
| f. Process control | 9 |
| v. Internal supplier - customer chain | 10 |
| w. Business operation outcome | 11 |
| e. Management of suppliers | 12 |
| a. Audits for the quality system | 13 |
| k. Management of operation | 14 |
| q. Training and educational programmes | 15 |
| r. Promotion of a culture of quality | 16 |
| u. Rewards and recognition | 17 |
| l. Market share | 18 |
| s. Quality improvement projects | 19 |
| i. Stakeholders expectations | 20 |
| c. Competitors' quality | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| p. Strategic planning process | 23 |
| t. Re-engineering management | 24 |
| b. Benchmarking | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Quality Awards | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 1.2 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

1. General Information

| | |
|---------------------|-----------------------------|
| Industrial Sector | Glass and glass products |
| Products / Services | Templated glass windshields |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| M1) Customer satisfaction |
| O3) Administration process planning |
| C3) Statistical process control |
| Q2) Audits to the management system |

Processes used in a modified way and documented

| |
|------|
| None |
|------|

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Marketing |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of Quality Assurance |
| Reports to: | Operations Manager |
| Education in TQM (# hours) | 1260 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Other | 1 |
| Low educational level | 2 |
| Customer do not demand quality | 3 |
| Top management involvement | 4 |
| Oposition of middle management | 5 |
| Lack of working methods | 6 |
| Lack of quality suppliers | 7 |
| Low technological level | 8 |
| Lack of financial resources | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| p. Strategic planning process | 3 |
| o. Quality policies | 4 |
| k. Management of operation | 5 |
| m. Production process planning | 6 |
| n. Product/service planning | 7 |
| q. Training and educational programmes | 8 |
| r. Promotion of a culture of quality | 9 |
| w. Business operation outcome | 10 |
| x. Customer satisfaction | 11 |
| a. Audits for the quality system | 12 |
| e. Management of suppliers | 13 |
| f. Process control | 14 |
| u. Rewards and recognition | 15 |
| v. Internal supplier - customer chain | 16 |
| b. Benchmarking | 17 |
| c. Competitors' quality | 18 |
| s. Quality improvement projects | 19 |
| l. Market share | 20 |
| i. Stakeholders expectations | 21 |
| h. Profits distribution | 22 |
| g. Fulfilment of stakeholders' expectations | 23 |
| y. Social and cultural values | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Quality & Productivity indexes | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 20 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

1. General Information

| | |
|---------------------|-------------------|
| Industrial Sector | Metallic products |
| Products / Services | Forging products |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S6) Quality policy |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects. |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|--|
| M2) Policy for profits and benefits distribution |
|--|

Processes used in a modified way and documented

| |
|---|
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| S8) Business process re-engineering |
| H1) Quality promotion |
| O3) Administration process planning |
| P2) Programme to select suppliers |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|---------------------------------|
| C3) Statistical process control |
|---------------------------------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Op's Management |
| implementation due to resistance | Op's Management |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|------------------|
| Position | Quality Manager |
| Reports to: | General Director |
| Education in TQM (# hours) | 80 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Low technological level | 2 |
| Lack of quality suppliers | 3 |
| Opposition of middle management | 4 |
| Customer do not demand quality | 5 |
| Lack of working methods | 6 |
| Lack of financial resources | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 2 to 4 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| i. Stakeholders expectations | 2 |
| j. Mission and vision | 3 |
| o. Quality policies | 4 |
| k. Management of operation | 5 |
| r. Promotion of a culture of quality | 6 |
| m. Production process planning | 7 |
| n. Product/service planning | 8 |
| p. Strategic planning process | 9 |
| v. Internal supplier - customer chain | 10 |
| y. Social and cultural values | 11 |
| s. Quality improvement projects | 12 |
| e. Management of suppliers | 13 |
| f. Process control | 14 |
| a. Audits for the quality system | 15 |
| g. Fulfilment of stakeholders' expectations | 16 |
| w. Business operation outcome | 17 |
| l. Market share | 18 |
| c. Competitors' quality | 19 |
| b. Benchmarking | 20 |
| x. Customer satisfaction | 21 |
| q. Training and educational programmes | 22 |
| u. Rewards and recognition | 23 |
| t. Re-engineering management | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 18 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No.

33

1. General Information

| | |
|---------------------|---------------------------|
| Industrial Sector | Non electrical machinery |
| Products / Services | Machinery for agriculture |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| L4) Corporate social and cultural values |
| S4) Strategies -benchmarking |
| S8) Business process re-engineering |
| M1) Customer satisfaction |
| O2) Production process planning |
| C2) Exercise of process control actions |

Processes used in a modified way and documented

| |
|---------------------------|
| S7) Benchmarking analysis |
|---------------------------|

Processes used in a modified way but not documented

| |
|-------------------------------------|
| Q2) Audits to the management system |
|-------------------------------------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Op's Management |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | OD Manager |
| Reports to: | Human Resources Manager |
| Education in TQM (# hours) | 200 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Lack of quality suppliers | 2 |
| Customer do not demand quality | 3 |
| Top management involvement | 4 |
| Low technological level | 5 |
| Lack of financial resources | 6 |
| Lack of working methods | 7 |
| Opposition of middle management | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| q. Training and educational programmes | 4 |
| r. Promotion of a culture of quality | 5 |
| p. Strategic planning process | 6 |
| m. Production process planning | 7 |
| n. Product/service planning | 8 |
| s. Quality improvement projects | 9 |
| y. Social and cultural values | 10 |
| x. Customer satisfaction | 11 |
| v. Internal supplier - customer chain | 12 |
| a. Audits for the quality system | 13 |
| e. Management of suppliers | 14 |
| f. Process control | 15 |
| g. Fulfilment of stakeholders' expectations | 16 |
| i. Stakeholders expectations | 17 |
| h. Profits distribution | 18 |
| k. Management of operation | 19 |
| l. Market share | 20 |
| b. Benchmarking | 21 |
| c. Competitors' quality | 22 |
| w. Business operation outcome | 23 |
| u. Rewards and recognition | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Other | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 14 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No.

34

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Glass and glass products |
| Products / Services | Glass container |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|---|
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| C2) Exercise of process control actions |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Strategic Planning |
| utilisation of human/financial resources | Marketing |

10. Characteristics of respondent

| | |
|----------------------------|--------------------------|
| Position | Division Quality Manager |
| Reports to: | Director of Quality |
| Education in TQM (# hours) | 1000 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Lack of working methods | 2 |
| Opposition of middle management | 3 |
| Low educational level | 4 |
| Lack of quality suppliers | 5 |
| Customer do not demand quality | 6 |
| Lack of financial resources | 7 |
| Low technological level | 8 |
| Other | 9 |

6. Time for implementation (years)

6 to 8

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| x. Customer satisfaction | 4 |
| p. Strategic planning process | 5 |
| m. Production process planning | 6 |
| n. Product/service planning | 7 |
| k. Management of operation | 8 |
| l. Market share | 9 |
| i. Stakeholders expectations | 10 |
| s. Quality improvement projects | 11 |
| r. Promotion of a culture of quality | 12 |
| q. Training and educational programmes | 13 |
| y. Social and cultural values | 14 |
| b. Benchmarking | 15 |
| c. Competitors' quality | 16 |
| f. Process control | 17 |
| e. Management of suppliers | 18 |
| v. Internal supplier - customer chain | 19 |
| u. Rewards and recognition | 20 |
| t. Re-engineering management | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| h. Profits distribution | 23 |
| a. Audits for the quality system | 24 |
| w. Business operation outcome | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Other | 1 |
| Cost of poor quality | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.8 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

1. General Information

| | |
|---------------------|---------------------------|
| Industrial Sector | Textile |
| Products / Services | Nylon and polyester fibre |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| H3) Rewards and recognition |
| M4) Market share |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| Q4) Teamwork for quality improvement |

Processes used in a modified way and documented

| |
|--------------------------------|
| C1) Work methods and standards |
|--------------------------------|

Processes used in a modified way but not documented

| |
|---|
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| O5) Production / administration information systems |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of quality assurance |
| Reports to: | Technical Manager |
| Education in TQM (# hours) | 300 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Lack of working methods | 1 |
| Low technological level | 2 |
| Low educational level | 3 |
| Lack of financial resources | 4 |
| Customer do not demand quality | 5 |
| Oposition of middle management | 6 |
| Top management involvement | 7 |
| Lack of quality suppliers | 8 |
| Other | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 4 to 6 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| o. Quality policies | 2 |
| r. Promotion of a culture of quality | 3 |
| d. Quality steering committee | 4 |
| i. Stakeholders expectations | 5 |
| l. Market share | 6 |
| c. Competitors' quality | 7 |
| b. Benchmarking | 8 |
| k. Management of operation | 9 |
| q. Training and educational programmes | 10 |
| t. Re-engineering management | 11 |
| y. Social and cultural values | 12 |
| m. Production process planning | 13 |
| n. Product/service planning | 14 |
| e. Management of suppliers | 15 |
| p. Strategic planning process | 16 |
| s. Quality improvement projects | 17 |
| v. Internal supplier - customer chain | 18 |
| a. Audits for the quality system | 19 |
| g. Fulfilment of stakeholders' expectations | 20 |
| f. Process control | 21 |
| w. Business operation outcome | 22 |
| x. Customer satisfaction | 23 |
| u. Rewards and recognition | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Other | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 2 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 36

1. General Information

| | |
|---------------------|--------------|
| Industrial Sector | Construction |
| Products / Services | Housing |

2. Involvement in TQM

NO

3. Degree of Implementation of system's processes

Processes widely used and documented

Processes widely used and documented

Processes widely used but not documented

Processes widely used but not documented

10. Characteristics of respondent

| | |
|----------------------------|------------------------|
| Position | Director of Operations |
| Reports to: | Director |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Opposition of middle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

6. Time for implementation (years)

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7. Recommended implementation sequence

| 7. Recommended implementation sequence | |
|--|---|
| a Audits for the quality system | 0 |
| b Benchmarking | 0 |
| c Competitors' quality | 0 |
| d Quality steering committee | 0 |
| e Management of suppliers | 0 |
| f Process control | 0 |
| g Fulfilment of stakeholders' expectations | 0 |
| h Profits distribution | 0 |
| i Stakeholders expectations | 0 |
| j Mission and vision | 0 |
| k Management of operation | 0 |
| l Market share | 0 |
| m Production process planning | 0 |
| n Product/service planning | 0 |
| o Quality policies | 0 |
| p Strategic planning process | 0 |
| q Training and educational programmes | 0 |
| r Promotion of a culture of quality | 0 |
| s Quality improvement projects | 0 |
| t Re-engineering management | 0 |
| u Rewards and recognition | 0 |
| v Internal supplier - customer chain | 0 |
| w Business operation outcome | 0 |
| x Customer satisfaction | 0 |
| y Social and cultural values | 0 |

8. Effectiveness measure of the QM programme

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

9. Improvement in the satisfaction of:

| | |
|---|------------|
| 9. Improvement in the satisfaction of: | |
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No.

37

1. General Information

| | |
|---------------------|-----------------------|
| Industrial Sector | Leather and Shoes |
| Products / Services | Shoes and sport shoes |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S8) Business process re-engineering |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| P1) Assurance of the quality of inputs |

Processes widely used but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| M1) Customer satisfaction |
| Q4) Teamwork for quality improvement |

Processes used in a modified way and documented

| |
|------|
| None |
|------|

Processes used in a modified way but not documented

| |
|--|
| H4) Employees' degree of satisfaction on the job |
| M3) Competitors' quality, strengths & weaknesses |

Processes used sporadically and not documented

| |
|---|
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |

Processes never used

| |
|---|
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| O5) Production / administration information systems |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Op's Management |
| implementation due to resistance | Op's Management |
| utilisation of human/financial resources | Strategic Planning |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | Quality Control Manager |
| Reports to: | General Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Lack of working methods | 2 |
| Top management involvement | 3 |
| Opposition of middle management | 4 |
| Low technological level | 5 |
| Lack of financial resources | 6 |
| Customer do not demand quality | 7 |
| Lack of quality suppliers | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| l. Market share | 3 |
| k. Management of operation | 4 |
| p. Strategic planning process | 5 |
| x. Customer satisfaction | 6 |
| w. Business operation outcome | 7 |
| s. Quality improvement projects | 8 |
| t. Re-engineering management | 9 |
| o. Quality policies | 10 |
| e. Management of suppliers | 11 |
| f. Process control | 12 |
| m. Production process planning | 13 |
| n. Product/service planning | 14 |
| g. Fulfilment of stakeholders' expectations | 15 |
| i. Stakeholders expectations | 16 |
| r. Promotion of a culture of quality | 17 |
| q. Training and educational programmes | 18 |
| h. Profits distribution | 19 |
| c. Competitors' quality | 20 |
| b. Benchmarking | 21 |
| a. Audits for the quality system | 22 |
| u. Rewards and recognition | 23 |
| v. Internal supplier - customer chain | 24 |
| y. Social and cultural values | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Quality & Productivity indexes | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 0 |
| Suppliers | 2 |
| Customers | 1 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 38

1. General Information

| | |
|---------------------|-----------|
| Industrial Sector | Beverage |
| Products / Services | Coca Cola |

2. Involvement in TQM

NO

3. Degree of Implementation of system's processes

Processes widely used and documented

[illegible]

Processes widely used but not documented

[illegible]

10. Characteristics of respondent

| | |
|----------------------------|---|
| Position | 0 |
| Reports to | 0 |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Opposition of middle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

6. Time for implementation (years)

11/11/2011

7. Recommended implementation sequence

| | |
|---|---|
| a. Audits for the quality system | 0 |
| b. Benchmarking | 0 |
| c. Competitors' quality | 0 |
| d. Quality steering committee | 0 |
| e. Management of suppliers | 0 |
| f. Process control | 0 |
| g. Fulfilment of stakeholders' expectations | 0 |
| h. Profits distribution | 0 |
| i. Stakeholders expectations | 0 |
| j. Mission and vision | 0 |
| k. Management of operation | 0 |
| l. Market share | 0 |
| m. Production process planning | 0 |
| n. Product/service planning | 0 |
| o. Quality policies | 0 |
| p. Strategic planning process | 0 |
| q. Training and educational programmes | 0 |
| r. Promotion of a culture of quality | 0 |
| s. Quality improvement projects | 0 |
| t. Re-engineering management | 0 |
| u. Rewards and recognition | 0 |
| v. Internal supplier - customer chain | 0 |
| w. Business operation outcome | 0 |
| x. Customer satisfaction | 0 |
| y. Social and cultural values | 0 |

8. Effectiveness measure of the QM programme

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0.0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 39

1. General Information

| | |
|---------------------|-------------------------|
| Industrial Sector | Publishers and printing |
| Products / Services | Flexible packaging |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H5) Employees' performance |
| M4) Market share |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| Q1) Quality improvement projects. |

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
|---|

Processes used in a modified way and documented

| |
|---|
| L4) Corporate social and cultural values |
| S4) Strategies -benchmarking |
| H2) Training and educational programmes |
| H6) Modification of the corporate culture |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| C3) Statistical process control |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| M1) Customer satisfaction |
| O1) Design of products and services |
| O8) Quality of the finished product |

Processes used sporadically and not documented

| |
|--|
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| P1) Assurance of the quality of inputs |

Processes never used

| |
|--|
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |

4. Critical sub-systems for:

| | |
|--|-----------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of quality assurance |
| Reports to: | Operations Manager |
| Education in TQM (# hours) | 520 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Other | 1 |
| Top management involvement | 2 |
| Lack of working methods | 3 |
| Low educational level | 4 |
| Low technological level | 5 |
| Opposition of middle management | 6 |
| Lack of quality suppliers | 7 |
| Lack of financial resources | 8 |
| Customer do not demand quality | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| c. Competitors' quality | 2 |
| j. Mission and vision | 3 |
| p. Strategic planning process | 4 |
| y. Social and cultural values | 5 |
| b. Benchmarking | 6 |
| o. Quality policies | 7 |
| l. Market share | 8 |
| q. Training and educational programmes | 9 |
| r. Promotion of a culture of quality | 10 |
| i. Stakeholders expectations | 11 |
| k. Management of operation | 12 |
| n. Product/service planning | 13 |
| m. Production process planning | 14 |
| v. Internal supplier - customer chain | 15 |
| g. Fulfilment of stakeholders' expectations | 16 |
| u. Rewards and recognition | 17 |
| x. Customer satisfaction | 18 |
| e. Management of suppliers | 19 |
| f. Process control | 20 |
| s. Quality improvement projects | 21 |
| t. Re-engineering management | 22 |
| w. Business operation outcome | 23 |
| h. Profits distribution | 24 |
| a. Audits for the quality system | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0.6 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 40

1. General Information

| | |
|---------------------|---------------------|
| Industrial Sector | Electric Appliances |
| Products / Services | Refrigerators |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|--|
| L3) Mission and vision statements |
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |

Processes widely used but not documented

| |
|----------------------------------|
| Q1) Quality improvement projects |
|----------------------------------|

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| S8) Business process re-engineering |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| C1) Work methods and standards |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |

Processes used in a modified way but not documented

| |
|--------------------------------------|
| Q4) Teamwork for quality improvement |
|--------------------------------------|

Processes used sporadically and not documented

| |
|--|
| M2) Policy for profits and benefits distribution |
|--|

Processes never used

| |
|---|
| S5) Strategies -re-engineering actions |
| O5) Production / administration information systems |
| Q3) Quality steering committee |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|------------------------------|
| Position | Manager of Q. and Technology |
| Reports to: | Director of Operations |
| Education in TQM (# hours) | 400 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Other | 1 |
| Opposition of middle management | 2 |
| Low educational level | 3 |
| Lack of working methods | 4 |
| Low technological level | 5 |
| Lack of quality suppliers | 6 |
| Lack of financial resources | 7 |
| Customer do not demand quality | 8 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| d. Quality steering committee | 2 |
| y. Social and cultural values | 3 |
| x. Customer satisfaction | 4 |
| o. Quality policies | 5 |
| p. Strategic planning process | 6 |
| r. Promotion of a culture of quality | 7 |
| q. Training and educational programmes | 8 |
| s. Quality improvement projects | 9 |
| n. Product/service planning | 10 |
| m. Production process planning | 11 |
| v. Internal supplier - customer chain | 12 |
| u. Rewards and recognition | 13 |
| k. Management of operation | 14 |
| f. Process control | 15 |
| c. Competitors' quality | 16 |
| e. Management of suppliers | 17 |
| g. Fulfilment of stakeholders' expectations | 18 |
| i. Stakeholders expectations | 19 |
| l. Market share | 20 |
| b. Benchmarking | 21 |
| a. Audits for the quality system | 22 |
| w. Business operation outcome | 23 |
| t. Re-engineering management | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Market share | 2 |
| Financial profitability | 3 |
| Cost of poor quality | 4 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.6 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No.

41

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Glass and glass products |
| Products / Services | Glass sheets |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S2) Strategies -capital available |
| M4) Market share |
| Q2) Audits to the management system |

Processes widely used but not documented

none

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|---|
| O4) Redesign of products and services |
| O5) Production / administration information systems |

Processes used sporadically and not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O2) Production process planning |
| O3) Administration process planning |

Processes never used

| |
|------------------------------|
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Suppliers Mgt |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-----------------|
| Position | General Manager |
| Reports to | 80 |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Top management involvement | 2 |
| Low educational level | 3 |
| Opposition of middle management | 4 |
| Low technological level | 5 |
| Customer do not demand quality | 6 |
| Lack of quality suppliers | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| j. Mission and vision | 2 |
| x. Customer satisfaction | 3 |
| q. Training and educational programmes | 4 |
| d. Quality steering committee | 5 |
| o. Quality policies | 6 |
| u. Rewards and recognition | 7 |
| r. Promotion of a culture of quality | 8 |
| s. Quality improvement projects | 9 |
| k. Management of operation | 10 |
| p. Strategic planning process | 11 |
| n. Product/service planning | 12 |
| m. Production process planning | 13 |
| l. Market share | 14 |
| y. Social and cultural values | 15 |
| v. Internal supplier - customer chain | 16 |
| f. Process control | 17 |
| e. Management of suppliers | 18 |
| a. Audits for the quality system | 19 |
| c. Competitors' quality | 20 |
| b. Benchmarking | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| h. Profits distribution | 23 |
| t. Re-engineering management | 24 |
| w. Business operation outcome | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 4 |
|---------|---|

1. General Information

| | |
|---------------------|-----------------------|
| Industrial Sector | Electrical Machinery |
| Products / Services | Electric transformers |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S8) Business process re-engineering |
| H6) Modification of the corporate culture |
| M4) Market share |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| H1) Quality promotion |
| H2) Training and educational programmes |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| C2) Exercise of process control actions |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |

Processes used in a modified way and documented

| |
|--|
| H5) Employees' performance. |
| M2) Policy for profits and benefits distribution |

Processes used in a modified way but not documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Corporate Quality Manager |
| Reports to | CEO |
| Education in TQM (# hours) | 500 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Oposition of muddle management | 1 |
| Lack of working methods | 2 |
| Customer do not demand quality | 3 |
| Low technological level | 4 |
| Low educational level | 5 |
| Lack of quality suppliers | 6 |
| Other | 7 |
| Lack of financial resources | 8 |
| Top management involvement | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 4 to 6 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| i. Mission and vision | 2 |
| o. Quality policies | 3 |
| b. Benchmarking | 4 |
| c. Competitors' quality | 5 |
| 1 Stakeholders expectations | 6 |
| w. Business operation outcome | 7 |
| x. Customer satisfaction | 8 |
| g. Fulfilment of stakeholders' expectations | 9 |
| q. Training and educational programmes | 10 |
| p. Strategic planning process | 11 |
| t. Re-engineering management | 12 |
| s. Quality improvement projects | 13 |
| v. Internal supplier - customer chain | 14 |
| l. Market share | 15 |
| m. Production process planning | 16 |
| n. Product/service planning | 17 |
| k. Management of operation | 18 |
| f. Process control | 19 |
| e. Management of suppliers | 20 |
| r. Promotion of a culture of quality | 21 |
| y. Social and cultural values | 22 |
| u. Rewards and recognition | 23 |
| h. Profits distribution | 24 |
| a. Audits for the quality system | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Other | 1 |
| Employees' satisfaction | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 1 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 16 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 43

1. General Information

| | |
|---------------------|------------|
| Industrial Sector | Food |
| Products / Services | Corn Flour |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S3) Strategies - mission, vision and corporate values |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S8) Business process re-engineering |
| H4) Employees' degree of satisfaction on the job |
| M4) Market share |
| O2) Production process planning |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| Q1) Quality improvement projects |

Processes used in a modified way and documented

| |
|--|
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| M3) Competitors' quality, strengths & weaknesses |
| O1) Design of products and services |
| O7) Productivity of the production process |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |

Processes used in a modified way but not documented

None

Processes used sporadically and not documented

None

Processes never used

None

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Marketing |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality assurance manager |
| Reports to: | General Manager |
| Education in TQM (# hours) | 1000 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Opposition of middle management | 2 |
| Other | 3 |
| Lack of financial resources | 4 |
| Lack of working methods | 5 |
| Low technological level | 6 |
| Customer do not demand quality | 7 |
| Lack of quality suppliers | 8 |
| Low educational level | 9 |

6. Time for implementation (years)

4 to 6

7. Recommended implementation sequence

| | |
|---|----|
| p. Strategic planning process | 1 |
| o. Quality policies | 2 |
| j. Mission and vision | 3 |
| k. Management of operation | 4 |
| d. Quality steering committee | 5 |
| r. Promotion of a culture of quality | 6 |
| x. Customer satisfaction | 7 |
| v. Internal supplier - customer chain | 8 |
| q. Training and educational programmes | 9 |
| f. Process control | 10 |
| m. Production process planning | 11 |
| n. Product/service planning | 12 |
| l. Market share | 13 |
| s. Quality improvement projects | 14 |
| u. Rewards and recognition | 15 |
| y. Social and cultural values | 16 |
| e. Management of suppliers | 17 |
| h. Profits distribution | 18 |
| i. Stakeholders expectations | 19 |
| c. Competitors' quality | 20 |
| t. Re-engineering management | 21 |
| b. Benchmarking | 22 |
| a. Audits for the quality system | 23 |
| w. Business operation outcome | 24 |
| g. Fulfilment of stakeholders' expectations | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Employees' satisfaction | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0.4 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 44

1. General Information

| | |
|---------------------|---------------------|
| Industrial Sector | Electric appliances |
| Products / Services | Wash machines |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O4) Redesign of products and services |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|------------------------------|
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |

Processes used in a modified way and documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| C1) Work methods and standards |

Processes used in a modified way but not documented

| |
|---|
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| Q1) Quality improvement projects. |

Processes used sporadically and not documented

| |
|--|
| H4) Employees' degree of satisfaction on the job |
|--|

Processes never used

| |
|---|
| S2) Strategies -capital available |
| M2) Policy for profits and benefits distribution |
| O3) Administration process planning |
| O5) Production / administration information systems |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Process Control |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality assurance manager |
| Reports to: | General Manager |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Other | 1 |
| Lack of working methods | 2 |
| Lack of quality suppliers | 3 |
| Low educational level | 4 |
| Customer do not demand quality | 5 |
| Low technological level | 6 |
| Lack of financial resources | 7 |
| Opposition of middle management | 8 |
| Top management involvement | 9 |

6. Time for implementation (years)

| |
|--------|
| 4 to 6 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| j. Mission and vision | 2 |
| k. Management of operation | 3 |
| m. Production process planning | 4 |
| o. Quality policies | 5 |
| n. Product/service planning | 6 |
| y. Social and cultural values | 7 |
| g. Fulfilment of stakeholders' expectations | 8 |
| f. Process control | 9 |
| e. Management of suppliers | 10 |
| a. Audits for the quality system | 11 |
| d. Quality steering committee | 12 |
| p. Strategic planning process | 13 |
| q. Training and educational programmes | 14 |
| r. Promotion of a culture of quality | 15 |
| v. Internal supplier - customer chain | 16 |
| x. Customer satisfaction | 17 |
| s. Quality improvement projects | 18 |
| t. Re-engineering management | 19 |
| u. Rewards and recognition | 20 |
| w. Business operation outcome | 21 |
| b. Benchmarking | 22 |
| c. Competitors' quality | 23 |
| l. Market share | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 16 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 46

1. General Information

| | |
|---------------------|-------------------------|
| Industrial Sector | Electrical Machinery |
| Products / Services | Electric cables & wires |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| H4) Employees' degree of satisfaction on the job |
| M1) Customer satisfaction |
| O3) Administration process planning |

Processes used in a modified way and documented

| |
|--|
| S5) Strategies -re-engineering actions |
|--|

Processes used in a modified way but not documented

| |
|---------------------------|
| S7) Benchmarking analysis |
|---------------------------|

Processes used sporadically and not documented

| |
|--|
| S4) Strategies -benchmarking |
| S8) Business process re-engineering |
| M3) Competitors' quality, strengths & weaknesses |

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Marketing |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Chief of quality systems |
| Reports to | Quality assurance Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Lack of working methods | 2 |
| Low technological level | 3 |
| Lack of financial resources | 4 |
| Low educational level | 5 |
| Lack of quality suppliers | 6 |
| Customer do not demand quality | 7 |
| Opposition of middle management | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| d. Quality steering committee | 2 |
| j. Mission and vision | 3 |
| b. Benchmarking | 4 |
| c. Competitors' quality | 5 |
| l. Market share | 6 |
| p. Strategic planning process | 7 |
| o. Quality policies | 8 |
| t. Re-engineering management | 9 |
| n. Product/service planning | 10 |
| m. Production process planning | 11 |
| k. Management of operation | 12 |
| y. Social and cultural values | 13 |
| r. Promotion of a culture of quality | 14 |
| q. Training and educational programmes | 15 |
| s. Quality improvement projects | 16 |
| f. Process control | 17 |
| e. Management of suppliers | 18 |
| v. Internal supplier - customer chain | 19 |
| w. Business operation outcome | 20 |
| x. Customer satisfaction | 21 |
| u. Rewards and recognition | 22 |
| a. Audits for the quality system | 23 |
| h. Profits distribution | 24 |
| g. Fulfilment of stakeholders' expectations | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Market share | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 20 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 47

1. General Information

| | |
|---------------------|---------|
| Industrial Sector | Textile |
| Products / Services | Carpets |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S7) Benchmarking analysis |
| H3) Rewards and recognition |
| M4) Market share |
| O3) Administration process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects. |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|-----------------------------------|
| P2) Programme to select suppliers |
|-----------------------------------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Mgt Human Behaviour |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | Quality assurance chief |
| Reports to: | Production Manager |
| Education in TQM (# hours) | 300 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Low technological level | 2 |
| Customer do not demand quality | 3 |
| Lack of financial resources | 4 |
| Lack of quality suppliers | 5 |
| Opposition of middle management | 6 |
| Lack of working methods | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

6 to 8

7. Recommended implementation sequence

| | |
|--|----|
| d Quality steering committee | 1 |
| p Strategic planning process | 2 |
| o Quality policies | 3 |
| q Training and educational programmes | 4 |
| r Promotion of a culture of quality | 5 |
| j Mission and vision | 6 |
| n Product/service planning | 7 |
| m Production process planning | 8 |
| k Management of operation | 9 |
| g Fulfilment of stakeholders' expectations | 10 |
| f Process control | 11 |
| b Benchmarking | 12 |
| v Internal supplier - customer chain | 13 |
| x Customer satisfaction | 14 |
| y Social and cultural values | 15 |
| w Business operation outcome | 16 |
| a Audits for the quality system | 17 |
| c Competitors' quality | 18 |
| l Market share | 19 |
| u Rewards and recognition | 20 |
| s Quality improvement projects | 21 |
| e Management of suppliers | 22 |
| i Stakeholders expectations | 23 |
| h Profits distribution | 24 |
| t Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 20 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 48

1. General Information

| | |
|---------------------|---------------|
| Industrial Sector | Textile |
| Products / Services | Acrylic Fibre |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| H3) Rewards and recognition |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O2) Production process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| L4) Corporate social and cultural values |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| O1) Design of products and services |
| O3) Administration process planning |

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| C3) Statistical process control |
| P2) Programme to select suppliers |

Processes used in a modified way but not documented

None

Processes used sporadically and not documented

None

Processes never used

None

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Process Control |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|------------------------|
| Position | Administrative Manager |
| Reports to: | General Director |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Opposition of middle management | 1 |
| Lack of working methods | 2 |
| Lack of quality suppliers | 3 |
| Low educational level | 4 |
| Lack of financial resources | 5 |
| Customer do not demand quality | 6 |
| Low technological level | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

4 to 6

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| i. Stakeholders expectations | 2 |
| j. Mission and vision | 3 |
| o. Quality policies | 4 |
| m. Production process planning | 5 |
| n. Product/services planning | 6 |
| r. Promotion of a culture of quality | 7 |
| q. Training and educational programmes | 8 |
| s. Quality improvement projects | 9 |
| x. Customer satisfaction | 10 |
| y. Social and cultural values | 11 |
| w. Business operation outcome | 12 |
| v. Internal supplier - customer chain | 13 |
| e. Management of suppliers | 14 |
| f. Process control | 15 |
| l. Market share | 16 |
| k. Management of operation | 17 |
| p. Strategic planning process | 18 |
| t. Re-engineering management | 19 |
| u. Rewards and recognition | 20 |
| h. Profits distribution | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| c. Competitors' quality | 23 |
| b. Benchmarking | 24 |
| a. Audits for the quality system | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Cost of poor quality | 1 |
| Market share | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 12 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 49

1. General Information

| | |
|---------------------|----------------|
| Industrial Sector | Pharmaceutical |
| Products / Services | Medicines |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| O1) Design of products and services |
| O2) Production process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| Q3) Quality steering committee |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| S6) Quality policy |
| S8) Business process re-engineering |
| H1) Quality promotion |
| M2) Policy for profits and benefits distribution |
| O4) Redesign of products and services |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O5) Production / administration information systems |

Processes used sporadically and not documented

| |
|---|
| H3) Rewards and recognition |
| H6) Modification of the corporate culture |
| O3) Administration process planning |
| C3) Statistical process control |

Processes never used

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| S4) Strategies -benchmarking |
| H2) Training and educational programmes |
| M1) Customer satisfaction |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Coordinator of improvement |
| Reports to: | General Director |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Oposition of muddle management | 1 |
| Lack of working methods | 2 |
| Lack of quality suppliers | 3 |
| Customer do not demand quality | 4 |
| Lack of financial resources | 5 |
| Low technological level | 6 |
| Low educational level | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| y. Social and cultural values | 3 |
| o. Quality policies | 4 |
| p. Strategic planning process | 5 |
| w. Business operation outcome | 6 |
| i. Stakeholders expectations | 7 |
| m. Production process planning | 8 |
| n. Product/service planning | 9 |
| v. Internal supplier - customer chain | 10 |
| s. Quality improvement projects | 11 |
| h. Profits distribution | 12 |
| k. Management of operation | 13 |
| l. Market share | 14 |
| f. Process control | 15 |
| a. Audits for the quality system | 16 |
| q. Training and educational programmes | 17 |
| r. Promotion of a culture of quality | 18 |
| u. Rewards and recognition | 19 |
| x. Customer satisfaction | 20 |
| t. Re-engineering management | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| b. Benchmarking | 23 |
| c. Competitors' quality | 24 |
| e. Management of suppliers | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Quality Awards | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.6 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 50

1. General Information

| | |
|---------------------|---------|
| Industrial Sector | Textile |
| Products / Services | Fabrics |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C3) Statistical process control |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| S6) Quality policy |

Processes used in a modified way and documented

None

Processes used in a modified way but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| S7) Benchmarking analysis |
| H4) Employees' degree of satisfaction on the job |
| O5) Production / administration information systems |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |

Processes used sporadically and not documented

None

Processes never used

| |
|--|
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Strategic Planning |

10. Characteristics of respondent

| | |
|----------------------------|--------------------------|
| Position | Chief of quality control |
| Reports to | Quality control manager |
| Education in TQM (# hours) | 68 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Opposition of middle management | 2 |
| Lack of working methods | 3 |
| Low educational level | 4 |
| Lack of financial resources | 5 |
| Lack of quality suppliers | 6 |
| Customer do not demand quality | 7 |
| Low technological level | 8 |
| Other | 9 |

6. Time for implementation (years)

4 to 6

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| r. Promotion of a culture of quality | 4 |
| s. Quality improvement projects | 5 |
| w. Business operation outcome | 6 |
| e. Management of suppliers | 7 |
| f. Process control | 8 |
| m. Production process planning | 9 |
| q. Training and educational programmes | 10 |
| c. Competitors' quality | 11 |
| i. Stakeholders expectations | 12 |
| y. Social and cultural values | 13 |
| x. Customer satisfaction | 14 |
| g. Fulfilment of stakeholders' expectations | 15 |
| a. Audits for the quality system | 16 |
| k. Management of operation | 17 |
| p. Strategic planning process | 18 |
| l. Market share | 19 |
| n. Product/service planning | 20 |
| u. Rewards and recognition | 21 |
| h. Profits distribution | 22 |
| b. Benchmarking | 23 |
| t. Re-engineering management | 24 |
| v. Internal supplier - customer chain | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Cost of poor quality | 1 |
| Financial profitability | 2 |
| Quality & Productivity indexes | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 12 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 51

1. General Information

| | |
|---------------------|-----------|
| Industrial Sector | Food |
| Products / Services | Chocolate |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| S3) Strategies - mission, vision and corporate values |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M4) Market share |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |

Processes widely used but not documented

| |
|--|
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| C3) Statistical process control |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S4) Strategies -benchmarking |
| M1) Customer satisfaction |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Mgt Human Behaviour |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Strategic Planning |

10. Characteristics of respondent

| | |
|----------------------------|--------------------------|
| Position | Chief of quality control |
| Reports to: | General Manager |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Low educational level | 2 |
| Low technological level | 3 |
| Opposition of middle management | 4 |
| Lack of financial resources | 5 |
| Customer do not demand quality | 6 |
| Lack of quality suppliers | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|--|----|
| j Mission and vision | 1 |
| o. Quality policies | 2 |
| d. Quality steering committee | 3 |
| p Strategic planning process | 4 |
| q Training and educational programmes | 5 |
| k Management of operation | 6 |
| m. Production process planning | 7 |
| f. Process control | 8 |
| e Management of suppliers | 9 |
| a. Audits for the quality system | 10 |
| n. Product/service planning | 11 |
| w. Business operation outcome | 12 |
| v Internal supplier - customer chain | 13 |
| x. Customer satisfaction | 14 |
| s. Quality improvement projects | 15 |
| u Rewards and recognition | 16 |
| r. Promotion of a culture of quality | 17 |
| y Social and cultural values | 18 |
| i. Stakeholders expectations | 19 |
| g Fulfilment of stakeholders' expectations | 20 |
| h. Profits distribution | 21 |
| b. Benchmarking | 22 |
| c. Competitors' quality | 23 |
| l. Market share | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Employees' satisfaction | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.8 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No.

52

1. General Information

| | |
|---------------------|-----------------------|
| Industrial Sector | Metallic Products |
| Products / Services | Valves and connectors |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

None

Processes widely used but not documented

None

Processes used in a modified way and documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| M4) Market share |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |

Processes used in a modified way but not documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| S7) Benchmarking analysis |
| M3) Competitors' quality, strengths & weaknesses |
| O2) Production process planning |
| O4) Redesign of products and services |

Processes used sporadically and not documented

None

Processes never used

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S6) Quality policy |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|--------------------------|
| Position | Quality Vice-President |
| Reports to: | Executive Vice-President |
| Education in TQM (# hours) | 50 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Opposition of middle management | 2 |
| Low educational level | 3 |
| Top management involvement | 4 |
| Lack of quality suppliers | 5 |
| Customer do not demand quality | 6 |
| Low technological level | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| p. Strategic planning process | 2 |
| d. Quality steering committee | 3 |
| l. Market share | 4 |
| o. Quality policies | 5 |
| r. Promotion of a culture of quality | 6 |
| s. Quality improvement projects | 7 |
| x. Customer satisfaction | 8 |
| y. Social and cultural values | 9 |
| v. Internal supplier - customer chain | 10 |
| q. Training and educational programmes | 11 |
| w. Business operation outcome | 12 |
| c. Competitors' quality | 13 |
| g. Fulfilment of stakeholders' expectations | 14 |
| i. Stakeholders expectations | 15 |
| k. Management of operation | 16 |
| b. Benchmarking | 17 |
| h. Profits distribution | 18 |
| t. Re-engineering management | 19 |
| u. Rewards and recognition | 20 |
| a. Audits for the quality system | 21 |
| e. Management of suppliers | 22 |
| f. Process control | 23 |
| m. Production process planning | 24 |
| n. Product/service planning | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Quality & Productivity indexes | 2 |
| Other | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

1. General Information

| | |
|---------------------|--------------------------------|
| Industrial Sector | Metallic products |
| Products / Services | Bronze valve for high pressure |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S6) Quality policy |
| S8) Business process re-engineering |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |

Processes widely used but not documented

| |
|---|
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| M1) Customer satisfaction |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |

Processes used in a modified way and documented

| |
|--|
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|-----------------------------|
| H3) Rewards and recognition |
|-----------------------------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|--------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Marketing |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|---|
| Position | 0 |
| Reports to: | 0 |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low technological level | 1 |
| Other | 2 |
| Lack of working methods | 3 |
| Low educational level | 4 |
| Lack of financial resources | 5 |
| Lack of quality suppliers | 6 |
| Top management involvement | 7 |
| Opposition of middle management | 8 |
| Customer do not demand quality | 9 |

6. Time for implementation (years)

0 to 1

7. Recommended implementation sequence

| | |
|--|----|
| d Quality steering committee | 1 |
| k Management of operation | 2 |
| f Process control | 3 |
| m. Production process planning | 4 |
| b. Benchmarking | 5 |
| n Product/service planning | 6 |
| o. Quality policies | 7 |
| c Competitors' quality | 8 |
| p Strategic planning process | 9 |
| i. Stakeholders expectations | 10 |
| l. Market share | 11 |
| e Management of suppliers | 12 |
| q. Training and educational programmes | 13 |
| r. Promotion of a culture of quality | 14 |
| s Quality improvement projects | 15 |
| t. Re-engineering management | 16 |
| w Business operation outcome | 17 |
| h Profits distribution | 18 |
| x Customer satisfaction | 19 |
| g Fulfilment of stakeholders' expectations | 20 |
| j Mission and vision | 21 |
| u Rewards and recognition | 22 |
| a. Audits for the quality system | 23 |
| v. Internal supplier - customer chain | 24 |
| y. Social and cultural values | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Employees' satisfaction | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No.

54

1. General Information

| | |
|---------------------|-------------------|
| Industrial Sector | Metallic products |
| Products / Services | Bronze valves |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|---|
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S8) Business process re-engineering |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O3) Administration process planning |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C2) Exercise of process control actions |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H5) Employees' performance |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O2) Production process planning |

Processes used in a modified way and documented

None

Processes used in a modified way but not documented

| |
|--|
| H4) Employees' degree of satisfaction on the job |
| O4) Redesign of products and services |
| C3) Statistical process control |

Processes used sporadically and not documented

| |
|---|
| H6) Modification of the corporate culture |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q3) Quality steering committee |

Processes never used

H3) Rewards and recognition

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|--------------------------|
| Position | Chief of quality control |
| Reports to: | Plant Manager |
| Education in TQM (# hours) | 40 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Lack of financial resources | 2 |
| Low technological level | 3 |
| Opposition of middle management | 4 |
| Customer do not demand quality | 5 |
| Low educational level | 6 |
| Lack of quality suppliers | 7 |
| Other | 8 |
| Top management involvement | 9 |

6. Time for implementation (years)

0 to 1

7. Recommended implementation sequence

| | |
|---|----|
| k. Management of operation | 1 |
| j. Mission and vision | 2 |
| i. Stakeholders expectations | 3 |
| h. Profits distribution | 4 |
| g. Fulfilment of stakeholders' expectations | 5 |
| f. Process control | 6 |
| m. Production process planning | 7 |
| s. Quality improvement projects | 8 |
| a. Audits for the quality system | 9 |
| l. Market share | 10 |
| b. Benchmarking | 11 |
| c. Competitors' quality | 12 |
| t. Re-engineering management | 13 |
| u. Rewards and recognition | 14 |
| d. Quality steering committee | 15 |
| v. Internal supplier - customer chain | 16 |
| p. Strategic planning process | 17 |
| n. Product/service planning | 18 |
| r. Promotion of a culture of quality | 19 |
| e. Management of suppliers | 20 |
| w. Business operation outcome | 21 |
| q. Training and educational programmes | 22 |
| x. Customer satisfaction | 23 |
| y. Social and cultural values | 24 |
| o. Quality policies | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 1 |
| Stakeholders' satisfaction index | 16 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 55

1. General Information

| | |
|---------------------|------------|
| Industrial Sector | Auto-parts |
| Products / Services | Auto-parts |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H2) Training and educational programmes |
| H5) Employees' performance. |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P2) Programme to select suppliers |

Processes widely used but not documented

| |
|-------------------------------------|
| S8) Business process re-engineering |
|-------------------------------------|

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|---|
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| S5) Strategies -re-engineering actions |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of quality assurance |
| Reports to: | Quality assurance manager |
| Education in TQM (# hours) | 1000 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Oposition of muddle management | 1 |
| Top management involvement | 2 |
| Low technological level | 3 |
| Lack of quality suppliers | 4 |
| Low educational level | 5 |
| Lack of financial resources | 6 |
| Lack of working methods | 7 |
| Customer do not demand quality | 9 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|--|----|
| x Customer satisfaction | 1 |
| c. Competitors' quality | 2 |
| y. Social and cultural values | 3 |
| r. Promotion of a culture of quality | 4 |
| l Market share | 5 |
| b Benchmarking | 6 |
| j. Mission and vision | 7 |
| o. Quality policies | 8 |
| i. Stakeholders expectations | 9 |
| p. Strategic planning process | 10 |
| n. Product/service planning | 11 |
| q. Training and educational programmes | 12 |
| v. Internal supplier - customer chain | 13 |
| k. Management of operation | 14 |
| w. Business operation outcome | 15 |
| m. Production process planning | 16 |
| s Quality improvement projects | 17 |
| d. Quality steering committee | 18 |
| u. Rewards and recognition | 19 |
| t. Re-engineering management | 20 |
| h. Profits distribution | 21 |
| e. Management of suppliers | 22 |
| f. Process control | 23 |
| a. Audits for the quality system | 24 |
| g Fulfilment of stakeholders' expectations | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Market share | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 0 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 56

1. General Information

| | |
|---------------------|---------------------------|
| Industrial Sector | Publishers and printing |
| Products / Services | Continuous printing forms |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| Q1) Quality improvement projects |

Processes widely used but not documented

None

Processes used in a modified way and documented

| |
|--|
| S4) Strategies -benchmarking |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O4) Redesign of products and services |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

None

Processes used sporadically and not documented

None

Processes never used

None

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|--------------------|
| Position | Production Manager |
| Reports to: | General Director |
| Education in TQM (# hours) | 150 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Opposition of middle management | 2 |
| Lack of quality suppliers | 3 |
| Lack of financial resources | 4 |
| Customer do not demand quality | 5 |
| Lack of working methods | 6 |
| Low technological level | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| a. Audits for the quality system | 1 |
| b. Benchmarking | 2 |
| c. Competitors' quality | 3 |
| d. Quality steering committee | 4 |
| e. Management of suppliers | 5 |
| f. Process control | 6 |
| g. Fulfilment of stakeholders' expectations | 7 |
| i. Stakeholders expectations | 8 |
| h. Profits distribution | 9 |
| j. Mission and vision | 10 |
| k. Management of operation | 11 |
| l. Market share | 12 |
| m. Production process planning | 13 |
| n. Product/service planning | 14 |
| o. Quality policies | 15 |
| p. Strategic planning process | 16 |
| q. Training and educational programmes | 17 |
| r. Promotion of a culture of quality | 18 |
| s. Quality improvement projects | 19 |
| t. Re-engineering management | 20 |
| v. Internal supplier - customer chain | 21 |
| w. Business operation outcome | 22 |
| x. Customer satisfaction | 23 |
| y. Social and cultural values | 24 |
| u. Rewards and recognition | 25 |

8. Effectiveness measure of the QM programme

| | |
|----------------------|---|
| Cost of poor quality | 1 |
| Market share | 2 |
| Quality Awards | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 1.4 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

57

| | |
|---------------------|-------------------------|
| Industrial Sector | Publishers and printing |
| Products / Services | Books / Textbooks |

NO

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This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

| | |
|----------------------------|---|
| Position | 0 |
| Reports to: | 0 |
| Education in TOM (# hours) | 0 |

| | |
|---------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Opposition of middle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

| | |
|---|---|
| a. Audits for the quality system | 0 |
| b. Benchmarking | 0 |
| c. Competitors' quality | 0 |
| d. Quality steering committee | 0 |
| e. Management of suppliers | 0 |
| f. Process control | 0 |
| g. Fulfilment of stakeholders' expectations | 0 |
| h. Profits distribution | 0 |
| i. Stakeholders expectations | 0 |
| j. Mission and vision | 0 |
| k. Management of operation | 0 |
| l. Market share | 0 |
| m. Production process planning | 0 |
| n. Product/service planning | 0 |
| o. Quality policies | 0 |
| p. Strategic planning process | 0 |
| q. Training and educational programmes | 0 |
| r. Promotion of a culture of quality | 0 |
| s. Quality improvement projects | 0 |
| t. Re-engineering management | 0 |
| u. Rewards and recognition | 0 |
| v. Internal supplier - customer chain | 0 |
| w. Business operation outcome | 0 |
| x. Customer satisfaction | 0 |
| y. Social and cultural values | 0 |

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0 0 |

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 58

1. General Information

| | |
|---------------------|------------------|
| Industrial Sector | Plastic products |
| Products / Services | Luggage Bags |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| O3) Administration process planning |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|---------------------------|
| S7) Benchmarking analysis |
|---------------------------|

4. Critical sub-systems for:

| | |
|--|----------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Suppliers Management |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | Quality Assurance |
| Reports to: | Quality Control Manager |
| Education in TQM (# hours) | 80 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Top management involvement | 1 |
| Low educational level | 2 |
| Lack of working methods | 3 |
| Lack of quality suppliers | 4 |
| Oposition of middle management | 5 |
| Lack of financial resources | 6 |
| Low technological level | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| p. Strategic planning process | 2 |
| x. Customer satisfaction | 3 |
| m. Production process planning | 4 |
| n. Product/service planning | 5 |
| o. Quality policies | 6 |
| s. Quality improvement projects | 7 |
| k. Management of operation | 8 |
| r. Promotion of a culture of quality | 9 |
| v. Internal supplier - customer chain | 10 |
| w. Business operation outcome | 11 |
| q. Training and educational programmes | 12 |
| f. Process control | 13 |
| i. Stakeholders expectations | 14 |
| h. Profits distribution | 15 |
| l. Market share | 16 |
| b. Benchmarking | 17 |
| e. Management of suppliers | 18 |
| j. Mission and vision | 19 |
| a. Audits for the quality system | 20 |
| t. Re-engineering management | 21 |
| u. Rewards and recognition | 22 |
| y. Social and cultural values | 23 |
| g. Fulfilment of stakeholders' expectations | 24 |
| c. Competitors' quality | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Quality & Productivity indexes | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 16 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No.

59

1. General Information

| | |
|---------------------|----------------------------|
| Industrial Sector | Food |
| Products / Services | Food/nutrients for animals |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|-------------------------------------|
| O8) Quality of the finished product |
| C1) Work methods and standards |
| Q2) Audits to the management system |

Processes widely used but not documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M3) Competitors' quality, strengths & weaknesses |
| O7) Productivity of the production process |
| C2) Exercise of process control actions |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used in a modified way and documented

| |
|--|
| L4) Corporate social and cultural values |
| P2) Programme to select suppliers |

Processes used in a modified way but not documented

| |
|---|
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|-------------------|
| Position | Quality Assurance |
| | General Director |
| Reports to | |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Opposition of middle management | 1 |
| Customer do not demand quality | 2 |
| Other | 3 |
| Top management involvement | 4 |
| Low educational level | 5 |
| Lack of working methods | 6 |
| Lack of financial resources | 7 |
| Lack of quality suppliers | 8 |
| Low technological level | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| l. Market share | 3 |
| i. Stakeholders expectations | 4 |
| g. Fulfilment of stakeholders' expectations | 5 |
| h. Profits distribution | 6 |
| n. Product/service planning | 7 |
| m. Production process planning | 8 |
| k. Management of operation | 9 |
| f. Process control | 10 |
| a. Audits for the quality system | 11 |
| b. Benchmarking | 12 |
| c. Competitors' quality | 13 |
| e. Management of suppliers | 14 |
| v. Internal supplier - customer chain | 15 |
| r. Promotion of a culture of quality | 16 |
| w. Business operation outcome | 17 |
| q. Training and educational programmes | 18 |
| s. Quality improvement projects | 19 |
| x. Customer satisfaction | 20 |
| t. Re-engineering management | 21 |
| p. Strategic planning process | 22 |
| u. Rewards and recognition | 23 |
| o. Quality policies | 24 |
| y. Social and cultural values | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Financial profitability | 1 |
| Market share | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.6 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 60

1. General Information

| | |
|---------------------|----------------|
| Industrial Sector | Pharmaceutical |
| Products / Services | Medicines |

2. Involvement in TQM

NO

3. Degree of Implementation of system's processes

Processes widely used and documented

[illegible]

Processes widely used but not documented

This is a blank sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

10. Characteristics of respondent

| | |
|----------------------------|---|
| Position | 0 |
| Reports to: | 0 |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Oposition of muddle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

6. Time for implementation (years)

7. Recommended implementation sequence

| | |
|---|---|
| a. Audits for the quality system | 0 |
| b. Benchmarking | 0 |
| c. Competitors' quality | 0 |
| d. Quality steering committee | 0 |
| e. Management of suppliers | 0 |
| f. Process control | 0 |
| g. Fulfilment of stakeholders' expectations | 0 |
| h. Profits distribution | 0 |
| i. Stakeholders expectations | 0 |
| j. Mission and vision | 0 |
| k. Management of operation | 0 |
| l. Market share | 0 |
| m. Production process planning | 0 |
| n. Product/service planning | 0 |
| o. Quality policies | 0 |
| p. Strategic planning process | 0 |
| q. Training and educational programmes | 0 |
| r. Promotion of a culture of quality | 0 |
| s. Quality improvement projects | 0 |
| t. Re-engineering management | 0 |
| u. Rewards and recognition | 0 |
| v. Internal supplier - customer chain | 0 |
| w. Business operation outcome | 0 |
| x. Customer satisfaction | 0 |
| y. Social and cultural values | 0 |

8. Effectiveness measure of the QM programme

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0.0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No.

61

1. General Information

| | |
|---------------------|----------------------|
| Industrial Sector | Office Supplies |
| Products / Services | Handwriting supplies |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|-------------------------------------|
| S6) Quality policy |
| S8) Business process re-engineering |
| O1) Design of products and services |

Processes widely used but not documented

| |
|--|
| L4) Corporate social and cultural values |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| H5) Employees' performance |
| M2) Policy for profits and benefits distribution |
| O7) Productivity of the production process |
| C1) Work methods and standards |
| Q3) Quality steering committee |

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| S3) Strategies - mission, vision and corporate values |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H6) Modification of the corporate culture |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O8) Quality of the finished product |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

| |
|---|
| L3) Mission and vision statements |
| S1) Strategies -stakeholders' & customers' expectations |
| S4) Strategies -benchmarking |
| H3) Rewards and recognition |
| M1) Customer satisfaction |
| O2) Production process planning |
| O6) Performance of the administrative process |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |

Processes used sporadically and not documented

| |
|-----------------------------------|
| S2) Strategies -capital available |
| C3) Statistical process control |

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality Assurance Manager |
| Reports to: | Technical Manager |
| Education in TQM (# hours) | 300 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Opposition of middle management | 1 |
| Customer do not demand quality | 2 |
| Top management involvement | 3 |
| Lack of financial resources | 4 |
| Lack of working methods | 5 |
| Low technological level | 6 |
| Low educational level | 7 |
| Lack of quality suppliers | 8 |
| Other | 9 |

6. Time for implementation (years)

1 to 2

7. Recommended implementation sequence

| | |
|---|----|
| y. Social and cultural values | 1 |
| j. Mission and vision | 2 |
| h. Profits distribution | 3 |
| o. Quality policies | 4 |
| q. Training and educational programmes | 5 |
| r. Promotion of a culture of quality | 6 |
| p. Strategic planning process | 7 |
| c. Competitors' quality | 8 |
| s. Quality improvement projects | 9 |
| f. Process control | 10 |
| m. Production process planning | 11 |
| n. Product/service planning | 12 |
| k. Management of operation | 13 |
| t. Re-engineering management | 14 |
| b. Benchmarking | 15 |
| x. Customer satisfaction | 16 |
| e. Management of suppliers | 17 |
| d. Quality steering committee | 18 |
| w. Business operation outcome | 19 |
| v. Internal supplier - customer chain | 20 |
| a. Audits for the quality system | 21 |
| l. Market share | 22 |
| g. Fulfilment of stakeholders' expectations | 23 |
| u. Rewards and recognition | 24 |
| i. Stakeholders expectations | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 1.0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 62

1. General Information

| | |
|---------------------|-------------|
| Industrial Sector | Automobile |
| Products / Services | Automobiles |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

None

Processes used in a modified way and documented

H3) Rewards and recognition

Processes used in a modified way but not documented

None

Processes used sporadically and not documented

None

Processes never used

None

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-----------------------|
| Position | Staff Quality Manager |
| Reports to: | General Direction |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Lack of working methods | 2 |
| Lack of quality suppliers | 3 |
| Low technological level | 4 |
| Opposition of middle management | 5 |
| Lack of financial resources | 6 |
| Top management involvement | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years)

4 to 6

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| r. Promotion of a culture of quality | 4 |
| a. Audits for the quality system | 5 |
| f. Process control | 6 |
| n. Product/service planning | 7 |
| m. Production process planning | 8 |
| g. Fulfilment of stakeholders' expectations | 9 |
| p. Strategic planning process | 10 |
| x. Customer satisfaction | 11 |
| k. Management of operation | 12 |
| q. Training and educational programmes | 13 |
| h. Profits distribution | 14 |
| i. Stakeholders expectations | 15 |
| l. Market share | 16 |
| b. Benchmarking | 17 |
| c. Competitors' quality | 18 |
| e. Management of suppliers | 19 |
| u. Rewards and recognition | 20 |
| v. Internal supplier - customer chain | 21 |
| w. Business operation outcome | 22 |
| t. Re-engineering management | 23 |
| s. Quality improvement projects | 24 |
| y. Social and cultural values | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 20 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 2 |
|---------|---|

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Non-electrical machinery |
| Products / Services | Undetermined |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |

Processes widely used but not documented

| |
|---|
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| P2) Programme to select suppliers |

Processes used in a modified way and documented

| |
|------|
| None |
|------|

Processes used in a modified way but not documented

| |
|--|
| H1) Quality promotion |
| H2) Training and educational programmes |
| O7) Productivity of the production process |

Processes used sporadically and not documented

| |
|---------------------------------|
| M4) Market share |
| C3) Statistical process control |

Processes never used

| |
|---|
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| M3) Competitors' quality, strengths & weaknesses |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------|
| Position | Technical Manager |
| Reports to | General Manager |
| Education in TQM (# hours) | 840 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Other | 2 |
| Customer do not demand quality | 3 |
| Lack of quality suppliers | 4 |
| Opposition of middle management | 5 |
| Low educational level | 6 |
| Low technological level | 7 |
| Lack of financial resources | 8 |
| Top management involvement | 9 |

6. Time for implementation (years)

0 to 1

7. Recommended implementation sequence

| | |
|---------------------------------------|----|
| o Quality policies | 1 |
| p. Strategic planning process | 2 |
| q Training and educational programmes | 3 |
| d. Quality steering committee | 4 |
| y Mission and vision | 5 |
| r Promotion of a culture of quality | 6 |
| c. Competitors' quality | 7 |
| s. Quality improvement projects | 8 |
| e. Management of suppliers | 9 |
| f Process control | 10 |
| m. Production process planning | 11 |
| n Product/service planning | 12 |
| a Audits for the quality system | 13 |
| l. Market share | 14 |
| b. Benchmarking | 15 |
| v. Internal supplier - customer chain | 16 |
| w. Business operation outcome | 17 |
| x. Customer satisfaction | 18 |
| t. Re-engineering management | 19 |
| i. Stakeholders expectations | 20 |
| y. Social and cultural values | 21 |
| 60 | 22 |
| k. Management of operation | 23 |
| u Rewards and recognition | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Cost of poor quality | 1 |
| Quality & Productivity indexes | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0 6 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

64

| | |
|---------------------|-------------------|
| Industrial Sector | Metallic Products |
| Products / Services | Pressure Cookers |

NO

[illegible]

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is a vertical margin line on the left side, creating a narrow left margin. The paper appears to be from a notebook or a standard ruled sheet of paper.

| | |
|----------------------------|-------------------------|
| Position | Quality Control Manager |
| Reports to: | General Manager |
| Education in TQM (# hours) | 0 |

| | |
|---------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Opposition of middle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

| 7. Recommended implementation sequence | |
|---|---|
| a. Audits for the quality system | 0 |
| b. Benchmarking | 0 |
| c. Competitors' quality | 0 |
| d. Quality steering committee | 0 |
| e. Management of suppliers | 0 |
| f. Process control | 0 |
| g. Fulfilment of stakeholders' expectations | 0 |
| h. Profits distribution | 0 |
| i. Stakeholders expectations | 0 |
| j. Mission and vision | 0 |
| k. Management of operation | 0 |
| l. Market share | 0 |
| m. Production process planning | 0 |
| n. Product/service planning | 0 |
| o. Quality policies | 0 |
| p. Strategic planning process | 0 |
| q. Training and educational programmes | 0 |
| r. Promotion of a culture of quality | 0 |
| s. Quality improvement projects | 0 |
| t. Re-engineering management | 0 |
| u. Rewards and recognition | 0 |
| v. Internal supplier - customer chain | 0 |
| w. Business operation outcome | 0 |
| x. Customer satisfaction | 0 |
| y. Social and cultural values | 0 |

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0 0 |

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 65

1. General Information

| | |
|---------------------|------------|
| Industrial Sector | Auto-parts |
| Products / Services | Auto-parts |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S6) Quality policy |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |

Processes widely used but not documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| S3) Strategies - mission, vision and corporate values |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O1) Design of products and services |
| O5) Production / administration information systems |

Processes used in a modified way and documented

| |
|---------------------------------|
| O2) Production process planning |
|---------------------------------|

Processes used in a modified way but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| O3) Administration process planning |
| O4) Redesign of products and services |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| M3) Competitors' quality, strengths & weaknesses |

4. Critical sub-systems for:

| | |
|--|-----------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Process Control |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|------------------|
| Position | Quality Manager |
| Reports to | Quality Director |
| Education in TQM (# hours) | 60 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Top management involvement | 2 |
| Opposition of middle management | 3 |
| Low technological level | 4 |
| Lack of working methods | 5 |
| Lack of financial resources | 6 |
| Lack of quality suppliers | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years)

1 to 2

7. Recommended implementation sequence

| | |
|--|----|
| d Quality steering committee | 1 |
| x Customer satisfaction | 2 |
| j Mission and vision | 3 |
| i Stakeholders expectations | 4 |
| g Fulfilment of stakeholders' expectations | 5 |
| k Management of operation | 6 |
| n Product/service planning | 7 |
| o Quality policies | 8 |
| p Strategic planning process | 9 |
| q Training and educational programmes | 10 |
| r Promotion of a culture of quality | 11 |
| v Internal supplier - customer chain | 12 |
| w Business operation outcome | 13 |
| a Audits for the quality system | 14 |
| c Competitors' quality | 15 |
| e Management of suppliers | 16 |
| f Process control | 17 |
| s Quality improvement projects | 18 |
| l Market share | 19 |
| t Re-engineering management | 20 |
| m Production process planning | 21 |
| y Social and cultural values | 22 |
| u Rewards and recognition | 23 |
| b Benchmarking | 24 |
| h Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Cost of poor quality | 1 |
| Quality & Productivity indexes | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 12 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 66

1. General Information

| | |
|---------------------|------------|
| Industrial Sector | Beverage |
| Products / Services | Pepsi-Cola |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| M1) Customer satisfaction |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|---|
| S3) Strategies - mission, vision and corporate values |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| Q3) Quality steering committee |

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| S1) Strategies -stakeholders' & customers' expectations |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |
| Q1) Quality improvement projects |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-----------------|
| Position | Chief of QC |
| Reports to: | Quality Manager |
| Education in TQM (# hours) | 60 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Low technological level | 2 |
| Lack of working methods | 3 |
| Opposition of middle management | 4 |
| Customer do not demand quality | 5 |
| Lack of financial resources | 6 |
| Lack of quality suppliers | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| x. Customer satisfaction | 1 |
| d. Quality steering committee | 2 |
| p. Strategic planning process | 3 |
| q. Training and educational programmes | 4 |
| r. Promotion of a culture of quality | 5 |
| f. Process control | 6 |
| m. Production process planning | 7 |
| n. Product/service planning | 8 |
| i. Stakeholders expectations | 9 |
| a. Audits for the quality system | 10 |
| c. Competitors' quality | 11 |
| g. Fulfilment of stakeholders' expectations | 12 |
| o. Quality policies | 13 |
| s. Quality improvement projects | 14 |
| e. Management of suppliers | 15 |
| j. Mission and vision | 16 |
| l. Market share | 17 |
| k. Management of operation | 18 |
| u. Rewards and recognition | 19 |
| v. Internal supplier - customer chain | 20 |
| t. Re-engineering management | 21 |
| w. Business operation outcome | 22 |
| h. Profits distribution | 23 |
| y. Social and cultural values | 24 |
| b. Benchmarking | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Financial profitability | 1 |
| Quality & Productivity indexes | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 67

1. General Information

| | |
|---------------------|--------------------|
| Industrial Sector | Plastic Products |
| Products / Services | Plastic containers |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| M3) Competitors' quality, strengths & weaknesses |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q3) Quality steering committee |

Processes widely used but not documented

None

Processes used in a modified way and documented

| |
|---|
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O2) Production process planning |
| O4) Redesign of products and services |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q4) Teamwork for quality improvement |

Processes used in a modified way but not documented

O1) Design of products and services

Processes used sporadically and not documented

| |
|-------------------------------------|
| O3) Administration process planning |
| C3) Statistical process control |

Processes never used

None

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Process Control |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality Assurance Manager |
| Reports to: | Operations Managers |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of working methods | 1 |
| Low educational level | 2 |
| Opposition of middle management | 3 |
| Top management involvement | 4 |
| Low technological level | 5 |
| Lack of financial resources | 6 |
| Lack of quality suppliers | 7 |
| Customer do not demand quality | 8 |
| Other | 9 |

6. Time for implementation (years)

1 to 2

7. Recommended implementation sequence

| | |
|--|----|
| i. Stakeholders expectations | 1 |
| j. Mission and vision | 2 |
| d. Quality steering committee | 3 |
| l. Market share | 4 |
| y. Social and cultural values | 5 |
| c. Competitors' quality | 6 |
| b. Benchmarking | 7 |
| p. Strategic planning process | 8 |
| m. Production process planning | 9 |
| o. Quality policies | 10 |
| n. Product/service planning | 11 |
| q. Training and educational programmes | 12 |
| s. Quality improvement projects | 13 |
| r. Promotion of a culture of quality | 14 |
| f. Process control | 15 |
| e. Management of suppliers | 16 |
| u. Rewards and recognition | 17 |
| v. Internal supplier - customer chain | 18 |
| k. Management of operation | 19 |
| a. Audits for the quality system | 20 |
| h. Profits distribution | 21 |
| 60 | 22 |
| x. Customer satisfaction | 23 |
| w. Business operation outcome | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality Awards | 1 |
| Quality & Productivity indexes | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | -1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.8 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 68

1. General Information

| | |
|----------------------------|------------------------------------|
| Industrial Sector | Metallic Products |
| Products / Services | Molds for plastic injection |

2. Involvement in TQM

NO

3. Degree of Implementation of system's processes

Processes widely used and documented

[illegible]

Processes widely used but not documented

Processes widely used but not documented

10. Characteristics of respondent

| | |
|----------------------------|---|
| Position | 0 |
| Reports to | 0 |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Opposition of middle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

6. Time for implementation (years)

7. Recommended implementation sequence

| | |
|--|---|
| a. Audits for the quality system | 0 |
| b. Benchmarking | 0 |
| c. Competitors' quality | 0 |
| d. Quality steering committee | 0 |
| e. Management of suppliers | 0 |
| f. Process control | 0 |
| 60 | 0 |
| h. Profits distribution | 0 |
| i. Stakeholders expectations | 0 |
| j. Mission and vision | 0 |
| k. Management of operation | 0 |
| l. Market share | 0 |
| m. Production process planning | 0 |
| n. Product/service planning | 0 |
| o. Quality policies | 0 |
| p. Strategic planning process | 0 |
| q. Training and educational programmes | 0 |
| r. Promotion of a culture of quality | 0 |
| s. Quality improvement projects | 0 |
| t. Re-engineering management | 0 |
| u. Rewards and recognition | 0 |
| v. Internal supplier - customer chain | 0 |
| w. Business operation outcome | 0 |
| x. Customer satisfaction | 0 |
| y. Social and cultural values | 0 |

8. Effectiveness measure of the QM programme

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 69

1. General Information

| | |
|---------------------|-------------------------|
| Industrial Sector | Food |
| Products / Services | Milk and Dairy Products |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| S1) Strategies -stakeholders' & customers' expectations |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| L4) Corporate social and cultural values |
| S2) Strategies -capital available |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O6) Performance of the administrative process |
| C3) Statistical process control |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |
| Q3) Quality steering committee |

Processes used in a modified way and documented

| |
|-----------------------------------|
| L3) Mission and vision statements |
|-----------------------------------|

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Quality Improvement |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Process Control |

10. Characteristics of respondent

| | |
|----------------------------|----------------------------|
| Position | Chief of the QC Laboratory |
| Reports to: | QC Manager |
| Education in TQM (# hours) | 72 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Customer do not demand quality | 1 |
| Low educational level | 2 |
| Low technological level | 3 |
| Lack of quality suppliers | 4 |
| Lack of working methods | 5 |
| Opposition of middle management | 6 |
| Top management involvement | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 1 to 2 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| b. Benchmarking | 1 |
| c. Competitors' quality | 2 |
| t. Re-engineering management | 3 |
| i. Mission and vision | 4 |
| a. Audits for the quality system | 5 |
| g. Fulfilment of stakeholders' expectations | 6 |
| e. Management of suppliers | 7 |
| q. Training and educational programmes | 8 |
| h. Profits distribution | 9 |
| r. Promotion of a culture of quality | 10 |
| f. Process control | 11 |
| y. Social and cultural values | 12 |
| l. Market share | 13 |
| u. Rewards and recognition | 14 |
| p. Strategic planning process | 15 |
| s. Quality improvement projects | 16 |
| w. Business operation outcome | 17 |
| m. Production process planning | 18 |
| d. Quality steering committee | 19 |
| v. Internal supplier - customer chain | 20 |
| n. Product/service planning | 21 |
| k. Management of operation | 22 |
| o. Quality policies | 23 |
| 1. Stakeholders expectations | 24 |
| x. Customer satisfaction | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Market share | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 2 |
| Customers | 2 |
| Stakeholders' satisfaction index | 18 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 70

1. General Information

| | |
|---------------------|-------------|
| Industrial Sector | Automobile |
| Products / Services | Automobiles |

2. Involvement in TQM YES

3. Degree of Implementation of system's processes

| | |
|---|--|
| Processes widely used and documented | |
| L1) Understanding of stakeholders' expectations | |
| L2) Satisfaction of stakeholders' expectations | |
| L3) Mission and vision statements | |
| S2) Strategies -capital available | |
| S3) Strategies - mission, vision and corporate values | |
| S4) Strategies -benchmarking | |
| S6) Quality policy | |
| S7) Benchmarking analysis | |
| S8) Business process re-engineering | |
| H1) Quality promotion | |
| H2) Training and educational programmes | |
| H3) Rewards and recognition | |
| H4) Employees' degree of satisfaction on the job | |
| H5) Employees' performance. | |
| M1) Customer satisfaction | |
| M2) Policy for profits and benefits distribution | |
| M3) Competitors' quality, strengths & weaknesses | |
| M4) Market share | |
| O2) Production process planning | |
| O3) Administration process planning | |
| O4) Redesign of products and services | |
| O5) Production / administration information systems | |
| O6) Performance of the administrative process | |
| O7) Productivity of the production process | |
| O8) Quality of the finished product | |
| C1) Work methods and standards | |
| C2) Exercise of process control actions | |
| C3) Statistical process control | |
| P1) Assurance of the quality of inputs | |
| P2) Programme to select suppliers | |
| Q1) Quality improvement projects | |
| Q2) Audits to the management system | |
| Q3) Quality steering committee | |
| Q4) Teamwork for quality improvement | |

| | |
|---|--|
| Processes widely used but not documented | |
| H6) Modification of the corporate culture | |
| O1) Design of products and services | |

| | |
|---|--|
| Processes used in a modified way and documented | |
| L4) Corporate social and cultural values | |
| S1) Strategies -stakeholders' & customers' expectations | |
| S5) Strategies -re-engineering actions | |

| | |
|---|--|
| Processes used in a modified way but not documented | |
| None | |

| | |
|--|--|
| Processes used sporadically and not documented | |
| None | |

| | |
|----------------------|--|
| Processes never used | |
| None | |

| | |
|--|---------------------|
| 4. Critical sub-systems for: | |
| company's competitiveness | Leadership |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|------------------------------|
| Position | Coordinator of the Q. System |
| Reports to | Quality Manager |
| Education in TQM (# hours) | 120 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Opposition of middle management | 1 |
| Lack of quality suppliers | 2 |
| Low educational level | 3 |
| Customer do not demand quality | 4 |
| Low technological level | 5 |
| Lack of financial resources | 6 |
| Top management involvement | 7 |
| Lack of working methods | 7 |
| Other | 9 |

6. Time for implementation (years) 1 to 2

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| y. Social and cultural values | 2 |
| i. Stakeholders expectations | 3 |
| d. Quality steering committee | 4 |
| q. Training and educational programmes | 5 |
| r. Promotion of a culture of quality | 6 |
| p. Strategic planning process | 7 |
| n. Product/service planning | 8 |
| m. Production process planning | 9 |
| k. Management of operation | 10 |
| o. Quality policies | 11 |
| s. Quality improvement projects | 12 |
| b. Benchmarking | 13 |
| c. Competitors' quality | 14 |
| f. Process control | 15 |
| e. Management of suppliers | 16 |
| a. Audits for the quality system | 17 |
| v. Internal supplier - customer chain | 18 |
| w. Business operation outcome | 19 |
| x. Customer satisfaction | 20 |
| g. Fulfilment of stakeholders' expectations | 21 |
| l. Market share | 22 |
| u. Rewards and recognition | 23 |
| h. Profits distribution | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 0 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 71

1. General Information

| | |
|---------------------|--------|
| Industrial Sector | Food |
| Products / Services | Bakery |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|-------------------------------------|
| C3) Statistical process control |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |

Processes used in a modified way and documented

| |
|------|
| None |
|------|

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |

4. Critical sub-systems for:

| | |
|--|-----------------|
| company's competitiveness | Marketing |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|------------------|
| Position | Chief of Quality |
| Reports to | Quality Manager |
| Education in TQM (# hours) | 260 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Low educational level | 2 |
| Opposition of middle management | 3 |
| Customer do not demand quality | 4 |
| Lack of working methods | 5 |
| Low technological level | 6 |
| Lack of quality suppliers | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 4 to 6 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| m. Production process planning | 3 |
| n. Product/service planning | 4 |
| k. Management of operation | 5 |
| e. Management of suppliers | 6 |
| f. Process control | 7 |
| a. Audits for the quality system | 8 |
| i. Stakeholders expectations | 9 |
| p. Strategic planning process | 10 |
| o. Quality policies | 11 |
| q. Training and educational programmes | 12 |
| r. Promotion of a culture of quality | 13 |
| x. Customer satisfaction | 14 |
| y. Social and cultural values | 15 |
| u. Rewards and recognition | 16 |
| v. Internal supplier - customer chain | 17 |
| l. Market share | 18 |
| w. Business operation outcome | 19 |
| c. Competitors' quality | 20 |
| g. Fulfilment of stakeholders' expectations | 21 |
| b. Benchmarking | 22 |
| t. Re-engineering management | 23 |
| s. Quality improvement projects | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Employees' satisfaction | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 1 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0.4 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

1. General Information

| | |
|---------------------|----------|
| Industrial Sector | Food |
| Products / Services | Icecream |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes**Processes widely used and documented**

| |
|---|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| M4) Market share |
| O4) Redesign of products and services |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |

Processes widely used but not documented

| |
|-------------------------------------|
| S8) Business process re-engineering |
|-------------------------------------|

Processes used in a modified way and documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| H3) Rewards and recognition |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| C1) Work methods and standards |
| Q1) Quality improvement projects |
| Q3) Quality steering committee |

Processes used in a modified way but not documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| S5) Strategies -re-engineering actions |

Processes used sporadically and not documented

| |
|---|
| O1) Design of products and services |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| Q4) Teamwork for quality improvement |

Processes never used

| |
|--|
| L1) Understanding of stakeholders' expectations |
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| H4) Employees' degree of satisfaction on the job |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| Q2) Audits to the management system |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Process Control |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------------|
| Position | Quality Assurance Coordinator |
| Reports to: | Plant Manager |
| Education in TQM (# hours) | 40 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Low educational level | 2 |
| Lack of working methods | 3 |
| Opposition of middle management | 4 |
| Low technological level | 5 |
| Customer do not demand quality | 6 |
| Lack of financial resources | 7 |
| Lack of quality suppliers | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|--|----|
| j Mission and vision | 1 |
| y. Social and cultural values | 2 |
| b. Benchmarking | 3 |
| d. Quality steering committee | 4 |
| i. Stakeholders expectations | 5 |
| k Management of operation | 6 |
| m. Production process planning | 7 |
| n Product/service planning | 8 |
| o. Quality policies | 9 |
| f Process control | 10 |
| a. Audits for the quality system | 11 |
| r. Promotion of a culture of quality | 12 |
| s. Quality improvement projects | 13 |
| t. Re-engineering management | 14 |
| x. Customer satisfaction | 15 |
| v. Internal supplier - customer chain | 16 |
| w. Business operation outcome | 17 |
| q Training and educational programmes | 18 |
| g Fulfilment of stakeholders' expectations | 19 |
| h. Profits distribution | 20 |
| c Competitors' quality | 21 |
| e. Management of suppliers | 22 |
| p. Strategic planning process | 23 |
| u. Rewards and recognition | 24 |
| l. Market share | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Market share | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 0 |
| Suppliers | -1 |
| Customers | -1 |
| Stakeholders' satisfaction index | 0 4 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 73

1. General Information

| | |
|---------------------|---------------------------|
| Industrial Sector | Auto-parts |
| Products / Services | Security Cars for Banking |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
|---|

Processes widely used but not documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| S2) Strategies -capital available |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| P1) Assurance of the quality of inputs |

Processes used in a modified way and documented

| |
|------|
| None |
|------|

Processes used in a modified way but not documented

| |
|---|
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| H1) Quality promotion |
| M3) Competitors' quality, strengths & weaknesses |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|---|
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Quality Improvement |
| utilisation of human/financial resources | Marketing |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Engineering Manager |
| Reports to: | Director of Manufacturing |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Low educational level | 2 |
| Low technological level | 3 |
| Lack of working methods | 4 |
| Customer do not demand quality | 5 |
| Lack of financial resources | 6 |
| Lack of quality suppliers | 7 |
| Opposition of middle management | 8 |
| Other | 9 |

6. Time for implementation (years)

1 to 2

7. Recommended implementation sequence

| | |
|---|----|
| y. Social and cultural values | 1 |
| p. Strategic planning process | 2 |
| d. Quality steering committee | 3 |
| j. Mission and vision | 4 |
| r. Promotion of a culture of quality | 5 |
| o. Quality policies | 6 |
| i. Stakeholders expectations | 7 |
| k. Management of operation | 8 |
| m. Production process planning | 9 |
| n. Product/service planning | 10 |
| s. Quality improvement projects | 11 |
| a. Audits for the quality system | 12 |
| b. Benchmarking | 13 |
| c. Competitors' quality | 14 |
| q. Training and educational programmes | 15 |
| v. Internal supplier - customer chain | 16 |
| e. Management of suppliers | 17 |
| f. Process control | 18 |
| g. Fulfilment of stakeholders' expectations | 19 |
| h. Profits distribution | 20 |
| t. Re-engineering management | 21 |
| u. Rewards and recognition | 22 |
| w. Business operation outcome | 23 |
| x. Customer satisfaction | 24 |
| l. Market share | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 74

1. General Information

| | |
|---------------------|---------|
| Industrial Sector | Textile |
| Products / Services | Nylons |

2. Involvement in TQM

NO

3. Degree of Implementation of system's processes

Processes widely used and documented

[illegible]

Processes widely used but not documented

[illegible]

10. Characteristics of respondent

| | |
|----------------------------|---|
| Position | 0 |
| Reports to | 0 |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| Obstacles during implementation | 0 |
|---------------------------------|---|
| Top management involvement | 0 |
| Low educational level | 0 |
| Lack of quality suppliers | 0 |
| Lack of working methods | 0 |
| Opposition of middle management | 0 |
| Low technological level | 0 |
| Customer do not demand quality | 0 |
| Lack of financial resources | 0 |
| Other | 0 |

6. Time for implementation (years)

7. Recommended implementation sequence

| 7. Recommended implementation sequence | |
|---|---|
| a. Audits for the quality system | 0 |
| b. Benchmarking | 0 |
| c. Competitors' quality | 0 |
| d. Quality steering committee | 0 |
| e. Management of suppliers | 0 |
| f. Process control | 0 |
| g. Fulfilment of stakeholders' expectations | 0 |
| h. Profits distribution | 0 |
| i. Stakeholders expectations | 0 |
| j. Mission and vision | 0 |
| k. Management of operation | 0 |
| l. Market share | 0 |
| m. Production process planning | 0 |
| n. Product/service planning | 0 |
| o. Quality policies | 0 |
| p. Strategic planning process | 0 |
| q. Training and educational programmes | 0 |
| r. Promotion of a culture of quality | 0 |
| s. Quality improvement projects | 0 |
| t. Re-engineering management | 0 |
| u. Rewards and recognition | 0 |
| v. Internal supplier - customer chain | 0 |
| w. Business operation outcome | 0 |
| x. Customer satisfaction | 0 |
| y. Social and cultural values | 0 |

8. Effectiveness measure of the QM programme

| | |
|----------------------|---|
| Cost of poor quality | 0 |
| Market share | 0 |
| Quality Awards | 0 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 0 |
| Stakeholders' satisfaction index | 0 0 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 0 |
|---------|---|

Company No. 75

1. General Information

| | |
|---------------------|----------------|
| Industrial Sector | Pharmaceutical |
| Products / Services | Medicines |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

| | |
|---|--|
| Processes widely used and documented | |
| L4) Corporate social and cultural values | |
| S4) Strategies -benchmarking | |
| S6) Quality policy | |
| H5) Employees' performance. | |
| M4) Market share | |
| O2) Production process planning | |
| O3) Administration process planning | |
| O4) Redesign of products and services | |
| O5) Production / administration information systems | |
| O6) Performance of the administrative process | |
| O7) Productivity of the production process | |
| O8) Quality of the finished product | |
| C1) Work methods and standards | |
| C2) Exercise of process control actions | |
| C3) Statistical process control | |
| P1) Assurance of the quality of inputs | |
| P2) Programme to select suppliers | |
| Q1) Quality improvement projects. | |
| Q2) Audits to the management system | |
| Q3) Quality steering committee | |
| Q4) Teamwork for quality improvement | |

| | |
|--|--|
| Processes widely used but not documented | |
| O1) Design of products and services | |

| | |
|---|--|
| Processes used in a modified way and documented | |
| L1) Understanding of stakeholders' expectations | |
| L2) Satisfaction of stakeholders' expectations | |
| L3) Mission and vision statements | |
| S2) Strategies -capital available | |
| S3) Strategies - mission, vision and corporate values | |
| S7) Benchmarking analysis | |
| H1) Quality promotion | |
| H2) Training and educational programmes | |
| H3) Rewards and recognition | |
| H4) Employees' degree of satisfaction on the job | |
| H6) Modification of the corporate culture | |
| M1) Customer satisfaction | |
| M2) Policy for profits and benefits distribution | |
| M3) Competitors' quality, strengths & weaknesses | |

| | |
|---|--|
| Processes used in a modified way but not documented | |
| None | |

| | |
|---|--|
| Processes used sporadically and not documented | |
| S1) Strategies -stakeholders' & customers' expectations | |
| S5) Strategies -re-engineering actions | |
| S8) Business process re-engineering | |

| | |
|----------------------|--|
| Processes never used | |
| None | |

4. Critical sub-systems for:

| | |
|--|----------------------|
| company's competitiveness | Mgt Human Behaviour |
| implementation due to resistance | Suppliers Management |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality Assurance Manager |
| Reports to: | Operations Director |
| Education in TQM (# hours) | 80 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Lack of quality suppliers | 1 |
| Low educational level | 2 |
| Opposition of middle management | 3 |
| Customer do not demand quality | 4 |
| Lack of financial resources | 5 |
| Lack of working methods | 6 |
| Top management involvement | 7 |
| Low technological level | 8 |
| Other | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 2 to 4 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| n. Product/service planning | 1 |
| m. Production process planning | 2 |
| k. Management of operation | 3 |
| o. Quality policies | 4 |
| q. Training and educational programmes | 5 |
| r. Promotion of a culture of quality | 6 |
| s. Quality improvement projects | 7 |
| v. Internal supplier - customer chain | 8 |
| y. Social and cultural values | 9 |
| u. Rewards and recognition | 10 |
| x. Customer satisfaction | 11 |
| p. Strategic planning process | 12 |
| t. Re-engineering management | 13 |
| l. Market share | 14 |
| e. Management of suppliers | 15 |
| f. Process control | 16 |
| j. Mission and vision | 17 |
| d. Quality steering committee | 18 |
| a. Audits for the quality system | 19 |
| c. Competitors' quality | 20 |
| b. Benchmarking | 21 |
| g. Fulfilment of stakeholders' expectations | 22 |
| h. Profits distribution | 23 |
| i. Stakeholders expectations | 24 |
| w. Business operation outcome | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Cost of poor quality | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 2 |
| Stakeholders' satisfaction index | 14 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

1. General Information

| | |
|---------------------|----------------|
| Industrial Sector | Pharmaceutical |
| Products / Services | Medicines |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

| | |
|---|--|
| Processes widely used and documented | |
| L1) Understanding of stakeholders' expectations | |
| L2) Satisfaction of stakeholders' expectations | |
| L3) Mission and vision statements | |
| L4) Corporate social and cultural values | |
| S1) Strategies -stakeholders' & customers' expectations | |
| S2) Strategies -capital available | |
| S3) Strategies - mission, vision and corporate values | |
| S4) Strategies -benchmarking | |
| S5) Strategies -re-engineering actions | |
| S6) Quality policy | |
| S7) Benchmarking analysis | |
| S8) Business process re-engineering | |
| H1) Quality promotion | |
| H2) Training and educational programmes | |
| H3) Rewards and recognition | |
| H4) Employees' degree of satisfaction on the job | |
| H5) Employees' performance | |
| H6) Modification of the corporate culture | |
| M1) Customer satisfaction | |
| M2) Policy for profits and benefits distribution | |
| M3) Competitors' quality, strengths & weaknesses | |
| M4) Market share | |
| O1) Design of products and services | |
| O2) Production process planning | |
| O3) Administration process planning | |
| O4) Redesign of products and services | |
| O5) Production / administration information systems | |
| O6) Performance of the administrative process | |
| O7) Productivity of the production process | |
| O8) Quality of the finished product | |
| C1) Work methods and standards | |
| C2) Exercise of process control actions | |
| C3) Statistical process control | |
| P1) Assurance of the quality of inputs | |
| P2) Programme to select suppliers | |
| Q1) Quality improvement projects | |
| Q2) Audits to the management system | |
| Q3) Quality steering committee | |
| Q4) Teamwork for quality improvement | |

| | |
|--|--|
| Processes widely used but not documented | |
| None | |

| | |
|---|--|
| Processes used in a modified way and documented | |
| None | |

| | |
|---|--|
| Processes used in a modified way but not documented | |
| None | |

| | |
|--|--|
| Processes used sporadically and not documented | |
| None | |

| | |
|----------------------|--|
| Processes never used | |
| None | |

| | |
|--|---------------------|
| 4. Critical sub-systems for: | |
| company's competitiveness | Op's Management |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Quality Improvement |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Quality Assurance Manager |
| Reports to | QA Director |
| Education in TQM (# hours) | 100 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Customer do not demand quality | 2 |
| Lack of quality suppliers | 3 |
| Lack of working methods | 4 |
| Lack of financial resources | 5 |
| Low technological level | 6 |
| Opposition of middle management | 7 |
| Top management involvement | 8 |
| Other | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 0 to 1 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| i. Stakeholders expectations | 4 |
| c. Competitors' quality | 5 |
| a. Audits for the quality system | 6 |
| b. Benchmarking | 7 |
| x. Customer satisfaction | 8 |
| k. Management of operation | 9 |
| l. Market share | 10 |
| q. Training and educational programmes | 11 |
| r. Promotion of a culture of quality | 12 |
| s. Quality improvement projects | 13 |
| t. Re-engineering management | 14 |
| u. Rewards and recognition | 15 |
| y. Social and cultural values | 16 |
| m. Production process planning | 17 |
| n. Product/service planning | 18 |
| g. Fulfilment of stakeholders' expectations | 19 |
| h. Profits distribution | 20 |
| e. Management of suppliers | 21 |
| f. Process control | 22 |
| p. Strategic planning process | 23 |
| v. Internal supplier - customer chain | 24 |
| w. Business operation outcome | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Quality Awards | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 2 |
| Top Management | 2 |
| Employees | 0 |
| Suppliers | 0 |
| Customers | 2 |
| Stakeholders' satisfaction index | 12 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 77

1. General Information

| | |
|---------------------|------------------------------|
| Industrial Sector | Equipment for communications |
| Products / Services | Equipment for transmission |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

| | |
|---|--|
| Processes widely used and documented | |
| L1) Understanding of stakeholders' expectations | |
| L2) Satisfaction of stakeholders' expectations | |
| L3) Mission and vision statements | |
| L4) Corporate social and cultural values | |
| S1) Strategies -stakeholders' & customers' expectations | |
| S2) Strategies -capital available | |
| S3) Strategies - mission, vision and corporate values | |
| S6) Quality policy | |
| H1) Quality promotion | |
| H4) Employees' degree of satisfaction on the job | |
| H5) Employees' performance. | |
| H6) Modification of the corporate culture | |
| M2) Policy for profits and benefits distribution | |
| M4) Market share | |
| O2) Production process planning | |
| O3) Administration process planning | |
| O4) Redesign of products and services | |
| O5) Production / administration information systems | |
| O6) Performance of the administrative process | |
| O7) Productivity of the production process | |
| O8) Quality of the finished product | |
| C1) Work methods and standards | |
| C3) Statistical process control | |
| P1) Assurance of the quality of inputs | |
| P2) Programme to select suppliers | |
| Q2) Audits to the management system | |
| Q3) Quality steering committee | |
| Q4) Teamwork for quality improvement | |

| | |
|--|--|
| Processes widely used but not documented | |
| None | |

| | |
|--|--|
| Processes used in a modified way and documented | |
| H2) Training and educational programmes | |
| M1) Customer satisfaction | |
| M3) Competitors' quality, strengths & weaknesses | |
| O1) Design of products and services | |
| C2) Exercise of process control actions | |
| Q1) Quality improvement projects. | |

| | |
|---|--|
| Processes used in a modified way but not documented | |
| S5) Strategies -re-engineering actions | |
| S8) Business process re-engineering | |

| | |
|--|--|
| Processes used sporadically and not documented | |
| S4) Strategies -benchmarking | |
| S7) Benchmarking analysis | |
| H3) Rewards and recognition | |

| | |
|----------------------|--|
| Processes never used | |
| None | |

| | |
|--|---------------------|
| 4. Critical sub-systems for: | |
| company's competitiveness | Leadership |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|---------------------|
| Position | Quality Manager |
| Reports to: | Director of Quality |
| Education in TQM (# hours) | 350 |

5. Difficulties during implementation

| | |
|--------------------------------|---|
| Top management involvement | 1 |
| Oposition of middle management | 2 |
| Low educational level | 3 |
| Customer do not demand quality | 4 |
| Lack of working methods | 5 |
| Lack of financial resources | 6 |
| Lack of quality suppliers | 7 |
| Low technological level | 8 |
| Other | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 4 to 6 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| j. Mission and vision | 2 |
| o. Quality policies | 3 |
| y. Social and cultural values | 4 |
| p. Strategic planning process | 5 |
| n. Product/service planning | 6 |
| m. Production process planning | 7 |
| l. Market share | 8 |
| h. Profits distribution | 9 |
| i. Stakeholders expectations | 10 |
| g. Fulfilment of stakeholders' expectations | 11 |
| k. Management of operation | 12 |
| w. Business operation outcome | 13 |
| x. Customer satisfaction | 14 |
| f. Process control | 15 |
| e. Management of suppliers | 16 |
| q. Training and educational programmes | 17 |
| s. Quality improvement projects | 18 |
| v. Internal supplier - customer chain | 19 |
| u. Rewards and recognition | 20 |
| r. Promotion of a culture of quality | 21 |
| a. Audits for the quality system | 22 |
| c. Competitors' quality | 23 |
| b. Benchmarking | 24 |
| t. Re-engineering management | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 14 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 78

1. General Information

| | |
|---------------------|-------------------------|
| Industrial Sector | Plastic Products |
| Products / Services | Plastic tube containers |

| | |
|-----------------------|-----|
| 2. Involvement in TQM | YES |
|-----------------------|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M4) Market share |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|---|
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S6) Quality policy |
| H5) Employees' performance. |
| O1) Design of products and services |
| O3) Administration process planning |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| Q1) Quality improvement projects |

Processes used in a modified way but not documented

| |
|--|
| S8) Business process re-engineering |
| M3) Competitors' quality, strengths & weaknesses |
| O2) Production process planning |

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|--|
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| M2) Policy for profits and benefits distribution |
| C3) Statistical process control |

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------------|
| Position | Quality Assurance Chief |
| Reports to: | Operations Manager |
| Education in TQM (# hours) | 700 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Lack of quality suppliers | 2 |
| Opposition of middle management | 3 |
| Other | 4 |
| Lack of working methods | 5 |
| Low technological level | 6 |
| Lack of financial resources | 7 |
| Top management involvement | 8 |
| Customer do not demand quality | 9 |

| | |
|------------------------------------|--------|
| 6. Time for implementation (years) | 6 to 8 |
|------------------------------------|--------|

7. Recommended implementation sequence

| | |
|---|----|
| i. Stakeholders expectations | 1 |
| j. Mission and vision | 2 |
| h. Profits distribution | 3 |
| y. Social and cultural values | 4 |
| c. Competitors' quality | 5 |
| b. Benchmarking | 6 |
| l. Market share | 7 |
| t. Re-engineering management | 8 |
| d. Quality steering committee | 9 |
| p. Strategic planning process | 10 |
| o. Quality policies | 11 |
| q. Training and educational programmes | 12 |
| r. Promotion of a culture of quality | 13 |
| u. Rewards and recognition | 14 |
| v. Internal supplier - customer chain | 15 |
| n. Product/service planning | 16 |
| m. Production process planning | 17 |
| k. Management of operation | 18 |
| f. Process control | 19 |
| e. Management of suppliers | 20 |
| w. Business operation outcome | 21 |
| a. Audits for the quality system | 22 |
| x. Customer satisfaction | 23 |
| g. Fulfilment of stakeholders' expectations | 24 |
| s. Quality improvement projects | 25 |

8. Effectiveness measure of the QM programme

| | |
|-------------------------|---|
| Financial profitability | 1 |
| Other | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 14 |

11. Estimated profitability index

| | |
|---------|----|
| P Index | -1 |
|---------|----|

Company No. 79

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Glass and Glass Products |
| Products / Services | Glass containers |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S6) Quality policy |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| M1) Customer satisfaction |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| H6) Modification of the corporate culture |
| M2) Policy for profits and benefits distribution |

Processes used in a modified way and documented

| |
|--|
| L1) Understanding of stakeholders' expectations |
| S4) Strategies -benchmarking |
| S5) Strategies -re-engineering actions |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| M3) Competitors' quality, strengths & weaknesses |
| C3) Statistical process control |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|---------------------------|
| Position | Total Quality Coordinator |
| Reports to: | General Manager |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Other | 2 |
| Lack of working methods | 3 |
| Opposition of middle management | 4 |
| Low educational level | 5 |
| Customer do not demand quality | 6 |
| Lack of financial resources | 7 |
| Low technological level | 8 |
| Lack of quality suppliers | 9 |

6. Time for implementation (years)

| |
|--------|
| 4 to 6 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| o. Quality policies | 2 |
| y. Social and cultural values | 3 |
| d. Quality steering committee | 4 |
| p. Strategic planning process | 5 |
| i. Stakeholders expectations | 6 |
| n. Product/service planning | 7 |
| m. Production process planning | 8 |
| q. Training and educational programmes | 9 |
| v. Internal supplier - customer chain | 10 |
| k. Management of operation | 11 |
| a. Audits for the quality system | 12 |
| s. Quality improvement projects | 13 |
| f. Process control | 14 |
| u. Rewards and recognition | 15 |
| r. Promotion of a culture of quality | 16 |
| x. Customer satisfaction | 17 |
| w. Business operation outcome | 18 |
| b. Benchmarking | 19 |
| t. Re-engineering management | 20 |
| e. Management of suppliers | 21 |
| h. Profits distribution | 22 |
| g. Fulfilment of stakeholders' expectations | 23 |
| c. Competitors' quality | 24 |
| l. Market share | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Other | 2 |
| Cost of poor quality | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 2 |
| Employees | 1 |
| Suppliers | 0 |
| Customers | 1 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 80

1. General Information

| | |
|---------------------|--------------------------|
| Industrial Sector | Glass and Glass Products |
| Products / Services | Glass containers |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S7) Benchmarking analysis |
| S8) Business process re-engineering |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H5) Employees' performance. |
| H6) Modification of the corporate culture |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M3) Competitors' quality, strengths & weaknesses |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O3) Administration process planning |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|------|
| None |
|------|

Processes used in a modified way and documented

| |
|---------------------------------------|
| S4) Strategies -benchmarking |
| O4) Redesign of products and services |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|------|
| None |
|------|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Op's Management |

10. Characteristics of respondent

| | |
|----------------------------|-------------------|
| Position | Quality Assurance |
| Reports to: | General Manager |
| Education in TQM (# hours) | 400 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Opposition of middle management | 2 |
| Lack of working methods | 3 |
| Low technological level | 4 |
| Other | 5 |
| Lack of quality suppliers | 6 |
| Customer do not demand quality | 7 |
| Lack of financial resources | 8 |
| Top management involvement | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| o. Quality policies | 1 |
| j. Mission and vision | 2 |
| k. Management of operation | 3 |
| q. Training and educational programmes | 4 |
| r. Promotion of a culture of quality | 5 |
| d. Quality steering committee | 6 |
| m. Production process planning | 7 |
| n. Product/service planning | 8 |
| s. Quality improvement projects | 9 |
| c. Competitors' quality | 10 |
| e. Management of suppliers | 11 |
| l. Market share | 12 |
| a. Audits for the quality system | 13 |
| f. Process control | 14 |
| b. Benchmarking | 15 |
| p. Strategic planning process | 16 |
| g. Fulfilment of stakeholders' expectations | 17 |
| i. Stakeholders expectations | 18 |
| t. Re-engineering management | 19 |
| v. Internal supplier - customer chain | 20 |
| w. Business operation outcome | 21 |
| x. Customer satisfaction | 22 |
| y. Social and cultural values | 23 |
| u. Rewards and recognition | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Other | 1 |
| Quality & Productivity indexes | 2 |
| Quality Awards | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|-----|
| Shareholders | 0 |
| Top Management | 0 |
| Employees | -1 |
| Suppliers | 1 |
| Customers | 1 |
| Stakeholders' satisfaction index | 0 2 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 81

1. General Information

| | |
|---------------------|--------------------------------|
| Industrial Sector | Auto-parts |
| Products / Services | Security glass for automobiles |

2. Involvement in TQM

YES

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|--|
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| S5) Strategies -re-engineering actions |
| S6) Quality policy |
| S8) Business process re-engineering |
| M4) Market share |
| O4) Redesign of products and services |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| P2) Programme to select suppliers |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|--|
| H1) Quality promotion |
| H2) Training and educational programmes |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| O3) Administration process planning |

Processes used in a modified way and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L4) Corporate social and cultural values |
| S3) Strategies - mission, vision and corporate values |
| H3) Rewards and recognition |
| H4) Employees' degree of satisfaction on the job |
| H6) Modification of the corporate culture |
| O1) Design of products and services |
| O2) Production process planning |
| O5) Production / administration information systems |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| Q1) Quality improvement projects. |

Processes used in a modified way but not documented

| |
|---|
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S4) Strategies -benchmarking |
| S7) Benchmarking analysis |
| M3) Competitors' quality, strengths & weaknesses |

Processes used sporadically and not documented

| |
|-------------------------------------|
| H5) Employees' performance. |
| Q2) Audits to the management system |

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Leadership |
| implementation due to resistance | Leadership |
| utilisation of human/financial resources | Mgt Human Behaviour |

10. Characteristics of respondent

| | |
|----------------------------|--------------------|
| Position | Quality Assurance |
| Reports to: | Operations Manager |
| Education in TQM (# hours) | 250 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Top management involvement | 1 |
| Low educational level | 2 |
| Lack of working methods | 3 |
| Opposition of middle management | 4 |
| Low technological level | 5 |
| Lack of quality suppliers | 6 |
| Customer do not demand quality | 7 |
| Lack of financial resources | 8 |
| Other | 9 |

6. Time for implementation (years)

2 to 4

7. Recommended implementation sequence

| | |
|---|----|
| d. Quality steering committee | 1 |
| p. Strategic planning process | 2 |
| j. Mission and vision | 3 |
| m. Production process planning | 4 |
| q. Training and educational programmes | 5 |
| o. Quality policies | 6 |
| n. Product/service planning | 7 |
| f. Process control | 8 |
| r. Promotion of a culture of quality | 9 |
| y. Social and cultural values | 10 |
| k. Management of operation | 11 |
| x. Customer satisfaction | 12 |
| v. Internal supplier - customer chain | 13 |
| e. Management of suppliers | 14 |
| c. Competitors' quality | 15 |
| i. Stakeholders expectations | 16 |
| t. Re-engineering management | 17 |
| w. Business operation outcome | 18 |
| s. Quality improvement projects | 19 |
| u. Rewards and recognition | 20 |
| l. Market share | 21 |
| b. Benchmarking | 22 |
| g. Fulfilment of stakeholders' expectations | 23 |
| h. Profits distribution | 24 |
| a. Audits for the quality system | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Quality & Productivity indexes | 1 |
| Financial profitability | 2 |
| Market share | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 0 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 10 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

Company No. 82

1. General Information

| | |
|---------------------|-----------|
| Industrial Sector | Beverages |
| Products / Services | Coca Cola |

2. Involvement in TQM

| |
|-----|
| YES |
|-----|

3. Degree of Implementation of system's processes

Processes widely used and documented

| |
|---|
| L1) Understanding of stakeholders' expectations |
| L2) Satisfaction of stakeholders' expectations |
| L3) Mission and vision statements |
| L4) Corporate social and cultural values |
| S1) Strategies -stakeholders' & customers' expectations |
| S2) Strategies -capital available |
| S3) Strategies - mission, vision and corporate values |
| S5) Strategies -re-engineering actions |
| S8) Business process re-engineering |
| H5) Employees' performance. |
| M1) Customer satisfaction |
| M2) Policy for profits and benefits distribution |
| M4) Market share |
| O1) Design of products and services |
| O2) Production process planning |
| O4) Redesign of products and services |
| O5) Production / administration information systems |
| O6) Performance of the administrative process |
| O7) Productivity of the production process |
| O8) Quality of the finished product |
| C1) Work methods and standards |
| C2) Exercise of process control actions |
| C3) Statistical process control |
| P1) Assurance of the quality of inputs |
| Q2) Audits to the management system |
| Q3) Quality steering committee |
| Q4) Teamwork for quality improvement |

Processes widely used but not documented

| |
|-----------------------------|
| H3) Rewards and recognition |
|-----------------------------|

Processes used in a modified way and documented

| |
|--|
| S4) Strategies -benchmarking |
| S6) Quality policy |
| S7) Benchmarking analysis |
| H1) Quality promotion |
| H2) Training and educational programmes |
| H4) Employees' degree of satisfaction on the job |
| H6) Modification of the corporate culture |
| O3) Administration process planning |
| P2) Programme to select suppliers |
| Q1) Quality improvement projects. |

Processes used in a modified way but not documented

| |
|------|
| None |
|------|

Processes used sporadically and not documented

| |
|--|
| M3) Competitors' quality, strengths & weaknesses |
|--|

Processes never used

| |
|------|
| None |
|------|

4. Critical sub-systems for:

| | |
|--|---------------------|
| company's competitiveness | Strategic Planning |
| implementation due to resistance | Mgt Human Behaviour |
| utilisation of human/financial resources | Strategic Planning |

10. Characteristics of respondent

| | |
|----------------------------|---------------------|
| Position | Director of Quality |
| Reports to: | General Director |
| Education in TQM (# hours) | 0 |

5. Difficulties during implementation

| | |
|---------------------------------|---|
| Low educational level | 1 |
| Low technological level | 2 |
| Lack of quality suppliers | 3 |
| Lack of working methods | 4 |
| Customer do not demand quality | 5 |
| Opposition of middle management | 6 |
| Lack of financial resources | 7 |
| Top management involvement | 8 |
| Other | 9 |

6. Time for implementation (years)

| |
|--------|
| 2 to 4 |
|--------|

7. Recommended implementation sequence

| | |
|---|----|
| j. Mission and vision | 1 |
| o. Quality policies | 2 |
| r. Promotion of a culture of quality | 3 |
| q. Training and educational programmes | 4 |
| d. Quality steering committee | 5 |
| a. Audits for the quality system | 6 |
| s. Quality improvement projects | 7 |
| t. Re-engineering management | 8 |
| k. Management of operation | 9 |
| e. Management of suppliers | 10 |
| f. Process control | 11 |
| m. Production process planning | 12 |
| n. Product/service planning | 13 |
| x. Customer satisfaction | 14 |
| v. Internal supplier - customer chain | 15 |
| w. Business operation outcome | 16 |
| b. Benchmarking | 17 |
| c. Competitors' quality | 18 |
| g. Fulfilment of stakeholders' expectations | 19 |
| i. Stakeholders expectations | 20 |
| l. Market share | 21 |
| p. Strategic planning process | 22 |
| u. Rewards and recognition | 23 |
| y. Social and cultural values | 24 |
| h. Profits distribution | 25 |

8. Effectiveness measure of the QM programme

| | |
|--------------------------------|---|
| Other | 1 |
| Quality & Productivity indexes | 2 |
| Financial profitability | 3 |

9. Improvement in the satisfaction of:

| | |
|----------------------------------|----|
| Shareholders | 1 |
| Top Management | 1 |
| Employees | 2 |
| Suppliers | 1 |
| Customers | 2 |
| Stakeholders' satisfaction index | 14 |

11. Estimated profitability index

| | |
|---------|---|
| P Index | 1 |
|---------|---|

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