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Value creation through investments in Web-based systems  
within not-for-profit organisations: the case of two UK  
museums

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Thesis submitted in fulfilment of the requirement for the award of the degree of Doctor  
of Philosophy

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## *Abstract*

A large number of not for profit organisations use Web technologies for community building, to improve services offered to their public or to generate income. However, the Internet is not a universal panacea and between the hype and counter-hype on the benefits of Web technologies, it is clear there are limits. Some third sector organisations are failing to make the most of Web technologies. Thus, it is important to develop a clear understanding of the process of deriving value from those technologies within a not-for-profit environment.

This thesis aims at understanding the way organisational value can be derived from investments in Web technologies within the museum context. Two in-depth case studies of Web projects' implementation processes and their financial, as well as non financial outcomes within two UK museums are presented. The data presented in this thesis was collected through a variety of methods including semi-structured interviews, observation, document review and an evaluation of the two websites.

A theoretical approach that takes into account organisational and cultural issues embedded in Web-based systems was used in order to understand better the process of acquiring value from the Web activities of the two museums. Thus, a synthesised conceptual framework based on the "Mangle of Practice" and the "Limits to Value" model was used for data collection. While the theoretical framework equipped the researcher with a sound basis upon which data collection was conducted, the framework did not offer much assistance in the task of data analysis. For this purpose, techniques were adapted from grounded theory.

The two case studies show that although limited resources and the challenges of dealing with the digital content are very important issues for museums, Web systems planning aligned to the museum strategy and assigning the responsibility for the monitoring of Web related initiatives to a senior manager with a broad view of the organisation, as well as the power to initiate changes can improve the value obtained from those initiatives.



# CHAPTER ONE: INTRODUCTION

## *Introduction*

For-profit organisations are implementing Web technologies at a dramatic speed and level. For many businesses, these technologies have led to more efficient production structures, improved economy of scale and have intensified co-operation. Not-for-profit organisations are also starting to recognise that they are subject to the new paradigms of the digital economy. A large number of museums use Web-based systems for community building, to improve their services (customisation, access to more information regardless of user location, new education programs reaching more users) or to generate income. However, Web technologies are not a universal panacea for businesses or not-for-profit organisations. Between the hype and counter-hype on the benefits from Web technologies, it is clear there are limits.

Some organisations are failing to make the most of the power of Web technologies. Even in cases where large amounts have been invested in these systems, the result has not always been successful. The first two chapters of the thesis will show that, although there are a number of studies examining the value of Web related investments for commercial organisations, there is not much published on the impact of Web-based systems within not-for-profit organisations. Existing studies concentrate on levels of adoption of Web technologies within the not-for-profit sector and their potential benefits, whereas issues like the process of value creation or the effect of organisational factors on this process have not been examined.

This dissertation is an attempt to cover that gap in the literature. It presents an in-depth, qualitative case study documenting the experience of two UK museums in planning and developing Web technologies, as well as their efforts to obtain value from those technologies. The study uses a socio-technical approach, with a focus on the interrelated nature of Web technologies and wider organisational factors, to answer questions like

when, where, how, and why value is realised from investments in Web-based systems within a not-for-profit environment. In addressing these issues this dissertation makes an important contribution to research into the strategic use of Web technologies in not-for-profit organisations.

This introductory chapter commences with the motivations and the background for the study. In order to provide the reader with a sense of the distinctive time period during which research took place, three areas are examined: the state of academic research on IT value, existing literature on the use of Web technologies by not-for-profit organisations and recent management trends in the museum environment. Drawing on those areas of the literature, the research objectives and an overview of the research design are then presented. An examination of the terms organisational value and Web-based systems, as well as the way those terms are used in this thesis follows. The chapter concludes with a brief overview of each chapter in order to show how prevalent themes and key terms are developed over the course of the dissertation.

### *1.1 Need for studies investigating the value of Web-based systems*

For IS academics and professionals the value created by IT investments has always been considered an issue of principal importance. Keen (1998) proposed a three-category classification of research areas of concern in Information Systems: the classical concerns (eternal questions), the situational concerns (questions important for their time) and the immediate concerns (need to be solved before moving on). He argued that “evaluating the benefits from investments in IT infrastructure” is a classical area of concern. Measuring IS effectiveness and productivity has been ranked in the top ten most critical issues by Australian CEOs and CIOs (Pervan, 1998) and a recent study amongst executives (Tallon & Kraemer, 2007), indicated their frustration by the lack of available metrics for assessing the true value of IT.

Although, a large number of studies have already been published measuring the value from IT at various levels of analysis (national, firm, individual), practitioners and



academics are not satisfied with their outcomes (Davern & Kauffman, 2000). Nicholas Carr's article "IT Doesn't Matter" (Carr, 2003) triggered a debate over the new "IT value paradox" in 2003 and scepticism about the value of information technology was renewed during the last years, due to the gap between substantial firm spending on IT - particularly on Web technologies - and a widespread perception about the lack of value from e-business (Zhu & Kraemer, 2005). During the last few years, IS researchers have been facing strong pressure to answer the question of whether and how e-business investments create business value (Zhu et al., 2004).

In order to respond to this pressure, some efforts in academia have been devoted to studying e-business adoption. While these studies significantly improved our understanding of Web-related innovation, several gaps can be identified in the literature. First, much of the existing research has focused on the adoption decision and on measures such as "adoption versus non adoption" (Zhu & Kraemer, 2005). Although this is helpful, there is a need for a better understanding of the post adoption variations in usage and value regarding e-business technologies. Second, there is a lack of empirical studies on e-business usage and its impact on firm performance (Zhu & Kraemer, 2002). A study by Kauffman & Walden (2001) charted several directions along which useful work in e-business could be developed. One of the directions recommended was to understand how the use of e-business technologies for organisational processes creates value for an organisation.

Kohli & Devaraj (2003) as well as Dedrick, Gurbaxani, & Kraemer (2003) pointed out several opportunities for future IT payoffs research. Among their suggestions were: gathering data from primary sources, including small and medium-sized organisations in the research sample, capturing the actual usage of IT (i.e. how investment is converted into assets, resources, and firm performance) and developing process-oriented dependent variables, especially for studies on the e-business phenomenon. Drew (2003) published a list with significant research issues in the area of e-business, based on literature research and dialogue with e-business practitioners. He argued that one of the main issues that needed to be examined was the relationship between organisational change and e-

business. Kohli, Sherer, & Baron (2003) suggested that there were excellent opportunities for future research in measuring IT payoff in e-business environments related to four general themes: metrics, environment, technological infrastructure, and process. They concluded that research on e-business that examines issues like the impact of complementary investments on change management and the effect of risks in the development and implementation process of e-business technologies was clearly desirable.

### *1.2 Need for studies investigating the value of Web-based systems in not-for-profit organisations*

Bryson (1995) warned that “leaders and managers of governments, public agencies of all sorts, non-profit organizations, and communities, face difficult challenges in the years ahead.” Like their counterparts in North America, voluntary organisations in the United Kingdom are experiencing significant shifts within the social, economic, and political spheres in which they operate. Competition for funding and volunteers is becoming more acute, as new organisations enter the marketplace, and changes in the nature of funding available and in volunteering patterns are having a big impact on the way those organisations operate (Ryan, 1999; Wintz, 1998).

At the same time, demands to not-for-profit organisations are growing for more accountable, better-quality services. UK Central Government has further raised the profile of general evaluation issues in the public sector by introducing the Best Value (Local Government Act, 1999). The Best Value Performance Indicators require local authorities (and other best value authorities) to seek to achieve continuous improvement by having regard to the efficiency, effectiveness and economy of their service delivery (ODPM, 2003). Furthermore, strategic complexity adds another dimension to the challenges faced. Campaign issues and social services are increasingly perceived to be holistic in nature and solution.



Electronic networks hold the promise of innovation within voluntary organisations, as they seek to respond to these challenges. Adoption of information technology has the potential to improve productivity and service provision in the voluntary sector (Cukier & Middleton, 2003). For organisations able to use information technologies effectively, the benefits could extend beyond conventional enhancements of administrative and operational efficiency and effectiveness. Information technologies create the potential to reshape organisations internally, reconfigure relationships across networks of organisations, and redefine relationships with individual citizens (Burt & Taylor, 2000). While creating new opportunities, IT also presents an enormous risk, because of the costs to develop and maintain IT systems. The “digital divide” implies more than just access to technology; it also involves the skills, knowledge, control and resources needed to use it effectively (Cukier & Middleton, 2003).

A report published in 1999 by the National Strategy for Non-Profit Technology (US) concluded: “non-profits are hesitant to use technology and are ill-informed about the impact that it could have on their work ... the fundamental problems are lack of knowledge, fragmentation, inadequate investment and lack of skills” (NSNT, 2002). Finn (1998) surveyed US not-for-profit agencies using the Web and found that although most organisations were satisfied with their Web activities, less than five percent of funds and 10 percent of volunteers were derived this way. In UK, Saxton & Game (2000) concluded that charities most frequently used their websites in fundraising and the provision of information, but many not-for-profit organisations were not using the potential of Web technologies to the full even in these areas, let alone in the provision of services or to provide differential access to groups of stakeholders.

These results raise important questions and studies that aim to understand the current situation in not-for-profit organisations would be of principal importance. However, Boeder (2002) argues that there is hardly any published material on the use and effectiveness of Web tools and strategies employed by not-for-profit organisations. Saxton & Game (2000) support Boeder’s view when stating that the impact of Web technologies is not well documented on organisations driven by a cause and not by a

bottom line. Although considerable attention has focused on the emergence of e-business and the use of Web technologies in the private sector, less attention has been paid to how these technologies can be used by the voluntary sector (Cukier & Middleton, 2003).

Furthermore, there is lack of best practices concerning IT in not-for-profit organisations (Dameri, 2005), so managers have a great difficulty in identifying the most appropriate IT solutions for specific organisational needs. Existing literature on Web technologies and their application within commercial organisations can be beneficial but cannot provide all the answers. Not-for-profit organisations operate within a different environment and are constrained in their IT activities by budget and other controls for accountability (Bennet Thatcher, Brower, & Mason, 2006; Saidel & Cour, 2003). In an era where not-for-profit organisations are facing significant challenges and increasing demands for more accountable, better-quality services (Light, 2000) understanding how value is created from Web technologies acquires increasing importance.

### *1.3 Need for studies that investigate the use of Web-based systems in the museum sector*

#### **1.3.1 Cultural institutions as important economic players**

The cultural sector, from subsidised sector through to the commercial sector, is an important economic player (Arts & Business, 2003). The Treasury has calculated that within 10 years, the creative and knowledge economy will be 50% of the UK economy (Arts & Business, 2006). Figures on business investment in the cultural sector showed that a total of £114.4 million was spent by the corporate sector in supporting cultural activities during the financial year 2000/2001 (Arts & Business, 2002) and the amount was raised to £529.5 million in 2005/06 (Arts & Business, 2006). Of the total figure, in both studies museums and galleries received the highest proportion.

The financial support that museums receive either in the form of donation by individuals and organisations or in the form of government funding could be used in a variety of ways. Some of the areas where increasing amounts of finance are invested are digitisation initiatives and Web projects. Muller (2002a) argued that tens of millions of



pounds are being spent world wide on digital heritage initiatives. In 2002, the New Opportunities Fund announced the creation of a £50m fund for putting the UK's national heritage online (Muller, 2002c).

### 1.3.2 "Economisation" of culture

The traditional separation between a publicly subsidised non-commercial cultural sector and the cultural industry has been increasingly "softening" in favour of mixed forms. Public establishments are called on to adopt market-oriented behaviour. Furthermore, the function of public cultural establishments and their programmes can be defined according to cultural, economic, as well as artistic criteria; exhibitions without museum shops and restaurants/coffee shops are practically inconceivable. In the arts sector, both culture and employment signals the penetration of private enterprise structures into areas, where they previously did not exist.

"Cultural Economics" as an academic discipline has acquired increased importance and as a result of it a number of new research centres have been established (Editorial: Museums and Cultural Economics, 2000). An example of these centres is the Centre for Cultural Economics and Management (CCEM) within the Department of Economics in UCL. This change can be attributed to the urgent need of museums and cultural organisations for reliable economic information, so that they can respond to both the practical demands of tourism, "cultural recreation" and the "heritage industries", as well as the financial requirements imposed by funding bodies that they generate increased cash flow and, greater profits (Editorial: Museums and Cultural Economics, 2000).

### 1.3.3 Impact of economic pressures on museum management

In 1996 the Department of National Heritage (currently known as the DCMS) in its report of the museum sector recommended that museums become "more self reliant and ... develop plural funding sources" (Department of National Heritage, 1996). According to Moore (1994) the change in audience attitude, the policies to encourage competition for the provision of public services and the wider international perspective of cuts in direct public funding pushed museums into the marketplace. Museums had to survive in

a rapidly changing environment and for the first time strategic planning; targeting and funding strategies became part of museum life.

Today, UK museums are under pressure to deliver on many fronts and particularly on the government agendas of education and social inclusion. However, public subsidies may not be sufficient to enable them to meet these objectives. In the case of the nationals, the grants given are far from adequate, and do not increase with growing demands and targets set by the Department of Culture, Media and Sport (McCrossan, 2002). Local Authority museums are in a worse condition as Local Authorities cannot keep up with the competing demands on their limited budgets, and museums, which are not considered a compulsory service, feel the pressure (Museums in Crisis, 2000).

#### 1.3.4 Need for sustainability of digital cultural heritage initiatives

According to Zorich (2003) the economic downturn has affected the digital cultural heritage initiatives, in the US, in two ways. Fund raising has become more difficult for these initiatives as foundation endowments have been doing poorly and corporations have been tightening their belts. Furthermore, new program development within digital cultural heritage initiatives has slowed substantially, as some organisations were concerned about launching a new program in uncertain fiscal times, while others have sustained budget cuts that have made new program development impossible.

Another challenge that digital cultural heritage initiatives face is the change in the nature of funding by foundations and other sponsors. In most cases, foundations are willing to offer financial support in order to initiate projects but unwilling to provide general operating support to sustain those projects once they are up and running. Although, foundations are not prepared to provide operating support for projects they insist on sustainability as a requirement in order to sponsor new projects (Meaney, 2002). Furthermore, there is increasing competition in the development of digital content from commercial content providers, as well as freely available online resources (Meaney, 2002; Zorich, 2003).



According to Zorich (2003) besides environmental/external problems, digital cultural heritage initiatives need to deal with a number of internal issues in order to achieve and maintain sustainability. In some cases, digital cultural heritage initiatives' missions are not fully developed and as a result too many institutions lurch from idea to idea without guiding principles. Tanner & Deegan (2002) in a study on resource cost efficiency and income generation of UK digital cultural heritage initiatives discovered amongst other issues that none of the institutions were fully recovering the cost of creation, management, storage and service provision, solely from the sale of digital items and no institution was able to quantify accurately the cost of digital preservation and thus consider mechanisms to sustain the service in the prices of the digital items.

Due to economic and political pressures, as well as the changes in management and the increasing amount of financial and human resources invested in digitisation and Web-based initiatives within museums, it is important for them to have an understanding of how value is created by investments in these projects and the factors that are important in achieving a successful result.

#### *1.4 Research objective and overview of the design of the study*

The previous sections identified the need to investigate the process of obtaining value from investments in Web-based systems within not-for-profit institutions and museums in particular. Although previous studies by governmental bodies and consulting companies have provided some information on the potential benefits of Web technologies for not-for-profit organisations, they fell short of explaining the reasons for the variation in the use of Web technologies by these organisations and their consequent success or failure to maximise value. Any studies that would aim to develop a better appreciation of the notion of value from investments in Web technologies within the context of not-for-profit institutions, as well as gain an understanding of the factors that could have an impact on the process of value creation would fill in a gap in the relevant literature. This study is an attempt to fill in that gap by investigating the use of Web technologies by museums, as well as their efforts to obtain value from these

technologies. Through this investigation the researcher aimed to answer questions like *when, where, how, and why value is realised from investments in Web-based systems within a museum environment.*

At an early stage of this research, it became apparent that except from a few studies that suggested directions regarding the potential benefits of Web technologies for museums, there were not enough previous studies to allow the researcher to make an educated guess regarding: a) the set of organisational or technical factors that could affect the value creation process, b) the extent of their impact and c) the stage at which those factors become relevant (at the planning, during or after the implementation of Web technologies). Thus, the formulation of a specific hypothesis for testing was not considered appropriate for this study. Instead, it was considered more appropriate to have a sufficiently broad research question to enable a systematic inquiry to be conducted of all the aspects of the value creation process in-depth. The openness of the research question allowed the researcher to examine the impact of Web technologies on different aspects of the museum operation (where), as well as the impact of a number of organisational and technical factors on the process of value creation (how and why) in relation to a timeframe that covered the period from planning to post-implementation stages of Web-based systems (when).

In the same way that it was important to adopt a broad research question and allow the theory emerge from the data, it was also important to clarify a couple of key concepts contained in the relevant statement. The first of these terms is “value”. According to Bannister & Remenyi (2000) the absence of a clear conception of “value” in IT studies can lead to some serious misunderstandings about the methods designed to measure it. A number of researchers in the 1980s and early 1990s have used the term IS effectiveness in their studies to describe how well a programme is achieving its stated goals (Symons, 1991) or to evaluate system usage plus user satisfaction (Udo & Guimaraes, 1994). During the 1990s the most common conceptualisation of value in IT studies has been “IS business value” Cronk & Fitzgerald (1999). This term may equate to: strategic value (Berger, 1992); an economic measure of IS investment in relation to productivity (Jordan, 1995); or the impact of IS on business performance (Mukhopadhyay, Kekre, &



Kalathur, 1995). In this study, *the term value has been used to describe the outcome of financial and non-financial consequences of investments in Web-based systems. Efficiency and effectiveness impacts of Web technologies at the intermediate and the organisational level* have been the focus of this research.

An individual's IS value perspective could be a composite of factors, such as preconceived ideas about IS, the role of the individual in the organisation, personal value system/ethics, as well as organisational factors like the IS support service and quality (Cronk & Fitzgerald, 1999). Furthermore, as Web technologies cut across boundaries, relevant research needs to consider payoff to more than one party and determine how to relate these payoffs to each other to measure the joint payoff from the application (Kohli, Sherer, & Baron, 2003). For this reason, special effort has been made in this study to *examine perceptions of value from multiple groups of stakeholders.*

Another term that requires qualification is "Web-based systems". The way the term is used in this study bears a close resemblance to the way IS academics have previously defined "e-business". Zwass (2003) described e-business as "the sharing of business information, maintaining of business relationships, and conducting of business transactions by means of telecommunications networks". DeLone & McLean (2004) used the term e-business to describe "the use of the Internet to facilitate, execute, and process business transactions" and the IBM Advanced Business Institute defined e-business as "an organizational strategy linking IT and the World Wide Web to create strategic advantage through operational efficiency, customer relationships, innovative products and services, and speed" (Kohli, Sherer, & Baron, 2003). In this study, the terms Web-based systems, Web technologies, and Web activities, have been used interchangeably to describe the administration of transactions or information exchange implemented through the use of Web platforms. The study has focused on a broad range of functions, which have included *the provision of services (with or without a cost) and products through the Web, the traditional B2B and C2C aspects of e-business, as well as the use of Web technologies for internal communication (e.g. Intranet).*

Finally, considering the existing variety regarding the nature of the governance of institutions that define themselves as museums, it is important to state that the focus of the research has been on museums that had the following characteristics, found in not-for-profit organisations (Febbraro, Hall, & Parmegiani, 1999):

- organised (institutionalised to some extent)
- private (institutionally separate from government)
- self-governing (equipped to control their activities)
- non-profit-distributing (not returning profits generated to their owners or directors)
- voluntary (involving some degree of voluntary participation, either in the actual conduct of the organisation's activities or in the management of its affairs).
- public benefit organisation

Realising the research aim involved making a number of key research design choices. The most fundamental of those choices was that this research should be qualitative longitudinal and empirically grounded. In this way, the experience of museums and the decisions, choices and approaches they adopted towards obtaining value from their Web activities could be captured. The role of IT is determined by the social context into which it is introduced. The same technology might be used in different ways by different people, leading to different outcomes. Technology will not only be adapted by different users, but it will also be interpreted by people in different ways. A theoretical approach that takes into account organisational and cultural issues embedded in Web-based systems was necessary in order to understand better the process of acquiring value from those systems. Thus, a synthesised conceptual framework based on the "Mangle of Practice" by Pickering (1995) and the "Limits to Value" model by Davern & Kauffman (2000) was used for data collection.

By using the "mangle", Web technologies were treated as ongoing artefacts-in-construction through the situated practice of agents, rather than as the products or the producers of predictable effects. The "mangle" also encouraged the researcher to see the whole set of interactions between the social and the technical elements as locally emergent, rather than seeing humans with clearly-defined goals applying Web



technologies with clearly-defined properties to achieve clearly-defined organisational effects. While the “mangle” provided the researcher with a broad theoretical lens, the limits to value model provided more specific directions for data collection.

A case research strategy was chosen due to the focus of the research on the process of value creation, which could only be examined within an organisational setting. A theoretical sampling technique was followed for the case sites, where “data collection is controlled by the emerging theory” (Glaser & Strauss, 1967 p. 45), so although field research took place in two museums (the Science Museum and the Geffrye Museum) the possibility of adding extra cases remained opened until the last stages of the analysis. The main method of collecting data within the two museums was semi-structured interviews with staff from different organisational levels and a variety of departments. Field notes from visits to the sites and lunch meetings with the “gatekeepers” were kept and a number of museum documents were also reviewed in order to support the evidence gathered through the interviews. Finally, in order to put in context the interviewees’ comments about their websites an evaluation of the two websites was also conducted.

While the theoretical framework equipped the researcher with a sound basis upon which data collection was conducted, the framework did not offer much assistance in the task of data analysis. For this purpose, techniques were adapted from grounded theory (Glaser & Strauss, 1967). Data collection and data analysis occurred simultaneously, as it is the case in the development of grounded theory. This allowed for theoretical sampling on the basis of emerging concepts, and it enabled validation of concepts and hypotheses as these were being developed. During the last stages of the analysis, besides a number of concepts related to the areas of museum operation affected by Web technologies, two core theoretical concepts emerged: “the strategic alignment of Web activities” and “the engagement of senior management in the planning and development of Web activities”, as the factors with the most significant impact on the process of value creation.

## *1.6 Outline of the thesis*

This thesis is divided into eight chapters. This chapter provides information about the motivations and the background for this study; it continues with a brief discussion of the main objectives of the research and the basic concepts that were the focus of this study and ends with a description of the structure of the thesis.

Chapter two provides more information about relevant literature and the background of this research. In the first part, issues of performance measurement within not-for-profit organisations, as well as the current trends that affect museum management are examined. In the second part, the benefits that Web technologies offer to organisations and museums in particular are analysed and a number of challenges that museums face as a result of Web adoption are presented. In the last part, a number of significant studies, which investigated the impact of IT on organisational performance, are presented. The chapter ends with information on previous research about the value of Web technologies.

Chapter three provides the rationale behind the choice of the theoretical framework that was used for this study. A detailed discussion of the two elements of the synthesised framework (the mangle of practice and the limits to value model) is also provided, with a brief description of related theories, in order to locate the framework used for this study in the wide spectrum of theories from social sciences.

Chapter four begins with a discussion of the different research paradigms in social sciences and a description of the main assumptions of the interpretive paradigm that underpin this study. The justification for the use of case research and the limitations of the method are then presented. Details on the selection of the case sites and the techniques used to facilitate data collection and analysis (e.g. case study protocol and Atlas.ti) are explained in a later section. Finally, a detailed description of the data collection methods (e.g. interviews, observation, and website evaluation reports) is

provided and the chapter concludes with a discussion on grounded theory and the stages of analysis.

Chapter five provides the reader with a description of the two case sites in order to put in context the main findings of the research that are presented in the next chapter. The chapter is divided in two parts; the first part describes the organisational and IT context in the Science Museum, whereas the second part provides similar information about the Geffrye Museum.

Chapter six continues with the presentation of evidence collected from the two case sites. It provides a set of findings that articulate a response to the main research question. The narrative includes references to areas, where the two museums obtained value from their Web activities and a set of factors that affected the process of value creation. The chapter is comprised of two parts corresponding to the evidence collected from each case site. Within each of the two main sections, the narrative is arranged around the four aspects of museum operation that benefited from the museum's Web investments, namely, support of traditional museum services and provision of online educational services, income generation, e-procurement and operational efficiency.

Chapter seven provides a discussion of the case study material presented in chapters five and six. It provides an in-depth analysis of the evidence from both museums enriched by references from the relevant body of the literature. The discussion is arranged around the four aspects of museum operation that were affected by the museums' Web activities (i.e. support of traditional museum services and provision of online educational services, income generation, e-procurement and operational efficiency). The chapter ends with a separate section on the two core concepts that emerged during the grounded theory process of analysis, as the factors with the most significant impact on the process of value creation (the strategic alignment of Web activities and the engagement of senior management in the planning and development of Web activities).

Finally, chapter eight addresses the contribution of the thesis, as well as its limitations and presents suggestions for future research.



## CHAPTER TWO: LITERATURE REVIEW

### *Introduction*

In this chapter, a critical review of academic literature relevant to the research question is provided. This study is concerned with “understanding the process of value creation from Web-based systems within museums”. This phrase consists of three main concepts: the museum as a distinctive type of organisation, Web-based systems, and the process of obtaining value from investments in those systems. A critical overview of studies relevant to each of those concepts will be provided in this chapter. The aim is to make relevant theories and their assumptions more explicit, widen the author’s perspective in understanding the theoretical contribution of this study and allow the reader to place this study within a broader body of existing literature.

The chapter is divided in three parts. In the first part, issues of performance measurement within not-for-profit organisations and current trends that affect museum management are examined. In the second part, a number of benefits that Web technologies can offer to organisations and museums in particular are analysed and a number of challenges that museums face as a result of adopting those technologies are presented. In the last part, a number of important studies from the IT value literature are presented. Finally, the chapter concludes with a section on existing research on the value of e-business technologies and the characteristics of those studies.

### *2.1 The new landscape for not-for-profit organisations and museums*

In this section, issues of not-for-profit management practices and performance measurement as well as the role of museums and current trends that affect museum management are examined. It is important to understand the social environment, where implementation of Web-based systems takes place, as a number of contextual factors

may have an influence on the process of creating value from investments in Web-based systems within museums.

### 2.1.1 Management and performance measurement in not-for-profit organisations

Management in the commercial and in the not-for-profit sector presents a number of similarities. Both types of organisations have boards of directors, trustees, regular meetings, and so forth. In both cases, boards would be responsible for setting the organisation's mission, monitoring its progress toward achieving that mission, and selecting and evaluating its managers. However, the governance of not-for-profit organisations remains different from the governance of businesses in several critical areas. One of the main differences is how these sectors develop and evaluate their missions (McFarlen, 1999). On the one hand, the principal goal of any commercial organisation is to increase shareholder value, and any progress toward this goal can be precisely measured (at least the financial aspect). On the other hand, financial considerations form only one dimension of the non-profits' mission statement and the service that they provide to their community may be a more critical variable when measuring performance (McFarlen, 1999).

Another area, where pronounced differences exist between not-for-profit and commercial organisations is in the structure of their boards. Commercial organisations have smaller boards, consisting of leaders of similar corporations, specialists in relevant technologies, and people with good political contacts. According to McFarlen (1999) non-profits' boards tend to be much larger as they have to represent the different constituencies that have an interest in the organisations' future (especially potential donors). Furthermore, in cases, where the financial needs of a not-for-profit organisation reach large proportions (e.g. large museums), the composition of the board might "swell".

In spite of the differences between the management of not-for-profit and commercial organisations, managerial efficiency should be just as important for not-for-profit



organisations as for commercial organisations. The primary objective for this efficiency might still be different but the existence of the need for efficiency should be quite similar. Commercial organisations will still aim to increase shareholder wealth and not-for-profit organisations, would be interested in improving managerial efficiency in order to be able to distribute a larger percentage of revenues towards the achievement of their mission.

The current funding and political environment makes it more important than ever for not-for-profit organisations to demonstrate managerial efficiency. Government leaders and the public express scepticism that social interventions by charities and not-for-profit organisations have any noticeable impact on the problems of our society; public and private funding sources are being reduced, and the competition for funds means that not-for-profit organisations must offer evidence of their effectiveness. To do so, not-for-profit organisations must choose among various performance evaluation approaches and methods to assess their effectiveness, demonstrate their value to the community, provide useful and usable information, and meet the demands of the public.

The above-mentioned changes in society have already affected how not-for-profit organisations work. Light (2000) observed four tides of reform in the not-for-profit sector: scientific management, “war on waste”, “liberation management”, and “watchful eyes”. Scientific management is used to describe structural changes employed to boost organisational ends, and efficiency in operation becomes a principal goal. This efficiency is achieved through attention to rules and procedures. “War on waste” reforms, according to Light (2000) reflect calls for cost control and reengineering with attention to the possibility of combined service delivery and mergers between individual organisations to establish economies of scale. The “war on waste” draws from the philosophy of rational self-interest and market analogies for organisational behaviour and it reflects an emphasis upon performance. Where reform themes such as scientific management and “war on waste” tend to focus upon organisational structure as way to address not-for-profit achievement, “liberation management” and “watchful eyes” require an active human role from either within the organisation or as an external check

(Light, 2000). “Liberation management” requires a focus upon organisational ends but does so through the development of the employees. The “watchful eyes” reform movement presumes that access to information leads to accountability in the subsequent performance of the not-for-profit organisation.

Although not-for-profit organisations are already experiencing changes in several areas of management, measuring their effectiveness and efficiency hasn’t become an easier task. Speckbacher (2003) believes that this is due to the fact that not-for-profit organisations have no single primary interest group that would be clearly defined, and whose goals could be easily expressed and transferred into the organisation for assessment of alternative courses of action. Speckbacher (2003) also argues that not-for-profits have no relatively simple financial goal, which can be translated easily into sub goals and used as a means of communication. Thus, unlike commercial organisations, where profits serve as a common language for communication, decisions in not-for-profit organisations have to be made with reference to the mission. However, non-profits’ missions are lofty and vague and as a result of it, measuring their success becomes a very difficult task (Sawhill & Williamson, 2001). Sawhill & Williamson use as an example, to support their argument, the mission statement of the American Museum of Natural History: “discovering, interpreting and disseminating –through scientific research and education- knowledge about human cultures, the natural world and the universe” and comment on the difficulty in measuring success of some aspects of the mission like the discovery and interpretation of knowledge.

Kanter & Summers (1987) suggest that the ideal performance management system for not-for-profit organisations should acknowledge the existence of multiple constituencies and build measures around all of them. This ideal system should acknowledge the gap between grand mission and operative goals and would consist of an explicit array of tests of performance to balance clients and donors, board and professionals, groups of managers, and any of the other constituencies with a stake in the organisation. They propose as a solution to the problem of measuring success of vague missions, narrowing down the definitions of the missions, so that progress could be measurable, investing in



research into the outcomes (monitor the impact on society) or even develop “micro level” goals, whose achievement by the organisation would imply success on a larger scale.

Some researchers suggest that multidimensional/balanced assessments of performance are the most suitable for not-for-profit organisations. Kanter & Summers (1987) propose measurement of success in three areas: mobilising organisation’s resources, the staff effectiveness on the job and its progress in fulfilling its mission along with the use of some basic financial metrics. Kuser & Poole (1996) suggest performance measurement along four lines: the adequacy of funding, the efficiency of operations, the attainment of the organisational goals, and the satisfaction of its constituents and Kaplan & Norton (2001) as well as Kaplan (2001) recommend the use of a modified version of the Balanced Scorecard as a suitable way of evaluating non-profits’ performance.

### 2.1.2 The role of museums

MacDonald & Alsford (1991) raise the view of a museum as information, claiming that the “advantage of a shift in orientation away from objects towards information is that it should make it easier to balance the traditional functions of collection, preservation, research and display”. Bearman (1992) writes: “Museums are primarily in the business of dissemination of information rather than artefacts. The advantage to thinking in terms of information is that it validates the collection of intangibles, such as oral histories and replicas, as well as actual artefacts; it places museums in a key position in an information age; and it makes it easier to integrate traditional functions of collection, preservation, research and display with the new watchwords, education and communication.” The old perception of museums as repositories of strange and precious objects has been replaced by their role as information centres (Economou, 1997). The museums’ purpose is learning and creativity – informal, social, and pleasurable – is their medium (Anderson, 2000). MacDonald & Alsford (1989) have discussed other important modes of the museum, including the museum as symbol, vision, showcase, treasure house, memory, communicator, mentor, celebration, host and resource.



Teather (1991) believes a museum is: “a dynamic, complex and variable human form of endeavour, an entity which has shown over time adaptive qualities as it transforms to new societal developments...”. According to Teather (1991), the museum on the Web is another adaptation of this human phenomenon of collecting and showing, which has been in evidence for centuries. She goes on saying, “It is in the personal experience of museums that the essence of the museum lies”. Thus, the museum as idea can rest in a “real” museum located in a physical space, in a virtual museum or in a real museum, which is also virtually represented. Finally, according to Throsby (2001) the museums are many things to many people: to the “museologist” they perform a vital function in the transmission of information about art and culture to the community; to the artist they are showcases for their work; to the art historian they are essential repositories of material relevant to their profession; and to the economist they are not-for-profit organisations, motivated by a complex and multi-valued objective function and subject to a variety of economic and non-economic restraints.

### 2.1.3 Rethinking museums as “businesses”

Rentschler & Potter (1996) claim that museums may need to become more commercial in their orientation. They believe that terms like education, stimulation of imagination concerning the relationship between the past, the present and the future or enrichment of the public mind, which usually define a museum mission, are too wide to be used as clear concise guides to action. They argue that in the last years there is a need for museums to develop more specific aims and objectives, to guide their operations with more of a commercial emphasis as well as to develop greater orientation towards efficiency of resource use and effectiveness of operations.

Dees (1998) describes five major pressures and influences that are pushing not-for-profit organisations including museums into commercialisation. These include: a general pro business “zeitgeist”; the need to decrease dependency on an organisation’s constituency to deliver social goods and services; financial sustainability and the need to create more

reliable funding sources rather than donations; and competitive forces from commercial organisations. Threats from competition for funding and audience are related to the museums' need for a clear mission and for acquiring adequate information about the internal and external conditions, which could affect a museum's future (Kotler & Kotler, 1998). Museums that are compelled to raise revenues in the marketplace to supplement subsidies and public-sector support have to address questions of revenue-raising objectives, the variety of ways in which to raise revenues, the costs involved, and the prices to charge for various revenue streams.

## *2.2 Potential value of Web-based systems and challenges for organisations*

The explosion of Web technologies is creating enormous opportunities for organisations to capture value. At the same time, the challenges of creating and capturing value in the Network Era raise a number of strategic issues for every organisation. In this section, a number of benefits that Web technologies could offer to a variety of organisations and museums in particular are analysed and a number of challenges that these organisations could face as a result of Web adoption are presented.

### *2.2.1 Potential value of the Web for organisations*

Angehrn, (2002) claims that Web technologies create opportunities and threats for organisations in four different areas. He uses a generic framework, the ICDT model to categorise opportunities and threats under four “spaces”, the Virtual Information Space (VIS), the Virtual Communication Space (VCS), the Virtual Distribution Space (VDS), and the Virtual Transaction Space (VTS). The VIS provides visibility for the organisation. It offers information about people, availability of services or products, and so on. It allows visitors to choose the information they may be interested in but it remains a one-way communication channel. The VCS provides a “space” for engaging in relationship-building, exchange of ideas or opinions with customers/users. The VDS is about service delivery. It is only suitable for products and services, which can be digital or for products/services which are partly digital. At last, VTS is about trading. Thus, orders, commitments, invoices or transfers of payment take place in this “space”.

Ghosh (1998) believes that the Web could be an interactive link to customers, suppliers or distributors. Hoffman & Novak (1996) recognise the tremendous potential of Web technologies for improving decision making in companies and developing relationships with customers. According to Fruhling & Digman (2000) an information rich web site can help a firm develop relationships with customers by providing more effective marketing, new channels, shorter time to market, customised or personalised product, online 24 hours technical support, and online interactive community. These relationships



with customers can increase the likelihood of sales, as well as create opportunities to introduce new products and services (Fruhling & Digman, 2000). These new products or services could now be developed in relatively low cost (Ghosh, 1998). Zwass (2003) also talks about two types of innovations encouraged by the Web: product innovation and business-model innovation. The web could also be a delivery vehicle for digital products (Zwass, 2003). Digital products could be categorised as tools and utilities (including software), content-based products and on-line services (Hui & Chau, 2002). Some physical products like tickets, stamps, greetings, and other tokens could also be replaced by digital ones.

As a result of the adoption of Web technologies, costs are reduced in marketing, advertising, and in the area of business operations. These cost reductions come from less expensive product promotion, cheaper distribution channels, and direct savings (Bloch, Pigneur, & Segev, 1996). Particularly, the decrease in distribution costs can be expressed as a reduction in overhead expenses such as inventory, retail space, and personnel (Fruhling & Digman, 2000). The changes in marketing are not limited to the reduction of costs. Peppers & Rogers (1997) claim that the Web represents a total transformation of the marketing paradigm with a shift away from a predominantly one-way broadcast model towards unique, interactive and personalised one-to-one relationships. The interactive nature of the medium offers an opportunity to the customer to express his/her voice via e-mail, web surveys, virtual focus groups and the like (Zwass, 2003). As part of an organisation's marketing strategy Web technologies could be used to establish the organisation's brand image. Firms can use web sites to reinforce their identities, the differentiation of which can help build up customer loyalty, one of the most powerful competitive weapons in capturing market and customer share (Smith, 2000).

The use of Web technologies allows an organisation to expand quickly and effectively its geographical markets both regionally and globally (Fruhling & Digman, 2000). A Web presence can open new markets and new distribution channels. Companies could use Web technologies to bypass other companies in the commercial chain (e.g book publishers can sell straight to customers no need for distributors) or even become the

dominant players in the electronic channel of a specific sector (the average customer once he/she has established a relationship with an electronic seller is unlikely to go through the same effort again with other suppliers) (Ghosh, 1998).

The Web could support task-oriented collaboration within and across organisations (Zwass, 2003). The automotive sector has seen a large degree of online collaboration among firms (Fretwell, L. and Strandquest, B., 2002). Collaborative development of new products would be possible with the use of agent technology. Agent technology allows companies to address customer requirements through collaborating software modules with separate ownership, geographic distribution and operation on different computer platforms. An example of intra organisational collaboration facilitated by the Web is the case of Timex Corporation. The company employed web-based collaboration software to support the design cycle for its new products (Kontzer, 2002). With the use of this technology, the product development cycles of the new fashion watches and the athletic timing devices were cut up by 40%. As a universal telecommunications network the Web could support not only staff collaboration but also intra and inter organisational information system integration (Zwass, 2003). MasterCard international has implemented an IP-based global payment processing system to simplify data transfers among retailers, banks and the credit-card company's clearing offices (Mearian, 2002). The system was designed as a virtual private network with enhanced security and it provided a globally integrated operations platform to the company.

According to Zwass (2003) the spread of Web centric applications has already created a universal development platform for different kinds of organisational systems. The interoperability of web services allows the creation of enterprise-wide information system architectures that link all the corporate core business systems (e.g. ERP, CRM) to the firm's website and expose the desired interfaces for communication with partner's systems. The positive impact of interoperability could be seen in different levels and sections of an organisation. One of the possibilities is even the creation of a virtual enterprise. Web technologies enable the virtual enterprise through supply-chain re-configuration and integration (Feeny, 2001). Companies could identify the ideal network



of provider partners, arrange for all selected members to have immediate access to relevant information and offer to the whole network the advantages of a vertically integrated business without the disadvantages.

The Web does not provide only a platform for the integration of different kinds of information systems within and across organisations, but allows also the use of computing utilities that may not be owned by organisations. Zwass (2003) mentions grid computing as one of the opportunities offered by the Web. Grid computing enables the virtualisation of distributed computing and data resources such as processing, network bandwidth and storage capacity to create a single system image, granting users and applications seamless access to vast IT capabilities. It enables computing tasks like simulation, visualisation or data analysis. In the e-commerce domain, grid computing can enable data mining and access to joint databases for CRM or supply-chain management.

The Web can support communities of customers and communities of practice (Zwass, 2003). Communities of customers could be useful in identifying problems with corporate products and services, or misperceptions, so that the companies can correct them. Communities of practice can emerge within an organisation with the assistance of group support tools and are related to reuse of intellectual capital developed during projects and faster response time to requests for proposals. Web technologies can also have non-direct impacts to organisations. The technologies could initiate a new round of re-engineering of the company's primary infrastructure and lead to faster turnaround of customers' orders, enhanced customer support, improvements in a product's unit-cost structure and shorter time to market for new products (Feeny, 2001).

Porter (2001) identified a number of trends at the industry level with the introduction of Web technologies:

- The Internet weakens the bargaining power of intermediaries by providing companies with new direct avenues to customers.



- The Internet can also boost an industry's efficiency in various ways, expanding the overall size of the market by improving its position relative to traditional substitutes (other industries).
- Internet technology provides buyers with easier access to information about products and suppliers, thus boosting their bargaining power.
- Because Internet is an open system, companies have more difficulty maintaining proprietary offerings, thus intensifying the rivalry among competitors.
- The use of Internet expands the geographic market and with a combination of new and old companies as well as generally lower entry barriers, most industries end up with an increase in the number of competitors and fiercer rivalry.

The adoption of Web-based systems does not come without concerns for organisations both about the resources and the new processes required as well as about the risks regarding the implementation of Web-based systems. Christensen (2000) characterises the Web as a “disruptive” technology. He makes a distinction between two types of technological applications the “sustaining” ones, which allow an organisation to enhance its production processes, or improve the efficiency of some other organisational aspect and the disruptive ones, which cannot be easily integrated by existing organisations. In the case of the Web, Christensen (2000) believes it is a disruptive technology because its emergence requires new organisational models.

However, Boeder (2002) believes that the Web could be considered as a sustaining technology in a sense that it provides organisations with a set of tools to enhance productivity and efficiency, and enables a number of new forms of communication within existing organisational structures. The Web does not have to be disruptive to organisations when it is used to reinforce a distinctive strategy. Porter (2001) claims that Web technologies rarely destroy resources of competitive advantage. On the contrary, he argues that the Web makes an organisation's traditional strengths and resources even more important. He suggests that companies will be most successful with their use of Web technologies if they ensure operational effectiveness (easing and speeding the exchange of real-time information) and strategic positioning.

### 2.2.2 Potential value of Web technologies for not-for-profit organisations

The Web as a global communications tool offers the opportunity even to the smallest charity to spread its ideas to other organisations and individuals in a way, which were not possible before (Saxton & Game, 2000). Through the web it is as easy to access the site of the smallest environmental group as that of the largest company. People who may be interested in a specific issue could access non-profits' websites located anywhere in the world and ask for help or contribute to the organisations' missions. At the heart of the power of Web technologies lies its ability to process information. Much of the work of charities is about ideas and information. Not-for-profit institutions aim to change people's attitudes, raise awareness of issues, spread ideas about better ways to do things and provide people with information they need. In all of these areas, the Web is well suited to the needs of charities.

The traditional choice for not-for-profit organisations, which need to transfer a message to their public, has been financing an advertising campaign or hoping that the press would express an interest. However, advertising campaigns cost a lot, and effective media coverage usually means handing over control of the message to the journalists. The Web on the other hand, provides a mass communications tool, which does not rely on intermediaries and costs only a fraction of an advertising campaign (Saxton & Game, 2000). Salamon (2002) notes as donors become more involved with charities, they increasingly want information beyond that about the organisation's mission. Foundations and major gift donors often want to know what the organisation's objectives for the upcoming year are and how the members of the board are working to help the organisation meet those objectives. Posting this type of information on the organisation's website provides an inexpensive method for relaying this information to key stakeholders (Waters, 2007).

A number of charity websites (e.g. the RNLI website - [www.lifeboats.org.uk](http://www.lifeboats.org.uk)) are not simply supplying passive information, but interacting and responding to information that

the visitor provides. This kind of interaction allows marketing in which the users define their needs and choose their options (Saxton & Game, 2000). The new marketing strategies, together with the fact that a surfer decides what sites he or she visits (people who visit a charity's website are people who are potentially interested in what a charity has to say) make the Web an effective targeting tool. Another way of using the advantage of improved interaction with customers through the web is treating customers as potential partners in innovation. Not-for-profit organisations with online services could engage their users as collaborators or contributors in building, refining, and improving the service (Blau, 2001).

At a business operation level the Web leads to important improvements both in speed and quality. If the telephone calls to a charity help line doubled overnight, the organisation would have problems coping, let alone maintaining a high quality and rapid response. However, the Web has a high capacity for dealing with rapidly changing demand and a website (with enough server power) can easily cope with constantly changing demand (Saxton and Game, 2000). The Web could also change the way not-for-profits publish information. In printed publications mistakes can take months to be corrected, if they are corrected at all. With a website a correction can be made in minutes. It's not simply mistakes that can be rectified. The latest news from a charity can be added for easy downloading by journalists and fact sheets can be available to thousands of visitors the day they are finished (Saxton and Game, 2000).

Furthermore, as communications and information management costs fall, contracting out for services becomes more attractive, especially where other costs, including real estate, labour, or developing special expertise, are rising. An example of an interesting application is the emergence of Application Service Providers (Blau, 2001). ASPs install the software on their own servers and sell access to it over a network. The clients pay a fraction of the total cost of software and maintenance because they are sharing it with others. Not-for-profit organisations can take advantage of such strategies, and a group of ASPs like NPower and ASPIration, are already emerging to exploit these new economies for non-commercial organisations (Blau, 2001).



At last but not least not-for-profit institutions could use the Web to generate revenue. Saxton and Game (2000) report that one of the top planned Web related developments by not-for-profit institutions is purchasing (40% - third after email newsletters and jobs information available on the web site), whereas the top two absolute priorities are purchasing (31%) and fundraising via credit cards (22%). The difference between planned developments and absolute priorities may be an indication that charities' ambitions are limited by budget or organisational buy-in (Saxton and Game, 2000).

### 2.2.3 Concerns and challenges for not-for-profit organisations in the Network Era

As the costs of network access fall, accessing a network becomes easy and cheap. As a result, networks become more densely populated with both more participants, as well as more services competing for users' attention. Thus, the problem for not-for-profit organisations isn't getting access to the Web with millions of users but getting access to the attention of any one of those millions (Blau, 2001). Organisations that had been protected by geography now find themselves facing new regional or national competitors. Local not-for-profit organisations providing volunteer matching services, for example, will increasingly find that what had been their local "franchise" now faces competition for users from national volunteer matching sites (Blau, 2001). As Shapiro & Varian (1999) point out, "growth is a strategic imperative" in the network era. It is possible under specific conditions for one organisation in a sector to keep growing, attracting new members who choose the dominant player, thereby strengthening its position while others fall further behind.

Information technologies are resource intensive. They involve significant purchase costs, require significant training and upkeep, and yet become obsolete quickly. Furthermore, this spending does not automatically translate into measurable performance gains (Blau, 2001). Not-for-profit organisations may be investing in rapidly depreciating technologies without at the same time being positioned to take advantage of what they are buying.

As networks change the experience of distance and time they create new assumptions among users. Customers in different settings expect fast response, and they are able to provide direct feedback to the service provider. Individual donors, subscribers, or members of the public seeking a service provided by a not-for-profit organisation may expect the same responsiveness they have experienced with commercial organisations, which are making effective use of IT (Blau, 2001).

Concerning income generation from websites, it is a challenging task for not-for-profit organisations. According to Williams (2000) there are a number of issues, which a not-for-profit institution should examine before getting into e-business:

- E-business has to fit in with the organisation's mission. The e-business policy should aim to improve existing services; the result in the long run should be worth the initial financial investment and personnel effort.
- The cost of having an e-business component. It is not unbearable for not-for-profits. The initial cost depends on the kinds of services that the organisations will offer through their web sites. Monthly service and maintenance costs will vary.
- Not-for-profit organisations are often seen as a more trusted source of information than a commercial site, leading many people to buy products to support their mission if given the choice over a corporate e-business effort.
- Unrealistic expectations, lack of planning and promotion are major contributors to dissatisfaction with e-business efforts.
- Legal considerations. Lots of thinking is needed especially through the online order policies if the organisation is considering international orders.
- Regular evaluation of the e-business site is necessary in order to make sure it works the way it should and in order to explore how it could be improved.

#### 2.2.4 Potential value of Web technologies for museums

The popularity of the Web in museums is no accident and is "just as much a consequence of museums new visitor orientation, as it is technological appetite" (Sumption, 2000). The Web is a great equaliser among museums large and small, urban



and rural, well known and lesser known. The content transmitted through electronic networks takes up more or less equal space, creating innumerable opportunities for selection and choice in a fluid non-hierarchical environment (Thomas & Mintz, 1998).

One of the opportunities provided by the Web is that it allows museums to reach new audiences – the public at home, teachers preparing for class, students doing homework etc. There are physical limits to the number of people who can appreciate a museum exhibition, at any one time. There are geographical constraints too. However, a museum website can reach categories of people, who are either physically far away, or out of the usual target of museum initiatives (Gaia, 2000). In the case of large institutions, it is very common among visitors on a once in a lifetime excursion to complain that there is too much to see. The website could be seen as a tool for preparing visits to the actual museums, a visitor could understand better the importance of the objects and prepare his/her own itinerary according to his/her tastes and interests.

Digitisation offers the opportunity to broaden the audience for museums' collections to the whole world, but also for museums to add extensively to the value of collections in terms of interpretation, information, access and learning opportunities. Digital environments create the possibility to connect the collections to other learning environments, such as Curriculum Online and university information services (Understanding the future: Museums and 21<sup>st</sup> Century life, 2006). The Web provides great opportunities for customisation of services (Keene, 1998). New technological developments make it increasingly possible to integrate museum collections and their services more closely into people's lives by supporting personal learning environments and matching particular items to user needs, either based around where people are or their level of knowledge (Understanding the future: Museums and 21<sup>st</sup> Century life, 2006). The Metropolitan Museum (US) website offers the visitor extensive control over the format and content of their online experience (QUEST, 2000). There is an option for customising the Museum's online calendar so it displays only events of interest to the visitor and the facility for users to collate favourite works of art from the online collection. Furthermore, the Met's e-store automatically fills in contact details and

membership numbers for ease of online shopping and informs registered users of special offers and new products.

Besides offering the chance to the public to choose what they would like to see on each visit, there is also the possibility of providing the audience with enhanced information about the items of the museum collection. This information can be presented in a better way through the web than through the printed material or the labels, which accompany the artefacts of a physical exhibition. Multimedia material or text could be linked to catalogue descriptions and images of parts of the object. Moreover, virtual reality recreations or animated diagrams could be used to explain how the object works. Links to related museum objects, associated persons, other museum databases, and private collections could offer the audience a more exciting experience and therefore become an extremely useful educational tool (Keene, 1998). Already, seventy-two percent of museums in US use their web sites for educational programming (Institute of Museum and Library Services, 2002).

Through the Web there is potential to present various research activities which go on behind the scenes and which are not generally available for the public to view. Research results could be collected in electronic files and databases, and retrieved by specific users however dispersed in geography or time. Similarly, external researchers will be able to offer their research results to the museum, for incorporation into its main collections of data and information (McLeish, 1997). According to Hoopes (1997) researchers and academics will not probably replace the physical analysis of museum artefacts by similar study via the web. Nevertheless, he believes that access to information through the web can improve the ability of researchers to plan and implement study in the context of museums. Researchers can have access to text and images of museum objects, to museum archives, to integrated digital collections of museum objects. They can have access to even more advanced options like the possibility to control devices (like robotic cameras), directly or indirectly over the web, in order to get different views of an object and at the same time share comments or



observations through email or chat facilities. The museum could decide to offer all the information or a specific amount of that information to them for a cost.

Besides researchers and academics, a number of other categories of professionals would be interested in online access to that kind of information like: curators, archivists, librarians, teachers, audio-visual staff (documentation of movies), students, non professional researchers, journalists, auctioneers, restorers, or book publishers (acquiring rights for pictures or information about artefacts). Smith, L. (2001) argues that the intellectual property held by museums holds a real economic value. Museums publish their own books and collaborate with publishers on a huge range of projects, whether it is a publisher licensing a single image for the cover of a novel, or commissioning a scholarly publication by an expert working in a museum.

A website could be used not only for providing more information about the museum artefacts but also for improving customer interaction with these artefacts. Exhibitors are always looking for ways to allow people to handle artefacts, move them, and take them apart. Thomas & Mintz (1998) argue that digital media can facilitate interaction with the museum objects. The web could even be used to provide access to material, which is so fragile and vulnerable that the public cannot access it physically. According to McLeish (1997) the Web offers also the possibility of solving potential limitations of physical space by providing access to behind-the-scenes collections. The Prado in Madrid has about 8,600 paintings, but exhibits around 1,200; the Rijksmuseum in Amsterdam has around 5,000 but exhibits about half of these; the Russian Museum in Moscow has space to show only five per cent of its holdings and the Italian museums are reputed to have huge deposits of paintings mouldering away in often bad conditions (Pears, 2000).

Keene (1998) believes that one of the most important contributions of the web to a museum's mission is the two-way communication with the museum audience (bulletin board discussions, discussion lists, electronic debate). Steinbach (2003) provides an example of enhanced communication between a museum and its audience, as well as among members of the museum public. He describes a web application for museums that

involves broadband multicast. The technology was used as part of a distance-learning project of the Cleveland Museum with community institutions (e.g. nursing homes, mental health facilities). The goal of the project was to have a beneficial impact on the clients served, not only by delivering art education content, but also by increasing social interaction and intellectual stimulation.

Within the internal workings of a museum itself, Web technologies offer many ways to improve efficiency and effectiveness. One of the most important advantages of Web activity is integration. Integration involves progressing beyond the use of a museum website as a simple brochure and using it to restructure organisational processes and relationships. It has been suggested that in UK museums supported by the DCMS the number of business processes that could realistically be “integrated” electronically is limited. However, where it is possible to integrate, the benefits of integration could include: a) reduced costs, streamlined business processes and b) greater convenience to the end user and suppliers (QUEST, 2000).

Information can be disseminated to the public inexpensively and uniformly, with updates made quickly and cheaply in a dynamic website. Costs and volume of telephone enquiries can be cut by referral to the website and a ‘Frequently Answered Questions’ section and automated responses can help avoid an overload of free-form email queries. The digitisation process, which would have to take place in order to make information about the artefacts available on the web, could also lead to a more intimate knowledge of the collection acquired by museum staff (Rottenberg, 2001). This in turn can have a positive impact on many aspects of museum work from research and exhibition planning to the development of new products in the gift shop. An Intranet can be used to integrate data from a variety of sources, provide access to data by all stakeholders in an organisation, increase communication and foster collaborative working practices.

According to Muller (2002b) in online exhibitions there are no costs associated with insurance or the shipping or installation of objects. Exhibition plans could be redesigned more easily; last minute factual corrections pose few problems; and staff can be limited



to a small core team. The research and exhibition development process of an online show would be similar to that of a traditional exhibition but digitised information would be cheaper, and more flexible (Muller, 2002b). Electronic products delivered over the Web are subject to fewer constraints than their printed counterparts (no costs of printing, binding, storing, distributing). An electronic product once created by a museum can be delivered over the Web to one or thousands of individuals, in the same city or at the other side of the world, for the same cost (Keene, 1998).

The use of Web technologies can result in savings in another area of the museum operation, that of procurement. The operational benefits of e-procurement include reduction of administrative costs and improved audit trails of each transaction in the procurement process (Rajkumar, 2001). There is evidence that the implementation of e-procurement in the public sector can result in the streamlining of the purchasing process, and shorter purchasing processing times (Prier & McCue, 2007). The UK government seems to have recognised the potential value of e-procurement. It has launched “Zanzibar portal”, an initiative available to all public sector organisations (as well as institutions like national museums), that consists of a “purchase to pay” system and an e-marketplace (<https://www.zanzibarportal.gov.uk/>) and encourages not-for-profit and public sector organisations to participate in relevant initiatives.

Web technologies do not only result in savings, but can support museums with the task of income generation. There are many different ways in which Web technologies could be used in making money. It could be done by allowing advertising on the web site, by selling online museum products, by charging for access to databases or by providing access to museum content for parties interested in publishing material (Dymoke-Bradshaw, 1999). Forrester Research has recognised the ticketing industry as one of the top five services for which consumers will use the Web (Rhodes, 2000). According to a study by Arthur Andersen Consulting (2000), recreation and travel tickets are the top items that online users prefer to purchase online. For popular exhibitions, museums and galleries could offer the opportunity to book a ticket on-line. An online booking system for school parties would also make time management easier for education officers.

A website could be a medium for attracting members and donations globally (Rhodes, 2000). It would be possible for museums to benefit from on-line charitable giving; assuming security concerns over credit card payments calm down. A virtual museum could be used to raise awareness and possibly funds for a physical museum, which is still being built or designed. An online museum could also be used while its physical version remains closed for restoration; it could present the restoration process on the web and in that way raise awareness and funding. By making merchandise available through an online retail shop, a visitor could have the opportunity to purchase goods or services irrespective of time and location. Museum stores could serve as extensions of exhibition spaces, whose educational and artistic inspiration could directly influence purchases. The goods and services that museums provide could be more than simple revenue generators. The museum products could become commercial ambassadors that project the museum's trademark into the outside world, promoting the institution (Tellis and Reynolds-Moore, 2000).

A survey of more than 800 institutions by the American Association of Museums showed that the median gross income of museum stores contributed more to total operating budgets (6.8%) than admissions (6.2%) and membership fees (5.8%) (Sabulis, 2003). E-stores can contribute in a similar way to the museums' income, if managers decide to invest a similar amount of resources in building them. According to Gregory (2000) museum store wares could be seen as perfect offerings for online retail given that most web surfers tend to be well educated and financially well off, "a consumer base likely possessed of worldly tastes and the cash to satisfy them". Even if no purchase is made, a visit to a museum's retail Web page can still plant the seed for future visits to the museum and its on-site gift shop, and even return visits to the e-store.

Digitised images of pieces from the museum collections might be available through the museum website "gateway", which collects the royalty payment electronically, therefore allowing the purchaser to download them over the Web (Corfe, 1997). This approach is being taken by the British Museum Compass project and the National Portrait Gallery, both of which are encouraging users to licence images on a one-off basis for use on their



own websites, or to pay a fee for photographic quality image delivered through conventional post (Smith, 2001). There are also well developed online licensing models in the cultural sectors like the Scottish Cultural Resource Access Network (SCRAN) and, in the USA, the Arts Museum Image Consortium (AMICO). In terms of subscription based online business models, there are successful comparisons in the commercial publishing sector, and some cultural sites have introduced subscription driven online services (e.g. the Louvre developed a dedicated educational website, accessible only by subscription) (QUEST, 2000).

There also is the possibility of securing advertising sponsorships from partners based on web traffic. Tate acknowledges that its website is viable because of the high Web traffic it enjoys, with 66 million hits in 1999 (Smith, 2001). Many museum websites would provide ideal web advertising locations, as their content generates significant traffic (QUEST, 2000). The Government guidelines on websites state that advertising may be carried on public sector web pages ([www.iagchampions.gov.uk](http://www.iagchampions.gov.uk)). As in their real world locations, where sponsorship may cover an exhibition or a single gallery, examples of sponsorship often involve a company sponsoring part or the whole of the website. High-technology companies, for example, are often interested in sponsoring museum sites to showcase their technology.

#### 2.2.6 Concerns and challenges for museums in the Network Era

Besser (1997) is concerned about the losses to be incurred in the transformation of museums on the web, as “the aura” of the museum objects would be lost. Thomas and Mintz (1998) claim that looking at a painting on a screen is no substitute for the real thing. They argue that distinctions of scale disappear on screen, the electronic palette cannot perfectly match colours in the real world, and that the eye and brain process information from an object one way and information from a monitor another way. Muller (2002c) argues that the translation of museum objects into electronic representations creates both gains and losses. On the one hand, virtual programs eliminate the momentum created by the object’s physical presence. On the other hand,

the digital copy can offer new venues for contextualising the object and investigating its informational layers as well as interactive options for exploring its characteristics and history.

Besser (1997) believes that people are less likely to make a special trip to a museum to see an original object if they can see a quite reasonable facsimile at their home workstation - especially if they can “play” with it. However, Anderson (1997) argues that the demand for the original work will increase rather than decrease, following repeated exposure at an institutionally authorised site on the World Wide Web. Keene (1998) has the same view with Anderson. She believes that there is anecdotal evidence, which shows that the electronic provision makes people take up the actual counterpart more not less. She uses as examples publishers who are realising that electronic publishing helps sell the actual books and the videotaped versions of films, which were not able to destroy cinema audiences.

Web technologies adoption may have non-direct impact to different museum departments. Semper (2002) argues that in some cases resources that are allocated to web development may be diverted from exhibit development and this could be a serious issue when considering the current problems with museum budgets. A solution could be to make an effort to generate revenue from the web, which could then be used for the support of all museum departments. However, that could cause other kinds of problems. Rottenberg (2001) believes the debate on market or mission-driven institutions, which has been discussed widely in the museum literature, has a negative impact on the morale of museum staff, as many of them remain deeply committed to a public mandate. She argues that there is a division within museums between those who see information as a source of revenue and those who see it as a public good and are reluctant to any attempts of using it to generate income.

In order for museums to appropriate value from their Web systems’ investments changes both in processes as well as in the organisational culture will have to take place. Semper (2002) claims that interactions with an online audience can be much less direct than



those with physical visitors. He supports that online visitors are not captured in the same way as physical visitors are by a typical two hours visit. As a result of it, museums cannot rely on the traditional context of experience that it is observed in the exhibit gallery. Muller (2002c) argues that online activities are defined by the nervous energy of the World Wide Web, composed of a seemingly endless progression of links and museums must learn to navigate this new environment.

Muller (2002b) believes that if online museum exhibitions offer – through their composition, narrative, and design – a defined and meaningful environment, visitors will have the sense of “being somewhere” and will be less inclined to leave before they explore it. Katz (2002) draws museums’ attention to the fact that technology is a process and a culture. Because of it museums have to respond organisationally in the right way. He states that in order for museums to develop more profound Web policies they require both innovative structures and “revolutionary paradigmatic” strategies.

### *2.3 IT value studies at organisational level*

The impact of information technology on firm performance has long been a subject of intensive research, with the issues studied ranging from measurement of the impact to the conditions necessary to realise an impact. In the following sections a number of important studies, which investigated the impact of information technologies on the performance of firms are presented. A number of studies that investigated the organisational value of e-business technologies in particular are also presented.

#### *2.3.1 The early years - Productivity Paradox*

In the early 1980s a number of researchers focused on assessing the contribution of IT investments to performance metrics such as return on investment (ROI) and market share. Cron & Sobol (1983) studied the relationship between the number and type of computer applications and firm performance in 138 medical supply wholesalers. They found that on average, the IT impact was not significant, but that it seemed to be associated with both very high and very low performers. Strassman (1990) also reported disappointing evidence on return from IT investments in his study of 38 services sector firms. He found no correlation between IT and return on investment, he observed that some top performers had invested heavily in IT while some others hadn't. He concluded that there was no relation between spending for computers, profits and productivity. Weill (1992) examined IT investments in the valve-manufacturing business and found no overall relationship between IT investment and performance. However, he established a relationship between investments on transactional IT and return on assets (he made a distinction between three types of IT according to its function: transactional, informational and strategic).

Economics-based studies also pointed to disappointing results regarding IT productivity. Loveman (1994) provided some of the first econometric evidence of a potential problem when he examined data from 60 business units (Fortune 500 organisations). He included in his model variables such as IT capital, non-IT capital, and inventory during the 1978-



1984 time period and estimated that the contribution of IT capital to output was approximately zero in almost every sub sample he examined. He concluded that the non-IT factors of production would be preferred to IT for additional investments. Based on the disappointing observation that there was no correlation between IT investments and productivity, Roach (1989) coined the term “IT productivity paradox”. In his study on white-collar productivity, he found that IT was an effectively used substitute for labour in most manufacturing industries, but was paradoxically associated with growing white-collar employment in services, especially finance. Alpar & Kim (1990) found a more encouraging result than the previous mentioned studies. They showed that a 10% increase in IT spending led to 1.9% reduction in total costs. However, they noted that the methodology used to assess IT impacts could affect the results (they tried two approaches to the same data set and got different results).

Brynjolfsson (1993) in an attempt to explain the negative findings of those studies (productivity paradox) suggested that measurement issues (relatively small samples drawn from private sources), possible lags between IT investments and impacts, redistribution of outputs within an industry as well as mismanagement could lead to wrong conclusions. Mukhopadhyay, Kekre, & Kalathur (1995) suggested the complexity of isolating the effect of IT on firm performance as another factor that might have contributed in the negative results of those studies. Dedrick, Gurbaxani, & Kraemer (2003) believed that the problem with those studies was not the type of measurement but the actual data utilised, which were collected before the Web boom and before the advent of the so-called “new economy”.

### 2.3.2 Research from mid-90s to date

In the 1990s several streams of research on measuring the economic and performance contributions of IT have progressed concurrently and independently. One line of research can be classified as the process-oriented business value approach. Another stream of research continues the tradition of production economics whereas a third group of studies examined a number of complementary factors to IT, which had an impact on

the performance of the firm. The characteristic of the majority of these studies is that they have shown positive and significant returns to IT investments, and in most cases higher gross returns than for other investments.

### *Process oriented studies*

Barua, Kriebel, & Mukhopadhyay (1995) argued that the IT value studies which attempted to relate IT expenditures directly to output variables at the level of the firm (such as market share), through a microeconomic production function, have ignored the intermediate processes through which IT impacts arise. Kauffman & Weill (1989) suggested that the locus of impact, that is, the business process, should be the primary level of value analysis for the benefits to become noticeable for the investing firm. Soh & Markus (1995) proposed that the IT investment process should be broken down further to examine if it created the appropriate IT assets, and if such assets lead to the appropriate IT impacts. They believed that between the IT assets (i.e. investments in IT projects, applications and skill base) and organisational effectiveness, there could be many “losses” that might prevent the organisations from realising a payoff.

Barua, Kriebel, & Mukhopadhyay (1995) suggested that economic impacts might be measured at lower operational levels in an enterprise at or near the site where the technology is implemented. They argued that these effects might then be traced through a chain of relationships within the organisational hierarchy to reveal higher order impacts on business performance. In their study they analysed intermediate level variables such as capacity utilisation, inventory turnover, quality, relative price and innovation (i.e. new product introduction), which were found to be strong predictors of two high level measures: return on assets and market share.

The approach of assessing the business value of investing in IT at the process level has been applied by Mukhopadhyay and associates but in a different way as they concentrated on the impact of specific IT applications. Mukhopadhyay, Kekre, & Kalathur (1995) assessed the business value of electronic data interchange in a manufacturing setting. They found that EDI enabled effective use of information to



coordinate material movements between the manufacturer and its suppliers, which resulted in significant cost savings and inventory reduction. Mukhopadhyay, Rajiv, & Srivasan (1997) examined the optical character recognition and barcode sorting technologies in the mail sorting process at the United States Postal Service. Their analysis was at the application level and didn't involve aggregation of IT impact over multiple processes. They used an econometric model to investigate the impact of the specific technologies on both the sorting process output and the quality. Their results showed that mail-sorting output significantly increased with higher use of IT. They also found that IT improved quality, which in turn enhanced output.

In another study, Mukhopadhyay, Lerch, & Mangal (1997) examined the impact of introducing new IT in the toll collection process of 38 interchanges at the Pennsylvania Turnpike. In this study, they proposed an analysis at the information process level in order to understand the impact of IT. They defined the information process as a "goal directed transformation of information by an organisational unit consisting of tasks performed by either human or computing processors". Their aim was to analyse how the new IT changed the information tasks and if it had an effect in labour productivity both in the case of simple and complex transactions. They found that the new IT had a substantial impact on the efficiency of processing complex transactions but had no impact on simple transactions.

The great advantage of the process level approach is that it allows the researcher to trace the effect of IT on specific processes and tasks. However, the process level approach may not be suitable for investigating issues of value for applications with unclear boundaries (Barua & Mukhopadhyay, 2000; Mukhopadhyay, Lerch, & Mangal, 1997; Mukhopadhyay, Rajiv, & Srivasan, 1997)

#### *Production Economics-based approaches*

Hitt & Brynjolfsson (1996) continuing the tradition of production economics approaches, used the Cobb-Douglas production function (with computer capital, non-computer capital, IS staff labour and other labour as inputs) to investigate the impact of IT to the productivity of 367 large firms. They investigated the period 1987-1991,

discovered that spending on computer capital created more value than spending on other types of capital and concluded that the productivity paradox had disappeared by 1991. Brynjolfsson and Hitt in their study used the same models that previous researchers had used. They explained that their results were different from studies that supported the “productivity paradox” because of the use of a larger sample and more detailed firm level data.

The problem with the approach that Hitt & Brynjolfsson (1996) used (straightforward application of production economics) is that it does not allow the researcher to measure various efficiencies associated with the production process (Barua & Mukhopadhyay, 2000). Barua and Mukhopadhyay (2000) suggested the combination of both efficiency and productivity measurements within a single framework. They argued that “allocative” efficiency is important as it measures how well management chooses levels of various inputs (e.g. given the rapid decline in IT prices, a firm with high “allocative” efficiency would use more of IT and less of other inputs)

Menon, Lee, & Eldenburg (2000) used the stochastic production frontier approach to assess both the productivity and efficiency of IT investments in the health sector. In their model, they categorised Capital expense into three separate categories: IT capital, medical IT capital, and medical capital and included control variables for teaching hospitals and time-related factors for the period (1976-1994). They found that both IT and medical IT capital had a positive influence on output. In addition, their results indicated that IT labour and medical labour had a positive influence on output as well as a positive impact on mean marginal revenue. However, they found that medical capital was negatively associated with output during the specific time period (1976-1994). They explained that the latter finding might have reflected hospitals’ attempts to contain costs by substituting outpatient services for inpatient services, resulting in a decrease in length of stay for acute care wards (where medical capital is invested) and increasing outpatient visits for diagnostic tests and procedures (where medical IT capital is invested).



In studies like the above-mentioned where the elasticity of IT remains positive and significant even after the firm effects are taken into account, it is found that the productivity impacts of IT investments vary widely among different companies. Thus, a question arises about what causes these firm effects. This is a question that cannot be answered by this type of studies. Another problem with these models is the inability to handle issues like quality and speed of service (Brynjolfsson, 1993; Brynjolfsson & Hitt, 1998) and the fact that they don't include any costs of complementary investments such as training and process re-engineering on the investment side of the equation (so the results might present a more positive picture than the real situation).

In spite of the theoretical rigour of the production function approaches, these approaches do not have the explanatory power to locate where and how IT impacts are created and where management action may be necessary to increase the payoff from IT investments. The aggregate level of analysis in the production function approaches makes it difficult to distinguish between different types of IT investments and their impacts on specific areas of business.

*Studies using organisational variables (complementary factors' studies)*

Brynjolfsson & Hitt (1996) called for additional research to analyse the factors, which differentiate firms with high returns to IT from low performers. A couple of years after their first call they confirmed that while the average returns to IT investment were solidly positive, some organisations were spending vast sums on IT with little benefit, while others were spending similar amounts with tremendous success (Brynjolfsson & Hitt, 1998). Accounting for the complementary changes within the organisation was suggested as fundamental to achieve an understanding of the role of IT in adding value to organisational initiatives (Powell & DentMicallef, 1997). A number of IS researchers tried to investigate the contexts and conditions under which IT might improve performance.

Strassman (1990) was one of the first researchers who suggested that causal relationships between investment and returns should be interpreted in the context of managerial strategy. He argued that managerial strategy for the firm in the marketplace might play a

significant role in determining returns on investments. Weill (1992) went one step further and introduced the concept of “conversion effectiveness”. Conversion effectiveness was used to describe the way specific factors like top management commitment, user satisfaction, internal political turbulence and firm’s IT experience could affect the realisation of value from IT investments. Weill (1992) found that conversion effectiveness was an important moderator between “strategic” IT investment and performance. Although the “strategic” IT investment and firm performance were either not associated or negatively associated, firms with high conversion effectiveness were relatively better performers for the same “strategic” IT investment. Weill (1992) did not find any influence of “conversion effectiveness” on the realisation of value from other types of IT investments (transactional or informational), however, he argued that the inclusion of contextual factors in examining the value of IT investments for organisations would be a good way to understand why companies that invest the same amount in IT and have the same objectives experience different performance effects.

Several years later, influenced by Weill’s work, Barua, Lee, & Whinston, (1996) presented a theory called “business value complementarity”. One of the arguments based on this theory was that investments in IT and re-engineering couldn’t succeed in isolation. They argued that since technology and business processes were viewed as complementary factors they should be changed in a coordinated manner to improve performance. Another study on the issue of complementarity of re-engineering and other managerial practises to IT had different results. Kraemer & Ramirez (2003) studied the influence of IT and three types of work practices (employee involvement, TQM, and re-engineering) in Fortune 1000 firms throughout the 1990s. They found that organisations that invested more in IT and implemented employee involvement and TQM had better performance. However, they found no relationship between re-engineering work practices and IT and the adoption of these two factors and firm performance.

Black and Lynch (2003) used a microeconomics approach (the Cobb Douglas production function) to investigate the impact of different work practises and IT to the financial performance of the firm. They found that what affected productivity was not whether or



not an employer adopted a particular work practice but rather how that work practice was implemented within the organisation. For example, neither total quality management nor profit sharing exclusively for managers increased productivity. However, profit sharing for non-managerial workers had a positive effect on the performance of the firms. Concerning IT they showed that the greater the proportion of non-managerial workers who used computers, the higher was plant productivity.

Francalanci & Galal (1998) investigated a similar area in their study of life insurance companies. They found that increases in IT expenses when accompanied by changes in worker composition resulted to productivity benefits. They reported that life insurance companies that decreased their proportion of clericals and professionals while at the same time investing in IT had experienced productivity improvements. On the other hand, companies that decreased their proportion of managers while investing in IT were found to have reduced productivity.

Powell & DentMicallef (1997) conducted a survey with executives from the US retail industry in order to investigate the relationship between IT and several organisational resources and the way the combination of IT and these resources might produce competitive advantage. Their survey instrument included items corresponding to complementary human resources (e.g. open organisation, open communications, organisational consensus, CEO commitment, organisational flexibility, IT-strategy integration), complementary business resources (e.g. supplier relationships, IT training, business process design, team orientation, benchmarking, IT planning) and technology resources. They used two performance measures as the dependent variables in the study: IT performance and financial performance. Their findings showed that IT alone didn't produce sustainable performance advantages in the retail industry, but that some firms had gained competitive advantage by using IT to exploit human and business resources such as flexible culture, strategic planning-IT integration, and supplier relationships.

Strategic planning – IT integration was found to be an important complementary factor to IT in another study. Tallon, Kraemer, & Gurbaxani (2000) conducted a survey on



executives' perspectives on IT value. Using the value chain to represent the different business processes, they constructed a list of survey items to assess the perceived impacts of IT on a set of business activities at the core of a firm's value system. They discovered that management practices like strategic alignment and IT evaluation were strongly associated with perceived payoffs from IT investments. Thus, firms whose IT was closely aligned with the business strategy had higher perceived payoffs from IT and firms that made extensive use of ex-post evaluation techniques had also higher perceived payoffs from IT.

The results of the above-mentioned studies are based either on secondary data or on questionnaire data. However, understanding the relationship between firm specific factors and IT complementary factors like management or work practises cannot be addressed in large-sample studies. Although, there is a need to examine this relationship, it is obvious from several reviews of the IT value literature at the firm level (Chan, 2000; Dedrick, Gurbaxani, & Kraemer, 2003; Kohli & Devaraj, 2003) that there are not many of these studies currently available.

One longitudinal study that examined the influence of firm specific factors to the realisation of IT value was a study by Devaraj and Kohli (2000) in the health sector. They examined monthly data over a three-year period from eight hospitals that had recently implemented Decision Support Systems. They investigated the relationship between investments in IT and two kinds of revenues (net patient revenue per day, net patient revenue per admission) as well as investments in IT and some quality measures (mortality rates, customer satisfaction). They discovered that IT investments had immediately a positive impact on quality but it took more than three months to make a positive change to the profitability of the hospitals. They also investigated the combined effect of re-engineering and IT investments on the same performance measures and found strong support that their combination leads to improved financial performance for the organisation.

Sherer, Kohli, & Baron (2003) also examined firm specific factors in Cisco Systems using an exploratory case research approach. They studied the impact of organisational change management initiatives, aiming to support IT implementation, on IT payoff. They investigated a Cisco Systems' IT investment in an operating systems upgrade. The findings indicated that planned communications and change management strategies developed by Cisco's Systems Organizational Change Management group led to the smooth implementation of the upgrade process and contributed to the payoff from the IT investment, measured in terms of client satisfaction with the process and system and reduced cost and time to upgrade all systems.

### 2.3.3 General observations on the IT value literature

#### *Lack of IT value studies using non-financial dependent variables*

It is evident in reviews of the IT value literature at the firm level (Chan, 2000; Dedrick et al. 2003; Kohli and Devaraj, 2003) that the majority of the studies examine issues of profitability - financial performance. However, Brynjolfsson and Hitt (1998) suggested that the value of IT investments should not be measured only by cost savings. They recommended that improvements in quality, customer service, and new product development should also be considered. Such improvements are often not reflected in improved financial performance, as benefits may be redistributed within or across organisations or even passed on to consumers. For example, in a study of the IT impact on the number of suppliers, Bakos & Brynjolfsson (1993) showed that IT enhancements would give suppliers the incentive to be more responsive and innovative, in exchange for a fair share of the surplus generated in the IT-enhanced transaction.

Another problem with the financial performance measures is that they may not be suitable for evaluating the performance of not-for-profit organisations. Human resource metrics (e.g. employment efficiency and effectiveness, operating costs per work team, required vs current skill set) may be more suitable to evaluate the performance of not-for-profit institutions. According to Macpherson (2001) human costs could account for more than 75% of overall costs in not-for-profit organisations compared to capital based



organisations whose human costs may be less than 15% of total costs. Thus, attention to human resources performance may be more critical for those organisations.

#### ***Domination of “Black Box” approaches***

Another issue observed in literature reviews of IT value studies is that the majority of the articles published used organisation-level analysis, either solely or in conjunction with other analytic approaches. However, organisation effectiveness is achieved, and IT contributions are made, at many different levels (e.g., the individual and group). Barua et al. (1995) argued that the effects of IT on organisation performance could best be identified through a “web of intermediate level contributions”. However, this intermediate (e.g., process, individual, and group) approach to analysis has not been the norm. Instead, a “black box”, input-output approach has been dominant in the IT value literature. Dhillon (2005) argued that there is a dearth of interpretative case studies focusing on realising IT investment payoffs and this is the only type of studies that can examine the process of value creation at different organisational levels in detail.

Chan (2000) suggested that more concepts in IT value research could usefully be identified at intermediate levels. She proposed the use of innovative models (e.g., dynamic, process-focused, open system models of IT investments) to examine the impact of IT at different levels. She also suggested drawing on reference disciplines like organisation development or sociology, to examine organisational phenomena such as culture: the set of shared, taken-for-granted implicit assumptions that determine how a group perceives and reacts to its environments and its investments.

#### ***Limited number of IT value studies in small organisations outside US***

Besides the choice of variables and research designs, another aspect of IT value studies where one dominant choice is observed is the context. The majority of the IT value studies published in IS journals involve firm-level analysis mainly conducted in the United States. There are not many studies conducted on firms in other countries. Some of the existing studies produced similar results to the studies conducted in American firms. Bartelsman, Leeuwen Van, & Nieuwenhuijsen (1996) collected data on

manufacturing technology use in the Netherlands and found that adoption of advanced technology was associated with higher labour productivity, higher export intensity and larger size. Greenan, Mairesse, & Topiol-Bensaid (2001) analysed data on French firms' IT investment and productivity and came to results consistent with the findings of Brynjolfsson and Hitt (1996) for US based firms. However, a couple of studies in Asian countries had different results. Lal (2001) didn't find a relationship between IT investment and productivity in Indian garment makers and Teo & Wong (1998) found that the intensity of IT investment had no relationship with information quality and improvement in work environment in the retail industry in Singapore.

Another issue is that most of the research has involved data on large private organisations (especially the studies based on secondary data), as it is more difficult to get good financial data on smaller firms. However, the results of these studies should not be taken to represent the entire universe of organisations. For instance, very little is known about the ways in which information technologies are shaping and being reshaped by voluntary organisations and to what effect (Burt & Taylor, 2003). It may be that a more representative sample in the case of quantitative studies would show either higher or lower returns to IT investment and in-depth qualitative studies might discover that the process of value creation is influenced by factors related to those organisational characteristics (i.e. size or organisation's activities).

#### 2.3.4 Measuring the impact of E-business on Organisational Performance

There are a variety of views on whether e-business imposes special measurement needs. Some argue that e-business technologies are no different than other forms of IT, only a different type of asset. Others indicate that the metrics of e-businesses are evolving. Two special issues of Information Systems Research on e-commerce metrics placed the spotlight on the need for identifying metrics of electronic commerce (Straub et al., 2002). Clearly, e-business environments have re-defined the way organisations conduct



their operations. Therefore, it is argued, e-business environments should be given special consideration in measuring investment (Barua and Mukhopadhyay, 2000).

There are several studies, which examine issues of e-business value from the customer point of view, but these studies usually concentrate on defining metrics that contribute to a customer's improved e-commerce experience or to customer loyalty (Agarwal & Venkatesh, 2002; Chen & Hitt, 2002; Devaraj, Fan, & Kohli, 2002; Palmer, 2002) and do not trace the impact of these factors (loyalty, improved experience) to the performance of the firm. There is currently very little empirical data measuring the scale and characteristics of the Web-based initiatives and their impact on firm performance (Hong & Zhu, 2006).

Saeed, Hwang, & Grover (2003) examined how customer value created through improved web site interface and advertising affected firm performance in an electronic commerce context. They found that advertising spending alone (in order to attract visitors to the web site) did not have a significant impact on firm performance. However, the combination of advertising spending with a superior shopping experience provided by specific web site features that facilitate presale, sale and post-sale tasks had an impact on the firms' profit measured in terms of economic value added (EVA). Saeed, Grover, & Hwang (2005) suggested that Net-enabled companies that offer value creating and enhancing services when a customer is in the process of making a purchase decision online can attain high growth. They found that services that enhance product ownership experience and stimulate future purchases from the same company result in increasing customers' loyalty and consequently affect in a positive way short-term and long-term organisational performance.

Barua et al. (2001) found in a survey of more than 1000 companies (covering manufacturing, retail, distribution and wholesale sectors) that there was a strong association between e-business initiatives and operational excellence, and between operational excellence and financial performance. They concluded that the achievement of e-business operational excellence would lead companies to improved financial

performance. They also suggested eight drivers of e-business excellence within three areas a) e-business processes for customers and suppliers, b) IT applications for customers, suppliers and internal operations and c) the e-business readiness of customers and suppliers.

Zhu & Kraemer (2002) extended the IT-productivity research stream into the Web domain. They investigated 260 manufacturing companies to find out if e-commerce capabilities in conjunction with a firm's infrastructure were associated with specific performance measures. They found that higher e-commerce capability was associated with lower costs and supply chain efficiency but was not significantly associated to firm performance (total sales, profit margin). Subramani & Walden (2001) used the event study methodology to assess the impact on the market value of e-commerce initiatives announced by firms. They discovered that the impact of the e-commerce announcements to the market value of the firms in general was significant and positive. Lee, Cho, & Lee (2002) used the same method but with a Korean sample. They examined the effects of e-business announcements to the market value of firms and provided information on the differences in the effects according to capital market layer, and type of e-business activity (i.e. expansion or new initiative). The overall results of the study supported the view that e-business initiatives contribute to the creation of considerable future benefits for firms, which is reflected in the enhancement of the market values of firms.

Although recent literature reviews of IT value studies (Chan, 2000; Dedrick et al. 2003; Kohli and Devaraj, 2003) do not contain information on e-commerce studies, it seems that the e-commerce studies published in the last couple of years follow the same pattern as previous IT value studies. Thus, the majority of these studies use financial variables to assess effects on performance, collect data from secondary resources or surveys and analyse the impact of e-commerce initiatives only at the organisational level. However, these methodological approaches do not allow the researcher to address questions like why, how, and to whom e-commerce investments provide value. Case study designs with a combination of individual, group, process, and organisation-level measures might be more suitable to answer these questions. However, there has been a notable absence



of longitudinal case study designs, as well as structured multiple case study designs in e-commerce literature (Drew, 2003).

Besides the need to use a variety of research approaches there is also a need for future IT value studies to move their focus away from isolated investments in IT applications to the interrelated nature of IT and business. Barua and Mukhopadhyaya (2000) believe that especially in the case of e-commerce, given the widespread availability of Web compatible networking technologies and applications software, the technology will not be the decisive factor for success. On the contrary, only firms that would recognise and act on complementarities between business strategies, processes and incentives would be likely to succeed in the new digital economy.

### *Conclusion*

Web technologies have enabled organisations to change the way they interact with customers and suppliers in order to improve operational and financial performance. Despite the potential for improved organisational performance, there is a lack of systematic evidence regarding the process through which value is created from Web technologies. Existing e-business value studies showed that higher e-business capability is associated with operational excellence, as well as lower costs and supply chain efficiency. Although the insights provided by existing e-business value studies have been significant, they fall far short of providing an adequate answer to the question of why and how e-business investments generate value, especially within not-for-profit organisations.

The majority of existing studies use mainly financial variables to assess effects on performance and they analyse the impact of e-business initiatives at the organisational level (i.e. they do not trace value within the organisation). The results of those studies are based on methodological approaches like surveys or the analysis of secondary data. Those approaches do not allow the researcher to examine in detail the process of e-

business value creation within the organisation or focus on the interrelated nature of IT and organisation.



## CHAPTER THREE: THEORETICAL FRAMEWORK

*“As we come to recognize the conventional and artifactual status of our forms of knowing, we put ourselves in a position to realize that it is ourselves and not reality that is responsible for what we know.” (Shapin & Schaffer, 1985 p. 344)*

### *Introduction*

The discussion in the previous chapter revealed that the majority of studies on the value of Web-based technologies considered those technologies as sheer technical systems with organisational consequences. Those studies made no effort to trace the value from Web technologies at different levels within the organisation, and the effect of organisational factors on the process of value creation. According to the results of those studies we know that higher e-business capability is associated with operational excellence and that e-business initiatives are associated with improvements on financial performance. However, existing studies did not provide an adequate answer to the question of why and how the above-mentioned benefits can be achieved by organisations. The benefits obtained from Web technologies can vary quite dramatically according to the internal processes and activities, which determine how those technologies are used within an organisation.

Approaches that treat IT as a technical system, overestimate the ease of “going digital” by substantially underestimating the complexity and time of the required organisational changes (Kling & Lamb, 2000). It is the “hidden costs and benefits” of IT, which are “likely to be non-technical” that need to be identified in IT value studies (Brynjolfsson & Hitt, 1996). It has been suggested that research on IT implementation, should adopt a perspective that is not just techno-centric or socio-centric, but one that gives equal consideration to the technical and social dimensions, and the interactions between the social and the technological (Sarker & Lee, 2003) and future studies should examine a number of non-technical aspects of organisations, which affect e-business (Clegg,

Icasati-Johanson & Bennett., 2003). Thus, it was considered that a theoretical approach, which allows the researcher to focus on the interrelated nature of Web technologies, business, and organisational factors, would complement existing research and would provide some answers to questions like why and how benefits can be achieved from those technologies. This study proposes that only with the use of a theoretical framework, which takes into account the organisational and cultural issues embedded in Web-based systems, it is possible to understand better the process of acquiring value from those systems.

The author of this study believes that the role of a certain technology is determined by the social context into which it is introduced. Specific organisational outcomes arising from the introduction of technology in any social context tend to “surface” depending on a number of situational factors (Markus & Robey, 1988). The same technology might be used in different ways by different people, leading to different outcomes. Technology will not only be adapted by different users, but it will also be interpreted by people in different ways. Kling & Scacchi (1982) argue that the introduction of technologies in work practices has consequences that depend on peoples’ actual behaviour and the history of related changes in the specific organisation may influence the new change. Furthermore, there is no linear path between the design of a technology, its use and its impacts. In the real world the boundaries between what is social and what is technological blurs, because some of the system design encodes assumptions about the social organisation of the firm in which it is embedded (Kling & Lamb, 2000). Predicting the effects of a certain technology is difficult as: a) there could be a mismatch between the intentions of those implementing technologies and their actual use and b) the same technology could have many different effects. A synthesised theoretical framework based on the “Mangle of Practice” by Pickering (1995) and the “Limits to Value” model by Davern & Kauffman (2000) matched the above mentioned assumptions and the researcher’s general view of IT and was therefore, chosen to guide data collection.



This chapter presents a discussion of the two elements of the synthesised theoretical framework used for this study, as well as a brief discussion of the relationship between the social and the technical as viewed by theories originating in the field of social science or in science and technology studies. Thus, the chapter starts with an introduction to the main assumptions of technological determinism. Then the basics of the socio-technical systems theory and social constructivism (including the main theories within this paradigm) are outlined. A detailed discussion of the “mangle of practice” follows and the chapter ends with a description of the main concepts of the “limits to value” model.

### *3.1 Technological determinism*

In technological determinism information systems are considered as technical systems with social consequences. Technological change is an independent factor that affects society from outside of society (MacKenzie & Wajcman, 1985). “Rather than as a product of society and an integral part of it, technology is presented as an independent, self-controlling, self-determining, self-generating, self-propelling, self-perpetuating and self-expanding force.” (Chandler, 1995) The most widespread account of how technology comes to be an independent factor according to MacKenzie and Wajcman (1985) is that scientists discover, technologists follow the logic of those discoveries in turning them into new techniques and new devices and these techniques and devices are then introduced into society and have effects. Although technologists are members of society, their activity is seen as independent of their membership in the society.

This paradigm assumes that technologies implemented within organisations largely determine organisational performance, organisational structure and behaviour, more than interpersonal behaviour and leadership styles. Technologies have a progressive role based on their supposedly inherent qualities. Negative views on the impact of technologies are not uncommon within this paradigm. However, the majority of the proponents of this theory tend to presume that what happens in organisations and society is generally determined by the nature of technology, and they usually believe in

technology as a positive social force. Thus, technologies appear to have attributes that automatically make organisations more effective, flexible and adaptable.

Within the technological determinism paradigm, different views can be found ranging from “hard” to “soft” determinism. The variations of technological determinism are often distinguished by the extent of human intervention considered possible, the importance of technical constraints, the relative autonomy of technology, and questions of the historical development of technology (Winner, 1977). Hard technological determinism argues that information technology will radically transform society and our ways of thinking. Soft technological determinism presents technology as a key factor, which may facilitate changes in society and behaviour (Chandler, 1996). Technological determinism implies diminished human choice and responsibility in controlling technology and has been criticised by Science and Technology scholars for ignoring issues of power and politics and for ascribing an independent role of “neutral” change agent to technologies.

### *3.2 Socio-technical theory*

The socio-technical theory perceives the positive effects of technology as depending on both social factors and the technical qualities of the technology itself. The original theory, as formulated by Emery & Trist (1960), treats the organisational unit as a complex whole composed of two independent sub-systems, which influence each other. These are: a) the social system made up of people with distinct biological, social and psychological needs and b) the technical system, consisting of machines, other human artefacts as well as the knowledge embedded in them. Socio-technical theory researchers have been concerned with the social and psychological issues faced by employees in increasingly automated workplaces and were committed to promoting the active participation of employees in designing desirable workplaces. They saw themselves as intermediaries acting between machine designers, upper level management and the workforce to insure that socio-technical systems took both social and technological factors into account in the design of organisations (Kaghan & Bowker, 2001).



The socio-technical theory went beyond technological determinism in two ways: (1) by opening up the technology “black box”, so technology could be studied in detail; and (2) by bringing notions of systems theory that were in the air at the time, down to earth, so that the implications of systems thinking became more comprehensible (Griffith & Dougherty, 2001). The theory has been used widely in information technology design and implementation. The term “socio-technical system design” was used for the first time around 20 years ago to indicate information systems design approaches, which stress the importance of job satisfaction, workers’ needs, and skill enhancement (Mumford & Weir, 1979). Bostrom & Heinen (1977) also integrated STS principles into systems analysis and design techniques. Some IS researchers used the theory as a basis for examining the intersection between IT and organisational change (Lyytinen, Mathiassen, & Ropponen, 1998), whereas others used STS as the lens to investigate IT investment and adoption processes (Grenci, 2000; Ryan, Harrison, & Schkade, 2002).

Although the theory acknowledges both a social and technical side to information systems, the two subsystems are treated independently and viewed from a realist perspective. For that, socio-technical approaches have been described as “socially naive” (Avgerou, 2002 p. 54). Only the Dutch socio-technical school (Eijnatten & Zwaan, 1998; Sitter, Hertog, & Dankbaar, 1997) rejects the idea of a purely social system discrete from a purely technical system. “A (sub) system is always a complete set of relations between various elements that perform a certain function. Such relations are always social as well as technical.” (Sitter, Hertog, & Dankbaar, 1997).

Another limitation of the socio-technical perspective is its lack of regard for organisational politics. For socio-technical researchers, politics are considered disruptive, unless they can be mobilised in favour of managerial goals. The theory favours a very rational view of organisational change neglecting the various interpretations of the effect or the benefits of technology. However, individuals and groups of individuals act pragmatically rather than rationally (Kaghan & Bowker, 2001). Weick (1990) and Orlikowski (1992) have argued for incorporating into the socio-

technical tradition, the more complex “pragmatist/culturalist” approaches to the study of institutions and institutional processes that have been developed in sociology and anthropology. Those approaches recognise the “situatedness” (i.e. cultural specificity) of human intelligence (Weick, 1990).

### *3.3 Social construction of technology*

A stream of IS research influenced by the socio-technical theory is the social constructivists (Orlikowski, 1992). The social construction of technology perspective challenges any “a priori” distinction between the technical and the social and rejects assigning a dominant role to either of them. Social constructivist theories suggest that technology is shaped by different influences as part of its development and then reshaped in use. “Technology and its shaping have to do with the historical, the economic, the political and the psychological, as well as with the sociological” (Bijker & Law, 1992 p. 5). The stream of IS research influenced by this perspective examines how shared interpretations of information technology arise and affect the development of and interaction with that technology (Boland & Day, 1982; Klein & Hirschheim, 1983).

Although there are differences between social constructivist approaches, there are some important similarities that bind them together: “Authors have been concerned with moving away from the individual inventor (or “genius”) as the central explanatory concept, from technological determinism, and from making distinctions among technical, social, economic, and political aspects of technological development. The last point has been aptly summarized by using the metaphor of the seamless web of society and technology.” (Bijker, Hughes, & Pinch, 1987 p. 3). Bijker, Hughes and Pinch (1987) identify three main theories within this paradigm: the Social Construction of Technology (SCOT), the Systems Thinking, and the Actor-Network Theory (ANT).

#### **3.3.1 SCOT**



There are four main components to the conceptual framework of SCOT: relevant social groups, interpretive flexibility, closure mechanism/stabilisation and technological frame. Pinch & Bijker (1987, p. 30) define relevant social groups as “all members of a certain group [who] share the same set of meanings attached to a specific artefact”. Interpretative flexibility describes the way in which different social groups involved with a technology understand the technology. There is not just flexibility in how people interpret artefacts but also in how artefacts are designed. Artefacts are the product of inter-group negotiations. The interpretive flexibility diminishes, when one meaning of one specific social group becomes dominant. This stabilisation of an artefact over a period of time is what Pinch and Bijker (1987) call “closure”. Finally, technological frame refers to the socio-cultural and political context of a social group, which shapes the group’s norms and values, and influences the meaning they assign to an artefact (Pinch and Bijker, 1987).

The SCOT theory is criticised on a number of points. One of the main criticisms is that it focuses on relevant social groups, without attending to potential power asymmetries between these groups. However, not all social groups have equal access and power to influence technological innovations; class, race, gender, education and ethnicity may be important factors in the evolution of technology (Winner, 1985). Another criticism is that SCOT explains how technologies arise, but ignores the effects of the technologies after the point of “stabilisation” (Winner, 1993). Thus, the design and construction of technologies is said to be social as well as technical, but only up to the point of stabilisation.

### 3.3.2 Large Technical Systems Theory

One of the main critiques on both the SCOT and the ANT approach is that both deal mostly with small-scale systems. The large technical systems theory by Hughes partly provides an answer to this problem. Hughes uses large technological systems (not artefacts) as the unit of analysis to explain the relationship between the technical and the social. “Technological systems contain messy, complex, problem-solving components.

They are both constructed and society shaping. Among the components in technological systems are physical artifacts, such as the turbo generators, transformers, and transmission lines in electric light and power systems. Technological systems also include organizations, such as manufacturing firms, utility companies, and investment banks, and they incorporate components usually labelled as scientific, such as books, articles, and university teaching and research programs. Legislative artifacts, such as regulatory laws, can also be part of technological systems. Because they are socially constructed and adapted in order to function in systems, natural resources, such as coal mines, also qualify as system artifacts” (Hughes, 1987 p. 51).

The different components of the technological systems cannot be studied in isolation; the development of one part depends upon its relationship to other parts. The evolution of those systems takes place in six stages: invention, development, innovation, transfer, and growth, competition, and consolidation. These stages are not simply sequential but overlap. As systems mature they acquire technological style and “momentum”. According to Hughes’s theory of momentum, when a technology is young, society can control its use and scope; however, when a technology matures, it becomes embedded in the society and its own deterministic force takes hold. “System builders” are very important in the development of those systems. According to Hughes, the driving force of system builders originates from the vision of how to integrate the system components into a functioning entirety, and the desire to control this development. A system builder can be an individual (e.g. engineers, managers, innovators, politicians), an informal group of people, a project group or an organisation.

Most criticisms about the large technical systems tradition refer to the exaggerated significance assigned to the concepts of “momentum” and “system builders”. The importance of momentum is questioned by Bijker & Law (1992) with the essence that technological development is never predetermined. Furthermore, the focus on heroic actors (i.e. the successful system builders) and their will to control and expand the systems promotes a biased top-down perspective. According to Law (1991) the focus on a certain actor’s efforts might obscure the importance of other actors and aspects relevant



to the development of the system (e.g. the end-consumer, the services provided by the system or the applications of these services).

### 3.3.3 The Actor-Network Theory

Another approach within the social constructivist paradigm is the actor-network theory (ANT) developed by scholars including Bruno Latour, Michel Callon and John Law. The ANT looks at technology and society as “mutually constitutive” (MacKenzie & Wajcman, 1985 p. 23). The theory argues that the world is full of hybrid entities containing both human and non-human elements (people, social groups, artefacts and devices) and was developed to analyse situations, where the separation of those elements is difficult (Tatnall & Gilding, 1999). “The actor network is reducible neither to an actor alone nor to a network. Like networks it is composed of a series of heterogeneous elements, animate and inanimate that have been linked to one another for a certain period” (Callon, 1987 p. 93). Human actors, as well as technology and nature are treated as equal elements in variable actor-networks (in contrast to predefined systems) that need to be redefined regularly.

The ANT is concerned with tracing the transformation of heterogeneous networks. “It explores the ways that the networks of relations are composed, how they emerge and come into being, how they are constructed and maintained, how they compete with other networks, and how they are made more durable over time” (Tatnall and Gilding, 1999). According to ANT, there are three overlapping stages involved in the establishment of technology networks. The first stage is called inscription and it refers to the ways in which technology embodies the beliefs, practices, and relations of the social context it emerges from. The second stage is translation, when the actor-network is actually created, and when actors become involved. The final stage is framing, where technologies within a network can become stabilised, as the key issues and debates are resolved.

One of the main criticisms of the ANT approach is that it does not make a distinction between the micro and macro level and it does not have much interest in the external context. “In ANT there is too strict an adherence to the principle of following all the actors whoever they may be and wherever they go” (Kaghan & Bowker, 2001). The trajectory of a project is analysed in terms of the interactions between the chosen actors and the external context is not assigned an important role in the interpretation. Thus, the impact of any external contingencies like economic crisis, deregulation or IT-supported managerial principles may be underestimated.

ANT has also been criticised for its lack of distinction between people and objects and the fact that it seems to suggest that all actors are equal within a network (e.g. it does not take into account power asymmetries). In ANT, people have been reduced to the same level as machines and human qualities such as emotions, which play a vital role in human activity, seem to be lost (Mutch, 2002). Walsham (1997) has also criticised ANT for its disregard for social structures and its lack of political analysis. He suggests that empirical results from ANT studies should also be debated in terms of the moral and political issues. For example, the reason for the African continent almost totally being excluded in the Web cannot be understood by simply investigating the network.

### *3.4 The Mangle of practice – A. Pickering*

The “mangle of practice” is a theory that originates in the history of science and technology and bears many similarities to the social constructivists. However, Pickering avoids being characterised as a social constructivist and prefers the use of the term “posthumanist” to refer to his theory. The “posthumanism” of Pickering’s theory encourages researchers to be interested in the intertwining of the human and the nonhuman in the development of science and technology (Pickering, 1999). Pickering (1995) recognises that the human world is just one part of an evolving mixture of people and things, and that one needs to make the whole of this heterogeneous mixture the object of analysis in order to understand the dynamics of any part of it. He states: “the performative idiom that I seek to develop thus subverts the black-and-white distinctions



of humanism/antihumanism and moves into a posthumanist” space, a space in which the human actors are still there but now inextricably entangled with the nonhuman, no longer the center of the action and calling the shots.”(Pickering, 1995, p. 26)

One of the main concepts of the theory is the “agency”, which is defined by Pickering as the ability to do something or have effects. He distinguishes different types of agency: the material agency of natural world, which acts via natural laws; the human agency, characterised by individual intent, reflexive monitoring of action, and meaningful construction of the social world; and the disciplinary agency, in which the agency of a discipline (e.g. elementary algebra, a systems design methodology) leads people through a series of actions and naturalises these actions for them. Those three kinds of agency are linked in what Pickering (1995) calls the mangle\* of practice: “Scientists are human agents in a field of material agency which they struggle to capture in machines. Further, human and material agencies are reciprocally and emergently intertwined in this struggle. Their contours emerge in the temporality of practice and are definitional of and sustain one another. Existing culture constitutes the surface of emergence for the intentional structure of scientific practice, and such practice consists in the reciprocal tuning of human and material agency, tuning that can itself reconfigure human intentions. The upshot of this process is, on occasion, the reconfiguration and extension of scientific culture the construction and interactive stabilization of new machines and the disciplined performances and relations that accompany them.” (Pickering, 1995, p. 21)

Pickering describes the mangle as “a convenient and suggestive shorthand for the dialectic” that “conjures up the image of the unpredictable transformations worked upon whatever gets fed into the old-fashion device of the same name used to squeeze the water out of the washing” (Pickering, 1994 p. 567). In a broader sense, it refers to “the worldview... that sees science... as an evolving field of human and material agencies

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\* A mangle is an old fashioned mechanical laundry aid consisting of two rollers in a sturdy frame, connected by cogs and powered by a hand crank or electrically. The appliance was used to wring water from wet laundry.

reciprocally engaged in the play of resistance and accommodation” (Pickering, 1994 p. 567). Thus, in the course of practice, such as when implementing a new information system, human agency and material agency get intertwined. Human agency, in the shape of goals/objectives, encounters resistance from the material world (existing technologies, work practices). In accommodating to this resistance, during real-time practice, human agency and material agency get “mangled” (revising goals, intentions, or practices, or adjustment of technological parameters).

Pickering argues that one should see a given technology as one element that enters into the process of the mangle alongside the human and the social, with no predictable outcome. The only guidance one will receive is what temporarily emerges from the mangle, which can be traced back to Pickering’s notion of time and interest in becoming. He explains this concept at an interview: “In the mangle I argued that just as the becoming of machines depends upon us, so our becoming - our goals and intentions, social roles and relations, disciplines and subject positions - depends upon machines. Sometimes this is true in a relative continuous fashion, sometimes less so.” (Jensen, 2003b). During this process of becoming “whatever human or social variables one cares to appeal to – interests, say- are just as much at stake and liable to transformation in the production of knowledge as knowledge is itself. The social is thus itself part of the delicate and uncertain business of making alignments in practice as the material and the conceptual.” (Jensen, 2003b).

According to Schatzki (1999) the priority of humans in the mangle is enshrined in Pickering’s terminology. “Resistance”, for instance, is defined relative to human intentionality and the extension of culture is rather un-neutrally described as “practice”. Unlike, actor-network theory, to which his account bears admitted likenesses, he treats humans as the unified points of an agency, whose intentionality distinguishes it from the agencies of material things (Schatzki, 1999). In Pickering’s fashion, such “dances of agency” between people, objects, technology, etc. should not be reduced down to two encompassing categories of actors-actants. “One has to recognize that scientists usually work with some future destination in view, whereas it does not help at all to think about



machines in the same way.” (Pickering 1995, p. 17) Aware of his divergent position from ANT on the issue of absolute symmetry he explains: “semiotically, these things can be made equivalent; in practice they are not...the putative symmetry of this operation often breaks down when one tries to imagine delegating machinic functions back to humans” (Pickering 1995 pp.13,15). The unwillingness to fully embrace general symmetry makes Pickering inhabit an intermediary position between social constructivism and ANT (Jensen, 2003a).’

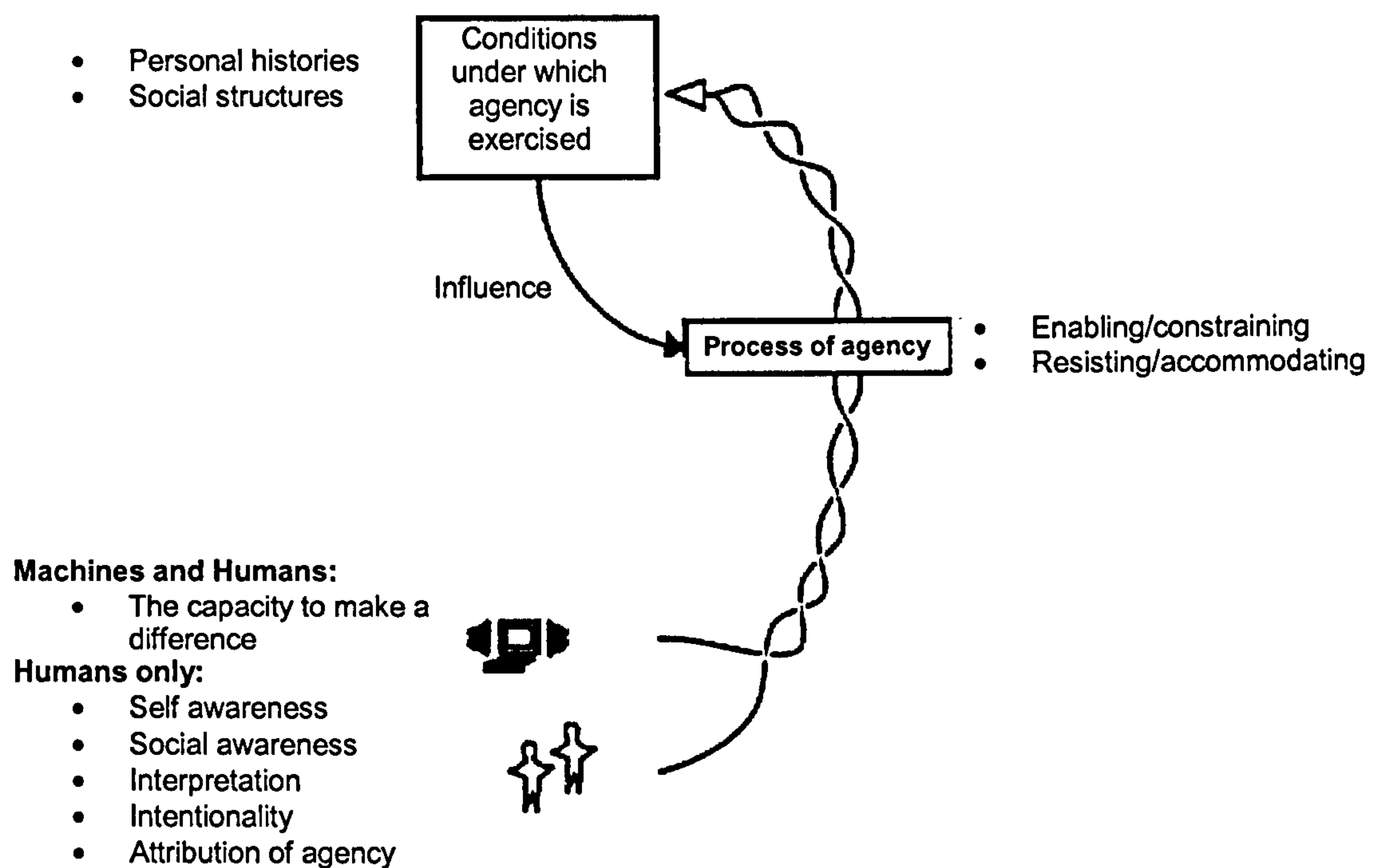
Another notable difference between Pickering’s mangle and the ANT theory has to do with a few of the main analytical concepts of those theories (Jensen, 2003a). Pickering has an explicit interest in time and change. Change happens through the interactive stabilisation of new combinations of conceptual, material and social elements. The ANT theory uses the concept of negotiation between actors (dependent on rhetoric or the coercion of allies) to explain change. Thus, knowledge for ANT, is about winning better and stronger allies but for Pickering, it is a matter of managing the stabilisation of various agencies through a series of tuning processes (Jensen, 2003a). Those tuning processes are characterised by a pattern in which structure (modelling/alignment influenced by existing culture) and chance (the appearance of resistances) are constitutively and necessarily interwoven (Pickering, 1999). “Modelling” for Pickering is an open-ended process with no determinate destination. From a given model (e.g. a particular functioning machine) an indefinite number of future variants can be constructed (Pickering, 1995 p. 19). Pickering’s conception of “Resistance” is also different to traditional notions of constraints on human agency (Pickering, 1994). He is against the idea of constraints as externalities that somehow control practice from without (Pickering, 1999). Instead, he sees resistance as genuinely emergent in time, as a block arising to this or that passage of goal oriented practice and existing in the crosscutting of the realms of human and material agency (Pickering, 1994).

It has been argued that the “mangle” would be a more suitable theory for the study of information systems development and their use, than Structuration Theory or the ANT (Jones, 1998; Rose & Jones, 2005). For the mangle offers a more balanced view of the

interaction between material and human agency than Structuration theory (i.e. technology is recognised as capable of exerting agency in its own right rather than being traces in the mind of social actors) without getting trapped in a semiotic symmetry between humans and non-humans as in ANT (Jones, 1998). Examples of the use of “mangle” in IS research include: the study of the role of existing information systems in the development and emergence of new systems (Chae & Poole, 2005), an examination of the process of alignment of a health information system to the requirements of its users (Thompson, 2002), a study of the link between an ERP implementation process and underlying influences within the organisational context (Nandhakumar, Rossi, & Talvinen, 2005) and an investigation of the integration of web-based generic groupware in geographically distributed work practices of organisations (Pors, 2004).

As it has already been discussed, previous studies in e-business literature examined mainly the technical processes of e-business implementation and the effects of those technologies in organisations, often after they had been established. Their models were based on sequential and success-oriented views of production and social assessment. By using the Mangle of Practice (Pickering, 1995) the researcher in this study managed to give due recognition to both the technical and social elements of Web-based systems and their impact on the process of value creation, while acknowledging their differences. Furthermore, the focus of this research was on Web technologies as ongoing artefacts-in-construction through the situated practice of knowledgeable agents, rather than as the products or the producers of predictable effects. The “mangle” encouraged the researcher to see the whole set of interactions between the social and the technical as locally emergent. Rather than seeing humans with clearly-defined goals applying Web technologies with clearly-defined properties to achieve clearly-defined organisational effects, the researcher tried to understand the process of Web-based systems development and use as an ongoing “dance of agency” (Figure 3.1).





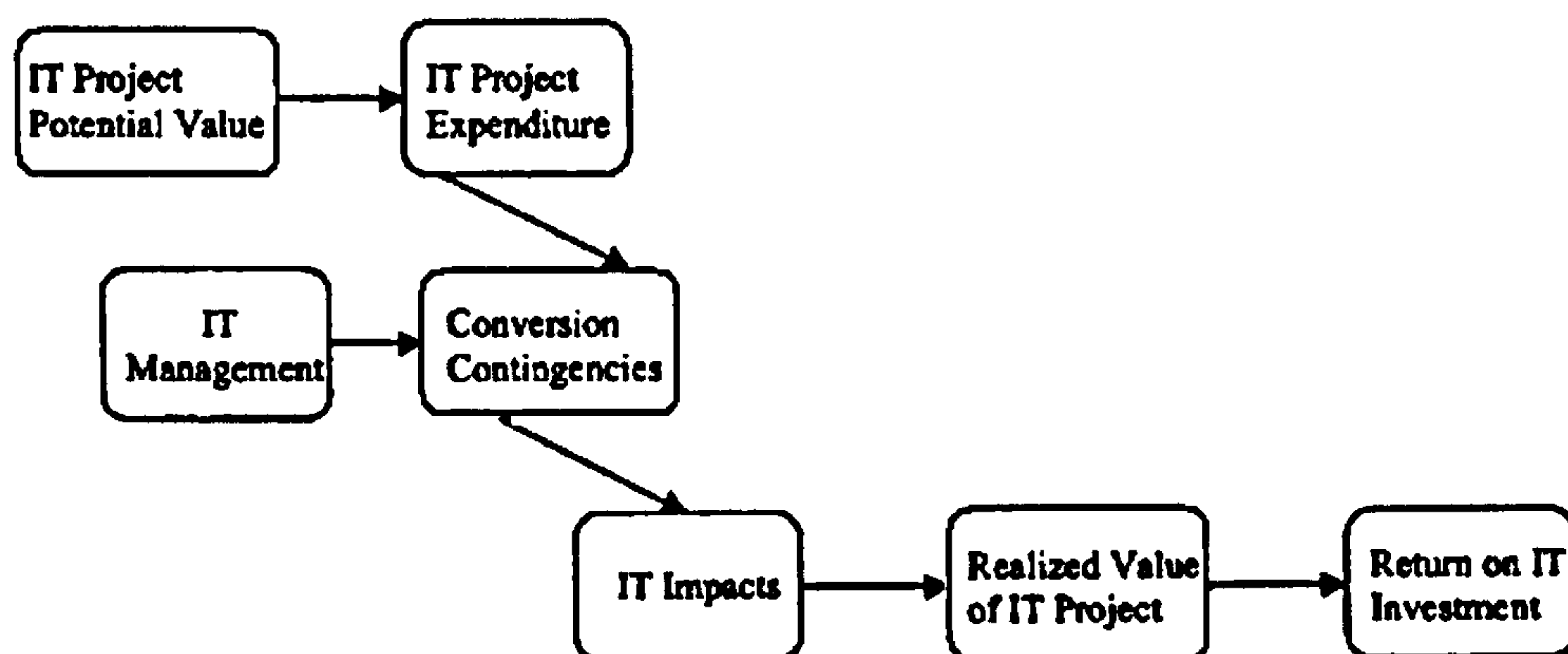
**Figure 3.1:** Dance of agency. Adapted by (Rose & Jones, 2005)

### 3.5 Limits to value model

The “limits to value model” originates in the IT value literature and was introduced first by Davern and Kauffman (2000) and expanded later by Chircu & Kauffman (2000). The model provides a way of understanding the enablers of potential IT value and the extent to which such value is actually obtained by an organisation across multiple levels of analysis. The authors argue that their model could be applicable in many IT investment settings: from infrastructure investments, to business-specific software applications, to multi-user systems or even highly customised single user systems.

Davern and Kauffman (2000) expanded prior models of IT value (Lucas, 1999; Markus & Soh, 1993; Soh & Markus, 1995) that used the concept of “conversion effectiveness” to measure the transformation of IT investments into application features. Their conceptualisation begins with the potential value of an IT investment, similar to

theoretical approaches in information economics. The locus of potential value occurs where the opportunity to obtain returns from IT investments exists for an organisation. This can occur at the level of the individual user, the work group, the business process, the firm, or the marketplace. In contrast, the locus of realised value is where value from an investment is actually appropriated by the firm (Figure 3.2). An IT project may have multiple loci of potential value nested within different levels of analysis from the market down to the individual users of the system. Since an IT project's potential can arise at multiple levels of analysis, it is possible for conflicts to arise among different levels of analysis. A project that has positive potential value at one level of analysis may have negative potential value at another level of analysis.



**Figure 3.2:** The IT value creation process adapted by Davern and Kauffman, 2000

Davern and Kauffman (2000) and Chircu and Kauffman (2000) also introduced a number of conversion contingencies, which act as moderating factors in the process by which potential is transformed, or fails to be transformed, into realised value. They make a distinction between internal and external moderators for IT value and refer to them as value-conversion contingencies (Table 3.3).



<b>Analysis level (Characteristics)</b>	<b>Examples of generalised value conversion contingencies</b>
Market (environmental conditions, competitor actions, government regulation, technology standards)	Competitor makes an investment in a comparable IT solution and acquires some of the identified potential. Technology standards change impacting value.
Firm (strategy choices, managerial performance, decision-making quality, IS development discipline, tolerance for change)	Inadequate senior leadership in championing the project to ensure it receives the resources necessary to realize its potential.
Work group (knowledge dissemination, use of team leaders to promote adoption, work group differences)	Lack of sharing of knowledge of effective system use across work groups causing potential value to be lost.
Business process (process design choices, system adoption subsidies, local management of change)	Inappropriate design of incentive schemes or procedures for use of application systems prompts problems with the adoption and effective use of systems, diminishing realised value.
Individual user (individual differences, experience, risk aversion, acceptance of change, professional level)	User inexperience, lack of training or cognitive limitations lead to ineffective use of systems

**Table 3.3:** Value conversion Contingencies adapted by Davern and Kauffman, 2000

The model has already been used by IS researchers in IT value studies of Web-based systems. Chircu, Kauffman, & Keskey (2001) used the model to study Web-based corporate travel reservation systems. They studied twenty of those systems in order to identify limits to the creation of value. They came up with a list of valuation and conversion barriers like: a) an unexpected level of complexity during the implementation stage of these systems, b) low adoption levels caused by lack of customised training and

incentives offered to users, c) the systems' lack of suitability for all types of travel (complex trips required extreme cognitive effort and time by the users) and d) a number of system and process integration issues that limited the usability of these systems (e.g. users could not make travel arrangements for the same day). Subramaniam & Shaw (2002) also used the model to examine the value of B2B e-commerce to a buyer organisation as well as the factors that affect most the realisation of the value of B2B e-commerce. Their preliminary results indicated that, although the Web affects all stages of B2B procurement, the value of Web-based procurement is most determined by the process characteristics, the organisation of business units, and the "extended enterprise".

The limits to value model matched the researcher's general assumptions about information systems as discussed in the introductory section of this chapter and fitted well with the premises of the "mangle of practice". In addition, by being a smaller scale theory, originating in the IT value literature, the model provided more specific directions for data collection. The model was most useful at the initial stages of the research, as it provided ideas for areas to investigate through the interviews and the document review, in order to trace the value from Web technologies at different levels (work groups, processes, performance).

### *Conclusion*

This chapter provided the rationale behind the choice of the theoretical framework used for this study. The synthesised conceptual framework that was used consisted of two elements: the mangle of practice and the limits to value model. A detailed discussion and investigation of each element has been offered. A brief description of related theories and some criticisms for them were also provided, in order to locate the framework used for this study in the wide spectrum of theories from social sciences and the history of science.

The synthesised theoretical framework was used during data collection (e.g. provided ideas for interview questions) and helped during the late stages of analysis by informing



the relationship among organisational context and the concept of value from Web technologies. However, because “theory is both a way of seeing and a way of not-seeing” (Walsham, 1993 p. 6) the researcher made an effort to preserve a degree of openness to the field data, and remained willing throughout the research process to modify the initial theoretical assumptions.

## CHAPTER FOUR: RESEARCH DESIGN

*"The act of understanding is at first a genial (or a mistaken) guess and there are no methods for making guesses, no rules for generating insights; the methodological activity of interpretation commences when we begin to test and criticize our guesses"*  
(Hirsch, 1967 p. 203)

### *Introduction*

Blaikie (2000) identifies five distinct levels of decision making in the process of designing a study within the discipline of social sciences. These decisions involve: a) the fundamental approach, paradigm or perspective, b) the strategy or logic of enquiry, c) the methods of data collection d) the form of the data (e.g. numbers or words) and e) the methods of analysis. Particular epistemological beliefs favour the use of specific research approaches and decisions made at one level affect choices at another. However, regardless of how researchers decide on those issues, one thing remains certain, that those choices determine what they will come to find. Thus, they should be explicit about the philosophical assumptions underlying their research (Davenport & Markus, 1999).

Furthermore, being explicit about the process by which the researcher reached her conclusions allows interested parties to assess the reliability and the validity of a study. It is through the detailed description of the research design that others can decide on the extent to which the findings can be applied to other contexts, the closeness of fit between the participants' subjective perception of the phenomenon under study and the researcher's own understanding of the participants' perceptions, or the level of consistency in the application of the chosen methods.

In this chapter a discussion on the philosophical assumptions for conducting this research will be presented. An examination of the case study and its applications in information systems will follow. Justifications for using case research will also be



provided, as well as some limitations of the specific method of empirical inquiry. More specific research design issues such as site selection, preparing for data collection and the exact data collection and data analysis techniques will also be addressed in later sections.

#### *4.1 Underlying philosophical assumptions*

All social scientists, as well as researchers from other academic disciplines, who use social sciences research methods approach their subjects via explicit or implicit assumptions about the nature of the social world and the way in which it may be investigated. Trauth (2001) argues: “it is important to distinguish the philosophical underpinnings from the methods that are employed to enact them”. Thus, a given epistemology may employ a variety of methods just as a particular method may be employed in research that reflects different epistemologies.

According to Burrell & Morgan (1979), the philosophical assumptions about the nature of social science can be categorised under four different dimensions: a) ontology, b) epistemology, c) human nature and d) methodology. The first set of underlying assumptions (the ontological) is related to the way researchers perceive the nature of reality. Researchers either accept that the phenomenon to be investigated exists independently of the researcher’s construction of it - *realism* or they believe that “reality” is the product of the researcher’s cognition and that world is made up of nothing more than concepts or labels that humans use to structure reality - *nominalism* (Burrell & Morgan, 1979).

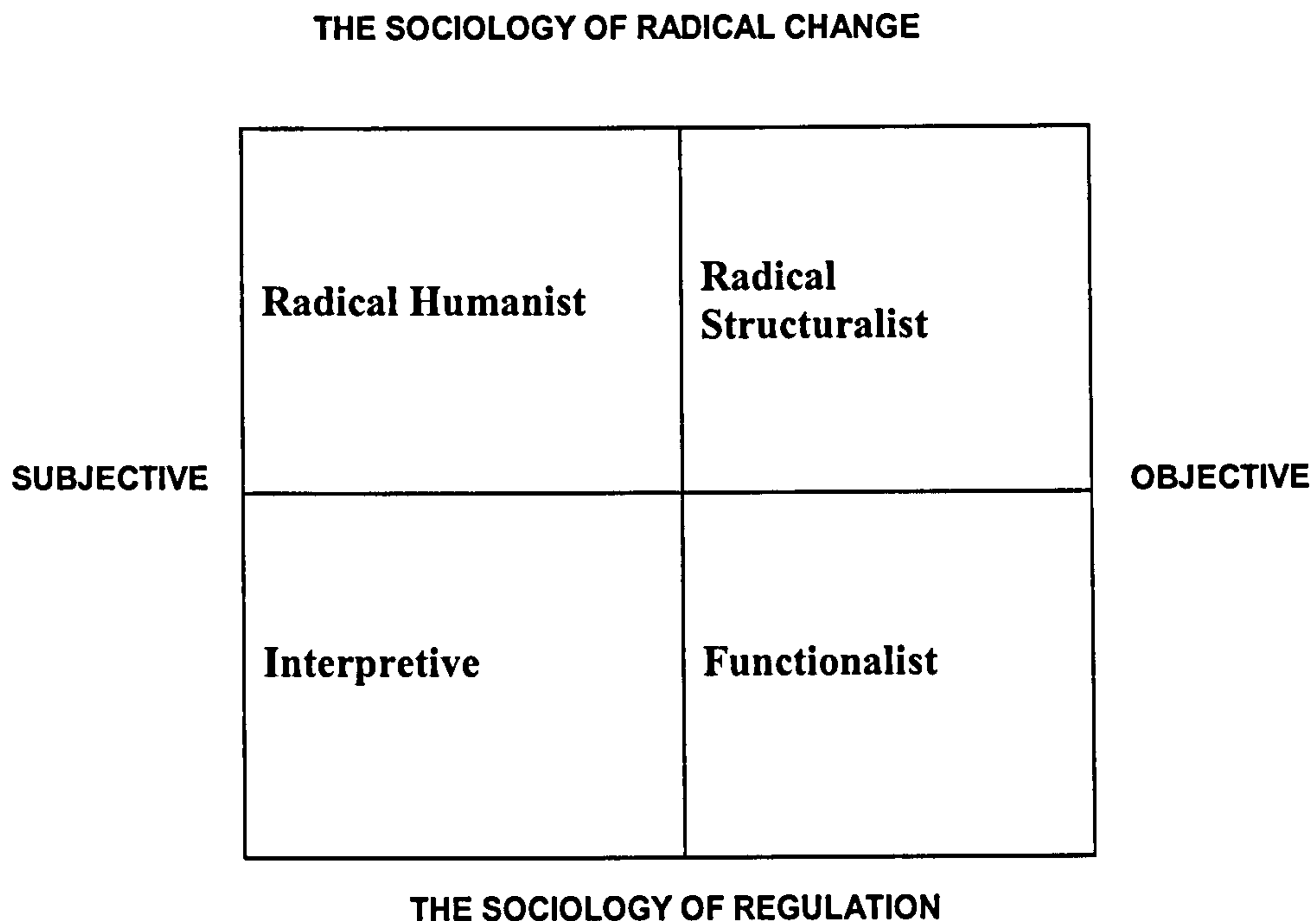
Associated with this ontological issue is a set of epistemological assumptions. These assumptions refer to knowledge and how it can be obtained. *Positivist* epistemology is based upon the traditional approaches used in the natural sciences. Although, positivists differ in terms of detailed approach they all believe that “the growth on knowledge is essentially a cumulative process in which new insights are added to the existing stock of knowledge and false hypotheses eliminated” (Burrell & Morgan, 1979). *Anti-positivist*

researchers believe that facts and values are intertwined, scientific method cannot be regarded as value free, and that the social world can only be understood from the point of view of the individuals who are directly involved in the activities under examination (Burrell & Morgan, 1979; Hirschheim, 1985).

A third set of philosophical assumptions is related to humans and their relationships with their environment. *Determinism* argues that the environment in which they are located “determines” the social nature of humans and their activities. At the other extreme, in *Voluntarism*, humans are regarded as creators of their environment. Burrell and Morgan (1979) state that researchers could adopt an intermediate standpoint in their studies that would allow both voluntary and environmental factors accounting for human behaviour.

The above-mentioned assumptions have direct implications of a methodological nature. According to Burrell and Morgan (1979) there are methodologies, which “treat the social world as being hard, real and external to the individual and others that view it as one of a more subjective quality”. When researchers adopt a *Nomothetic* research approach the emphasis is on using a systematic protocol and technique to test theories and general explanations broadly looking for confirmation of hypotheses. In the case of *Ideographic* research the focus is on the analysis of subjective accounts, which one generates by getting inside situations and by looking for patterns and trends (Burrell and Morgan, 1979).

All the philosophical assumptions about the nature of science that were mentioned above can be thought of as features of a “subjective” (nominalism, anti-positivism, voluntarism, ideographic) or an “objective” (realism, positivism, determinism, nomothetic) research approach. Burrell and Morgan (1979) add another dimension (*Regulation – Radical Change*) related to assumptions about the nature of society in order to create a matrix, which can be used to describe four different paradigms of social science study (Figure 4.1). These paradigms are: radical structuralism, functionalist sociology, interpretive sociology and radical humanism.



**Figure 4.1:** Four paradigms for the analysis of social theory (Adapted from Burrell and Morgan, 1979, p. 22)

In the information systems field one of the most popular schemes for classifying studies based on epistemology issues divides them into positivist, interpretive and critical (Orlikowski and Baroudi, 1991). Positivist studies are characterised by formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about a phenomenon from the sample to a stated population. Interpretive studies do not have a well defined set of instruments and aim “at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham, 1993). Critical studies assume that social reality is historically constituted; it is produced and reproduced by people. Proponents of the critical paradigm assume that people can consciously act to change their social and economic conditions, but recognise that peoples’ ability to improve their conditions is constrained by various forms of social,



cultural and political domination, as well as natural laws and resource limitations (Klein & Myers, 1999).

The philosophical assumptions of this study are located within an interpretive paradigm; research within this paradigm tends to be nominalist, anti-positivist, voluntarist and ideographic (Burrell and Morgan, 1979). Any studies within this paradigm seek to understand the nature of the social world at the level of subjective experience. Valid knowledge is gained through an understanding of the different meanings people ascribe to their actions; interpretive research allows the voice of the “passionate participant” to be heard (Lincoln & Guba, 1985). Creswell (1994) describes it as: “an inquiry process of understanding a social or human problem based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting.”

In terms of the popularity of different epistemologies within IS, there has been a general dominance (especially in US) of positivist studies (Mingers, 2004; Orlikowski & Baroudi, 2002). However, since the beginning of the 90’s there has been a growing interest from IS researchers in approaches that lie within the interpretive paradigm. This is evidenced by a change in the editorial policy of some of the main information systems journals, notably MIS Quarterly (Walsham, 1995a), by the fact that the ICIS conference now routinely includes panels and paper presentations involving interpretive research (Lee, 1999) and by literature surveys, which show an increase in the number of interpretive papers published in information systems journals (Nandhakumar & Jones, 1997).

Although the researcher did not regard other available paradigms illegitimate for research, she believed that an interpretive approach would be more appropriate for developing an understanding of the social dynamics involved in the process of value creation from Web technologies within a non-profit environment. Interpretive approaches can help obtain a more holistic view of how members of an organisation give meanings to particular information systems and enact on it in response to these given

meanings (Silverman, 1998). A positivist approach wouldn't have allowed the researcher to capture fully the richness of interactions evolved around the implementation of Web technologies. On the other hand, although differences in the interests of social actors and possible conflicts were acknowledged, it was not the aim of this research to explore in-depth where the actors' assumptions originated from or what interests they served, but merely to raise awareness that such differences existed. Thus, although the analysis touched upon some ideas related to the critical paradigm, this study lies within the interpretive paradigm.

The underlying philosophical assumptions of interpretive research were also consistent with the theoretical framework guiding this study and the researcher's belief on the nature of information technology. Recalling earlier discussions on the "Mangle of Practice" in chapter three, there is a synergy between viewing IT as a socio-technical system and interpretivism. Both paradigms see knowledge construction and IT implementation as a situational and social process. Following the discussion in section 2.3.4, there have not been many studies concentrating on participants' perceptions and interpretations of value. On the contrary, the majority of Web value studies have used positivist research approaches. Thus, it was considered that an interpretive study in this area could generate interesting insights.

Singleton & Straits (1999) argue that "the less you know about the subject, the less you can afford to limit data collection and ... the less you know, the more you must be open to all possibilities". The limited availability of studies on the impact of Web technologies within not-for-profit organisations would have been a big obstacle in defining a good set of propositions for testing if a positivist approach had been followed. This is both in terms of areas of potential value and in terms of the organisational factors that affect the process of value creation. Several IS researchers have argued that an interpretive study is the best way to indicate reformulated or new variables for use in subsequent positivist studies (Lee, 1991; Trauth & Jessup, 2000).



Choosing the interpretive approach does not come without any concerns. Nandhakumar & Jones (1997) identify some limitations of the interpretive approach that might endanger the quality of a study: a) the ability of the researcher to understand the participants' interpretations correctly, b) the problem of the difference between what is said and what is done, c) the issue of secrecy in social interaction and d) the fact that actors themselves might not be able to give an account of their action since those behaviours form part of their social routine of which they may not be fully aware. However, Klein & Myers (1999) believe that information systems researchers can produce a good interpretive study (within the hermeneutic tradition) if they follow seven principles:

- The principle of contextualisation (the subject matter set in its social and historical context),
- The principle of interdependence between the researchers and the subjects (examining the impact of interaction between researchers and subjects within the specific social context of a study),
- The principle of abstraction and generalisation (moving from the data collected to more abstract concepts, which apply to multiple situations),
- The principle of dialogical reasoning (confronting the researcher's initial "lenses" that guided the research design with emerging data),
- The principle of multiple interpretations (seeking out multiple ways in which the social context may have influenced the actions under study),
- The principle of suspicion (try to uncover "false preconceptions"),
- The fundamental principle of the hermeneutic circle.

By adopting the interpretive approach a researcher can choose from a number of research strategies that are compatible with the basic philosophical assumptions of that paradigm (e.g. action research, ethnographies or case studies). Walsham (1993) argues that in-depth case studies are the most appropriate method for conducting empirical research in the interpretive tradition.



#### *4.2 Research Strategy: Case Research*

Benbasat, Goldstein, & Mead (1987) propose a definition of the case research as: “an examination of a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, organisations). The boundaries of the phenomenon are not clearly evident at the outset of the research and no experimental control or manipulations are used”.

According to Orlikowski and Baroudi (1991) and Myers (1998) case research is the most widely used qualitative research method in information systems research. Case studies can be used as a research strategy in both positivist and interpretive traditions. For instance, case study approaches described by Yin (2003) and Benbasat et al. (1987) are implicitly grounded in the positivist stance, whereas Walsham (1993, 1995) offers guidelines on case research method from an interpretive perspective. However, it seems that most researchers regardless of their methodological stance agree on general issues related to the advantages and the limitations of case research, as well as on the data collection methods which can be employed.

Benbasat et al. (1987) point out three main reasons why case research is well-suited as a method of information systems enquiry: 1) the researcher can study IS in a natural setting, learn about the state of the art and generate theories from practice, 2) the case research method allows the researcher to address the “why” and “how” research questions. In other words, this method allows the researcher to explore and understand the nature and complexity of the context in which an information system develops and 3) a case approach is an appropriate way to research an area in which few previous studies have been carried out. Walsham (1993) argues that in a case study, the researcher can capture reality from a broader perspective and in considerably greater detail, as well as analyse a greater number of variables than is possible with any of the hard analytic research methodologies. Yin (2003) agrees with Walsham when stating that: “the case study allows an investigation to retain the holistic and meaningful characteristics of real-

life events". It seems that most IS researchers believe that the case study approach is useful in situations where no exact measures for the variables of interest have been developed or for practice-based problems where the experiences of the actors are important and the context of action particularly critical.

Teo, Tan, & Wei, (1997) claim there are three reasons that make case research a suitable research strategy especially for IT value studies:

- a) IT has the potential to alter many different aspects of organisations. Its impact is wide-ranging and intricate.
- b) The current body of literature on IT-enabled organisational transformation is mainly conceptual and anecdotal in nature. Causal research hypothesis could not be formulated and tested on the basis of such knowledge.
- c) The ways in which IT could alter organisations are likely to be closely intertwined with the business context and environment.

Thus, at the early stages of this study, it appeared that a quantitative research strategy would not have been suitable for this study. One of the reasons for this was that there were not enough previous studies to support the composition of a good quantitative instrument. Furthermore, the task of quantifying the concept of value from IT within not-for-profit institutions, where profitability is not necessarily the main concern carried the risk of examining areas that were not necessarily the important ones. Unlike quantitative methods, case research does not require the researcher to pre-define all variables prior to a study but enables the flexibility of variables emerging from the different stages of data collection and analysis. Case research was also chosen because of the researcher's interest in the process of value creation, which could only be examined within an organisational setting. The aim of this study was to investigate when, where, how, and why value is created from investments on Web-based systems. This type of research question is pertinent for case research strategy since it is one of the few methods, which allow the researcher to answer 'how' and 'why' questions.



Among the qualitative methods, ethnography is perhaps the only close alternative to case research. However, in ethnographic research the emphasis is on participant observation, usually quite lengthy, with researchers being integrated into the participants' daily activities. In this case, there is limited or no interest in other data collection methods like analysis of documents or websites, which was quite useful in this study. Instead of spending a lot of time concentrating only on one research site (by conducting an ethnographic study) the aim was to have a couple of in-depth case studies. Multiple-case designs allow cross-case analysis and comparison, and the investigation of a particular phenomenon in diverse settings. Evidence from multiple cases is often considered more compelling, so the overall study is more robust if there is more than one case (Herriott & Firestone, 1983). This is because "the propositions are more deeply grounded in varied empirical evidence. Constructs and relationships are more precisely delineated..." (Eisenhardt & Graebner, 2007). Yin (2003) agrees that "analytic conclusions independently arising from two cases will be more powerful than those coming from a single case alone".

There are however, certain limitations and concerns about the use of case research. Case research is among the hardest types of research to do because of the absence of routine formulas (Yin, 2003). Darke, Shanks, & Broadbent (1998) argue that data collection can be time consuming and tedious and can result in the accumulation of large amounts of data. Availability of suitable case sites may be restricted, as organisations - due to the resources required - may not be willing to participate in a case study research (Darke, Shanks, & Broadbent, 1998). Even the last part of the procedure - reporting - can be difficult, as the researcher needs to establish the rigour of the process followed and the validity of the findings (Darke, Shanks, & Broadbent, 1998).

Concerning the difficulty in finding suitable sites there was not much that could be done, other than collecting as much information as possible regarding potential sites and providing interested organisations with sufficient information regarding the research objectives, as well as issues of confidentiality. In terms of the need of having routine formulas, it mirrors Yin's (2003) positivist perspective; however, the case protocol used



in this study did improve the general level of consistency during data collection and analysis. Furthermore, the use of Atlas.ti for the analysis of case material reduced the amount of time needed to organise the large amounts of text generated and eventually facilitated reporting of the results by providing a track of the different stages of the analysis process.

Darke, Shanks, & Broadbent (1998) also suggest that subjectivity in the data collection and analysis process is one of the main disadvantages of case research. They argue that bias arise from two sources: the influence of the researcher over participants' behaviours and the impact of the researcher's own beliefs. In reality both biases are difficult to avoid. Nevertheless, action to reduce the level of bias was undertaken by offering enough information to the participants regarding the purpose and method of the study and by using a variety of data collection methods (interviews, website evaluations, observation, and document analysis).

Walsham (1993) mentions that the main criticisms of the interpretive case study method tend to focus on the non-representativeness and the lack of statistical generalisability. However, generalisation from case studies is in reality not statistical but analytic; achieved by using a previously developed theory as a template with which to compare the results of the case study (Yin, 2003). Alasuutari (1995) believes that "generalisation is a word that should be reserved for surveys only. What can be analysed instead is how the researcher demonstrates that the analysis relates to things beyond the material in hand... extrapolation better captures the typical procedure in qualitative research". The validity of an extrapolation according to Walsham (1993) depends on the plausibility and cogency of the logical reasoning used in describing results from the case, and in drawing inferences from those results. Walsham (1995b) proposes four types of generalisation from interpretive case studies: a) development of concept, b) generation of theory, c) drawing of specific implications and d) contribution of rich insights.

### *4.3 Selection and access to case sites*

Yin (2003) proposes that each case should be selected so that it either predicts similar results (literal replication) or it predicts contrasting results but for predictable reasons (theoretical replication). Because of the limited availability of previous studies in this area, it was not certain from the beginning, which organisational characteristics could have an impact on the findings. A basic requirement for all case sites was to have an up to date website, as well as an interest in the subject of the research. As according to Harris & Katz (1991) IT has its largest effect two years following implementation, it was considered a good idea to select museums that had completed a major web project within the last couple of years. A comprehensive search followed in the British press, major museum journals (Curator, Museum Management and Curatorship, Museums Journal etc), the Museum Computer Group mailing list (<http://www.jiscmail.ac.uk/lists/mcg.html>) and the Museums and the Web conference website (<http://www.archimuse.com/conferences/mw.html>) to identify sites that matched the basic criteria. A list with potential sites was generated.

In order to increase the chances of getting access to any case sites Bryman (1989) suggests that researchers should contact individuals with enough authority to approve a project of that kind. Thus, colleagues from the Arts Management Department and the VOLPROF team were consulted to find out if they knew any senior employees from the list of potential sites. Three senior employees from the listed museums were then contacted by colleagues, who provided a two-page document with information about the project prepared by the researcher. The document included information on the aim and the research design of the study, a general estimation of the time/resources required by the participating museum, and the potential benefits for the museum. Some of the main benefits outlined were a report on web evaluation issues with particular reference to the museums' websites, an understanding of the process of value creation from the museum's Web-based systems provided through the final case report, as well as recognition for the museums that decided to be identified. The document also assured the museum would not be harmed by the researcher's participation by addressing basic

confidentiality concerns. The museum employees who were initially approached were encouraged to contact the researcher, so as to arrange a meeting and find out more about the research project.

Two of those museums expressed no interest in participating (V&A and Tate), whereas NMSI expressed an interest and requested a meeting with the researcher. A meeting with two members of the executive board of NMSI took place in February 2004. In that meeting the researcher addressed questions by NMSI staff, while she evaluated the chances of conducting research successfully (by ensuring essential data would be made available to the researcher and the conditions would be suitable for this type of research). A period of internal consultation in NMSI followed and in April 2004 it was agreed that Science Museum would participate in the study.

Regarding the choice of the other site, after analysing the first set of data from Science Museum, it was decided that choosing a smaller museum with limited resources, a more flat organisational structure and different role division regarding web administration could generate interesting insights. The reason for this was that the first results indicated that these organisational characteristics could have an impact on the findings. Thus, Geffrye Museum, which was one of the smaller museums on the initial list, was approached in the same way as the first three museums (introduction through a colleague). The museum management expressed an interest in the study and a meeting took place with the assistant director and the web manager in May 2005. During the meeting it was confirmed that Geffrye had the characteristics that would make it a suitable second site and in August 2005 access to the site was approved (there was a delay as the museum was preparing a major exhibition). As a theoretical sampling technique was followed, where “data collection is controlled by the emerging theory” (Glaser & Strauss, 1967 p. 45) the possibility of adding extra cases remained opened. Thus, choosing other types of museums as the next cases in order to achieve replication of specific results was considered an option until the last stages of research.



After securing access to the case sites and in order to maintain access, the following recommendations by Silverman (2000) were followed:

- Avoiding giving an impression that might pose an obstacle to access.
- Obtaining bottom-up access within the organisation.
- Being non-judgemental (this is often the key to acceptance in many settings, including practitioners of a particular profession).
- Offering feedback while conducting research (some research subjects will actually want the researcher's judgements providing they are of an acceptable kind).
- Establishing a contract with the people researched.

#### *4.4 Preparing for data collection and analysis*

##### *4.4.1 Using a case study protocol*

In order to increase levels of consistency, avoid omissions during data collection across all case sites, and keep track of the overall research process, as well as any changes in direction during data collection and analysis, a case study protocol was used (Yin, 2003). The protocol contained an overview of the project (aims and objectives), information on field procedures (information about access to the sites, procedural reminders), case study questions and some relevant readings about the topic under investigation, as well as a guide for the case study report (see Appendix A).

The case study protocol was updated at different stages of the research, as a result of a constant review of the literature and changes in the direction of the research, which were initiated by the first results. Although the case study protocol is a technique used mainly in positivist case studies (De Vries, 2005), there is no reason why it could not be used in interpretive case studies. As it will be explained in a later section on the use of grounded theory for data analysis, the case protocol can be used in interpretive case studies to address to a degree the concern about the researcher's social construction of data. It can be used to improve the quality of an interpretive study by addressing the principle of dialogical reasoning (Klein & Myers, 1999) and consequently help the researcher

confront her theoretical preconceptions with alternative explanations from emerging data.

#### 4.4.2 Choosing a CAQDAS: Atlas.ti

Before beginning the data collection process the possibility of using software to assist with the process of analysis was considered as part of an effort to make "the best use of available technology" (Mason, 2002 pp.127-128) for this research project. A review of the literature on CAQDAS (Computer Assisted Qualitative Data Analysis Software) took place in order to examine advantages and disadvantages regarding their use in qualitative research. This was followed by a review of the available software in order to decide on the most suitable option for this research project. The rationale for using CAQDAS and for choosing Atlas.ti in particular for the purposes of this research is presented below.

#### *Using CAQDAS*

One of the main advantages of CAQDAS is that it makes it easier for the researcher to be exhaustive in analysis (Fielding, 2002). The programs offer data management capacities unquestionably superior to any paper based systems and features, which invite the researcher to extract the maximum from her data in terms of the theoretical thinking. In contrast to cut-and-paste methods (manual or electronic) the software allows the permutation of coding categories and links to produce a fine-grained analysis (Coffey, Holbrook, and Atkinson, 1996). Maps of relationships among codes, text segments or cases created by the software are a substantial aid to theorising, as they provide a real time representation of the researcher's thinking. These CAQDAS maps are better than any drawings produced directly by the researchers as they are tied to the underlying project and any changes to the links in the map cause relevant changes to the links among the objects in the database and vice versa (Weitzman, 2000).

CAQDAS also encourage researchers "to be clearer about their reasoning, and enables the analytic process to be more transparent" (Fielding, 2002). The ability to export parts of the data to a website means that others can play a part (e.g. supervisors, colleagues, research participants). This may make inquiry more open-ended, and depending on the social context of a study, it can give voice to those whose account is normally silenced

(Fielding, 2002). Most importantly, CAQDAS make it easier for a researcher to demonstrate the quality of a study (Flick, 2003).

On the other hand, a number of researchers have expressed their concerns on the use of software to assist with qualitative research. Seidel (1991) suggested it could distance researchers from their data. It is possible that a researcher could only read the data in context during the process of initial coding. After that, they could just read bits and pieces of data that have been coded under each category, without ever returning to the original text. However, (Barry, 1998) believes that this is equally possible for those that use index cards, scissors and photocopies or word processor cut and paste functions. “There will always be some researchers who conduct superficial analyses, whatever their tools” (Barry, 1998). Furthermore, most programs now place an emphasis on their facilities for the re-contextualisation of data (Gibbs, G., Friese, S., and Mangabeira, W., 2002).

Mason (2002) cautions about being seduced by the capabilities of software into performing types of analysis more suited to quantitative data (counting occurrences, giving more weight to more frequent events, ignoring isolated incidences). However this has been a danger even before the creation of the first CAQDAS packages. Barry (1998) states that there have been a number of qualitative research studies that focused on counts at the expense of conceptual and theoretical explanations; studies which didn't involve the use of CAQDAS.

Another concern is the possibility of CAQDAS leading to a single orthodoxy of data analysis. “There is an increasing danger of seeing coding data segments as an analytic strategy in its own right, and of seeing such an approach as the analytic strategy of choice” (Coffey, A., Holbrook, B., and Atkinson, P., 1996). However, researchers always have the option of using supplementary manual methods for the analysis of qualitative data, instead of confining themselves to the limitations of computerised methods (Webb, 1999).



It is obvious from reviewing the relevant literature that CAQDAS is neither "a panacea for analytic woes nor a devil-tool of positivism and scientism" (Lee, R. and Fielding, N., 1996) and that researchers who make use of these programs must remain alert to the need to preserve the integrity and context of the original material and not lose sight of this during the process of coding and subsequent analysis (Roberts, K. and Wilson, R., 2002).

### *Choosing Atlas.ti*

After reviewing the relevant literature regarding the use of CAQDAS, it was decided that for as long as the researcher remained aware of the limitations of the software, its use would be beneficial for this study. In drawing a decision about which program would be the most suitable, resources like (Williams, Mason, & Renold, 2004), (Lewins & Silver, 2004), and (Barry, 1998) proved quite useful. Attendance of two introductory workshops organised by the SdG Associates <http://www.sdgassociates.com> and the CAQDAS networking project <http://caqdas.soc.surrey.ac.uk/> also provided the researcher with information on the main features of different CAQDAS.

In order to decide on the CAQDAS one of the criteria used was the researcher's preferred way of working. In that aspect Atlas.ti was chosen because a) it supports non-hierarchical coding and theory building via hypertext (Williams, Mason, & Renold, 2004) and b) it operates as a more visual and spatial medium with data and software functions organised in pictorial form (Barry, 1998). Another important parameter in decision-making was the nature of the research project and in that aspect Atlas.ti was preferred because a) it is designed for more exploratory qualitative research (Williams et al. 2004) and b) it is suitable for simple projects. For instance, N6 and NVivo would have been a better choice for a complex project (involving large sample sizes and research teams, combination of qualitative and quantitative data), as they have powerful project management tools, and offer good support for attribute variables like gender (Barry, 1998; Seminar by SdG Associates, 31/3/2004). A few other characteristics of Atlas.ti that influenced the final decision, shared by few of the other CAQDAS, are good software support, the availability of training by organisations like the CAQDAS

networking project, a large community of users (with a very active mailing list: <http://forum.atlasti.com>), as well as a user friendly interface.

#### *4.5 Data collection*

According to Eisenhardt (1989), the triangulation made possible by multiple data collection methods provides stronger substantiation of constructs for case studies. Yin (2003) argues that with data triangulation, the potential problems of “construct validity” can be addressed because the multiple sources of evidence provide multiple measures of the same phenomenon. Thus, a number of different data collection methods were used for gathering information from each museum. Field research was conducted in Science Museum from April 2004 to October 2005, and in Geffrye from August 2005 to December 2006.

##### *4.5.1 Participant Observation*

In field observation there are a number of different roles available for the researcher to choose. At one extreme is the complete observer (no interaction with the people observed) and at the other is the complete participant, who conceals the observer role while becoming a fully accepted member of the in-group (Gold, 1958). If the researcher chooses a participant observation she can adopt a peripheral, an active or a complete membership role (Adler & Adler, 1987). In this study, a peripheral membership role was adopted. According to Adler and Adler (1987) peripheral members are only marginally part of the settings they observe; they limit their involvement in the group’s activities and do not strive for a full member status. Field observation was chosen as one of the data collection methods for this study, because it allows the researcher to check definitions of terms that participants use in interviews, observe events that informants may be unable or unwilling to share when doing so would be impolitic, impolite, or insensitive, and observe situations informants have described in interviews, thereby making them aware of distortions or inaccuracies in description provided by those informants (Marshall & Rossman, 1995).



Robson (1999) identifies nine dimensions of observation: space, actors (names and details of people involved), activities, objects, acts (specific individual actions), events (meetings), time (the sequence of events) and individuals' goals and feelings. Field observation in this study involved attendance of meetings (e.g. e-committee meetings in Science Museum), visits/tours of the museum and the IT department, lunches with the gatekeepers on site or attendance of museum events (e.g. summer jazz concert in Geffrye Museum gardens), which gave the opportunity for informal chats with museum staff. The observation took place during the same period in which the interviews were conducted at each site.

Field notes were composed as soon after the observations or at the end of each day and stored as memos in Atlas.ti. The notes contained basic information about what was seen as well as the behaviour of the researcher and the behaviour of others towards the researcher. Singleton & Straits (1999) advice about having a clear distinction between factual observations and the impressions/feelings of the researcher was followed. Field notes were imported in Atlas.ti as memos. As field observation was assigned a rather limited role in the overall data collection process, no particular effort was made to expand the initial field notes. Instead, the initial field notes were used to support the interpretation of data collected from the interviews and the document review. In that aspect the field notes were quite useful, as despite the fact that they only accounted for a very small percentage of the total number of pages analysed, they provided explanations for issues that interviewees had hinted at.

A major concern regarding field observation is the extent to which an observer affects the situation under observation. Robson (1999) suggests as a solution "to make the participants getting accustomed to the presence of the observer so that they carry on as if she were not there". In this study, this wasn't a major issue as the researcher adopted a peripheral role. Another potential limitation of field observation is researcher bias. DeWalt & DeWalt (2002) note that, gender, sexuality, ethnicity, class, and theoretical approach may affect field observation, analysis, and interpretation. In order to deal with



this issue the researcher made every effort to develop from the beginning a comprehensive understanding of any preconceptions she had that could have interfered with the interpretation of the phenomena observed and to use different approaches to data collection and observation, in order to get a richer understanding of the social context.

#### 4.5.2 Document review

Another method of gathering information for the aims of this study was the collection and analysis of museum internal documents. This kind of evidence is especially useful in the early stages of field research, as a means of learning about the history and the physical and social characteristics of the organisation (Singleton and Straits, 1999). Documents can also be helpful in providing specific details to corroborate information from interviews or they could be used to make inferences (e.g. ask some new questions at an interview) (Yin, 2003).

The types of documents collected were museum strategic plans, staff newsletters, minutes from IT or web project development meetings, documents related to the museums' websites or their Intranet, staff survey results, usability evaluation reports that museums had conducted for their websites, development plans for web projects, contracts/agreements for outsourcing of specific IT services, IT policies, museum leaflets for the public, memos and emails about changes in the organisational structure (see Appendix B). In terms of the sampling procedure followed, the researcher initially requested access to any material relevant to Web projects' implementation, wider IT museum issues, as well as museum strategic documents. The initial set of documents, as well as several interviewees provided ideas for other documents that could be relevant. In both sites access was provided to the majority of the documents requested; only a small number of documents were withheld for confidentiality reasons (e.g. marketing strategies for both museums).

Out of those documents, the majority were imported into Atlas.ti for analysis (48 documents), whereas a number of them like the organisational structures or leaflets with information on museum services were stored in printed or electronic form for consultation at different stages of the research. Some of the internal documents were selective, in that only certain aspects of the museums were documented (i.e., mostly positive aspects). In some cases, the documents were uneven, with great detail on some activities and virtually nothing on others. Nevertheless, the documents were very useful in providing a behind-the-scenes look at some aspects of the museums' operations, as well as supplying leads for asking related questions at the interviews.

Other than museum internal documents, a number of secondary sources like articles from national newspapers, museum journals, IT magazines or postings on the following mailing lists: MCN-L@listserv.mcn.edu, Musweb-L@museum.org, mcg@jiscmail.ac.uk, arts-management-policy@jiscmail.ac.uk, VOL-SECTOR-STUDIES-NETWORK@JISCMail.AC.UK with information on the two sites, were also collected. Those documents were not imported into Atlas.ti as primary documents for analysis. Instead, summaries of any important points from those resources were stored in Atlas.ti in the form of memos.

#### 4.5.3 Interviews

Interviews were the primary source of data, as this was an interpretive study and as such the main interest was in the views of the actors. The type of interview chosen was the in-depth semi-structured interview (an interview based on a framework of open ended questions, which also allows the respondents to express their thoughts). In this type of interview, the style of questioning and discussion offer greater flexibility than a survey-style interview. "The informant's responses can't be predicted in advance ... and you as interviewer therefore have to improvise probably half and maybe 80% or more of your responses to what they say in response to your initial prepared question" (Wengraf, 2001 p. 5). The main reason for choosing in-depth interviewing was that it is a method that focuses on understanding human experiences from the perspective of the actors. Finally



semi-structured interviews are recommended in cases that the researcher has to interview people from the same environment and she is interested in obtaining the same information from each one (Patton, 1980).

Regarding sampling for the interviews, it is recommended to use “numerous and highly knowledgeable informants who view the focal phenomena from diverse perspectives. These informants can include organizational actors from different hierarchical levels, functional areas, groups...” (Eisenhardt and Graebner, 2007). In this study, the initial group of interviewees in both museums consisted of staff from different departments and levels of the hierarchy (marketing, sponsorship and development, curators, education department, IT and web team, finance and administration, senior managers, etc). The sampling for the rest of the interviews within each site had an iterative quality. The analysis of each set of interview transcripts provided new leads to track down more data. As this was a case of theoretical sampling, the aim was to develop concepts emerging from the analysis by maximising and minimising differences among informants. Thus, interviewees were selected according to their potential to provide the required variation.

Since theoretical sampling is conducted on the basis of emerging concepts, the number of the interviewees wasn't specified in advance. The researcher began this study with a general idea of the type of people who would be interviewed, but was prepared to modify those plans after the initial interviews. Data collection continued until the researcher achieved theoretical saturation. In total, fifteen interviews took place in Science Museum and seven interviews took place in Geffrye Museum (see Appendix C). Theoretical sampling was used not only to decide on the list of interviewees but also on the topics/concepts covered during the interviews (i.e. emerging concepts were tested in consequent interviews). The aim of the researcher was to see different instances of a construct, at different moments, in different places, with different people. The prime concern in studies like this one is with the conditions under which the construct or theory operates, not with the generalisation of the findings to other settings (Miles & Huberman, 1994 p. 29).



In terms of approaching the interviewees, the names of potential interviewees were presented to the coordinator of the research at each site to check availability. On approval, the interviewees were contacted by the researcher via email in order to arrange the details of the interview. Only one out of the potential interviewees refused to be interviewed on the basis of having an overloaded work schedule. All the participants were provided with basic information about the research and any confidentiality issues regarding their participation in advance (see Appendix D).

The average duration of the interviews was 45 minutes, though interviews/meetings with web administrators and senior managers lasted much longer. All of the interviews were conducted face to face and Walsham's (1995) suggestions on the need for balance between excessive passivity and over-direction by the interviewer were followed. Thus, every effort was made by the researcher not to control tightly the interview, which would result in the data losing much of the richness of interpretation. The researcher also tried to prompt with questions into any new directions offered by the interviewee and to show that she shares their ideas in order to avoid any negative reactions (e.g. interviewees could think there is no interest in their views). At the end of each interview the participants were given the chance to comment on anything that they thought was relevant to the topic or the interview process. The researcher also made sure that the informants were aware of her appreciation for the time and energy that they had committed to the study.

The interview questions were tailored to each person and covered their background and experience within their departments, decision making and communication practices within the organisation, web projects development procedures and roles within the museum, staff views on the potential value of Web technologies, perceived realised value from their Web technologies and staff suggestions for improving the value obtained from investments in those technologies (see example of questions in appendix E). Besides the primary questions that were prepared before the interviews, improvised follow-up questions, probes, prompts and other interventions allowed participants to elaborate on their experiences.

A digital recorder was used in all but one of the interviews in order to avoid summarising, paraphrasing or omitting words of the respondents. This is very important especially for the opinion questions, where there is a need to write down the answers verbatim (Floyd, Fowler, & Mangione, 1990). Tape or digital recording is important in interpretive studies, because it makes it easier to capture people's interpretations in an effective way. It also allows the researcher to concentrate more on the questions and answers of the interviewee without losing time for taking notes. However, the researcher did inform the interviewees that the recorder could be turned off at any stage of the interview on their request. In one case, where a participant expressed concern regarding confidentiality issues at the beginning of the interview, notes were taken instead and were written down in full within the same day. All recorded interviews were fully transcribed using a set of transcription conventions outlined in Duranti (2005) that allowed recording of all talk, as well as basic gestures. The transcripts were then imported in Atlas.ti for analysis.

The interviews as well as the informal discussions, which followed some of the interviews (recorded as observation notes and imported in Atlas.ti), were the most useful data collection method used. They provided a clear picture of the organisational culture within each museum and the views of the individuals on different Web projects' implementation issues. They also helped clarifying issues, which were raised by the review of the museum documents.

#### 4.5.4 Evaluation of the websites

Evaluations of the websites of the participating museums were also conducted in order to collect information about an important technical aspect of Web technologies, which could have an impact on the value obtained from those technologies (e.g. a possible explanation for generating limited revenue from a museum e-store could be poor website design in terms of usability). Another reason for conducting usability evaluations was to put in context interviewees' comments about their websites (e.g. confirming any



negative or positive features of the websites) and consequently improve the overall reliability of the findings. Finally, the evaluation reports were presented as an extra benefit for the participating museums, in order to increase the chances of gaining access to potential case sites, as they were promised to be delivered to the museums in a short term and before the completion of the research.

### *Usability evaluation and its significance*

Definitions of usability range from the high-level conceptualisation incorporated in the ISO 9241 standard: “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (Karat, 1997 p. 34) to more focused descriptions that include notions of user relevance, efficiency, user attitude, learnability, and safety (Lecroft & Paterno, 1998). Some people regard usability as an important area of systems’ interface, while others see content coverage as one of the aspects of systems’ usability.

In the case of websites, for owners to be successful and for users to be satisfied, web sites need to consider usability as well as other design criteria (Nielsen, 2000; Pearrow, 2000). Website success is significantly associated with website download delay (speed of access and display rate within the website), navigation (organisation, arrangement, layout, and sequencing), content (amount and variety of product information), interactivity (customisation and interactivity), and responsiveness (feedback options and FAQs) (Palmer, 2002).

Recent research (Lindgaard & Dudek, 2003) indicates that web user satisfaction is also contingent upon users’ emotional responses as well as their expectations from the website and not only their interactive experience (so factors like the visual appeal of the website are also important). Furthermore, following some standard usability guidelines for every page on a web site does not automatically ensure that customers’ web experience at a given site will be satisfactory. It is believed that the instrumental goals of a user are key determinants to what they seek from a website (Agarwal & Venkatesh, 2002). Hence, Agarwal and Venkatesh (2002) suggest incorporating multiple user



characteristics and demographic variables along with task and product/service requested by users to examine how they influence user assessments of usability (as what is considered usable by one category of website users might not be the same for another category). In spite the fact that a diversity of factors, other than usability in the strict sense, could affect user satisfaction and consequently the success of a website, it is widely accepted that users are sensitive to usability issues and the focus on usability is integral to web user experience.

#### *Choosing a method for evaluation in this study*

Nielsen (1994) proposes the following categorisation of user interface evaluation methods: automatic (usability measures computed by running a user interface specification through some program), empirical (usability assessed by testing the interface with real users), formal (using exact models and formulas to calculate usability measures), and informal (based on rules of thumb and the general skill and experience of the evaluators). Although, usability testing with real participants is one of the most fundamental usability evaluation methods (Nielsen, 1994) it wasn't considered a good choice for the purposes of this study. Gaining access to a representative number of all the different categories of potential users of a museum site, would have been extremely time-consuming, as the intended user population is both vast and also too varied. As this wasn't the main data collection method and it was mainly used to improve the researcher's understanding of the interview data, an evaluation method that would not involve real users was deemed as more suitable.

According to Nielsen (1994), inspection methods are a set of methods based on using evaluators to inspect the interface. Typically, inspection is aimed at finding usability problems in a design, though some methods also address issues like the severity of the usability problems and the overall usability of an entire design. Some of the techniques that are categorised as inspection methods are:

- Guideline reviews (guideline conformance).
- Cognitive walkthrough (evaluators construct task scenarios and then they role-play the part of a user).

- Pluralistic walkthrough (group cognitive walkthrough).
- Heuristic evaluation (identify heuristic violations).
- Perspective based Inspection (narrowly focused heuristic evaluation).
- Feature Inspection (evaluate product features)
- Formal Usability Inspection (formal heuristic evaluation)
- Consistency Inspection (has designers representing multiple projects inspect an interface to see whether it does things in the same way as their own designs).
- Standards Inspection (ensure compliance with industry standards)

Dix (1998) believes that if the evaluator's expertise is limited it may be more practical to use heuristic methods than analytic methods, which require understanding of user goal structures and so on. Thus, it seemed that a heuristic evaluation based on a basic checklist could be a good solution for this study. During a heuristic evaluation session, the evaluator goes through the interface, inspects the various elements and compares them with a list of recognised usability principles (the heuristics).

The following are ten heuristics suggested by Nielsen (2000):

- Visibility of system status: The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
- Match between system and the real world: The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms.
- User control and freedom: Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue.
- Consistency and standards: Users should not have to wonder whether different words, situations, or actions mean the same thing.
- Error prevention: Even better than good error messages is a careful design, which prevents a problem from occurring in the first place.



- Recognition rather than recall: The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
- Flexibility and efficiency of use: Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users.
- Aesthetic and minimalist design: Dialogues should not contain information, which is irrelevant or rarely needed.
- Help users recognize, diagnose, and recover from errors: Error messages should be expressed in plain language, precisely indicate the problem, and constructively suggest a solution.
- Help and documentation: Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

According to Nielsen (2000), the evaluator is allowed to consider any additional usability principles as a supplement to the general heuristics. Cunliffe, Kritou, & Tudhope (2001) argue that the effective use of high level, abstract heuristics, such as "Speak the users' language" (Nielsen, 1993) requires a degree of professional judgement, so less experienced evaluators might find a larger, more detailed set of guidelines more appropriate. They also suggest in cases where there is a need to reduce the number of pages inspected to concentrate on the key pages of a website.

Thus, it was decided instead of choosing a set of high level heuristics (usually accompanied by a paragraph highlighting key concerns) for inspection purposes to choose a long checklist of website features (covering navigation and content issues) that could be answered by a yes or no. The researcher created a checklist based on principles found in: (Agarwal & Venkatesh, 2002; Nielsen & Tahir, 2002) as well as in: (Dyson & Moran, 2000; Gillard & Cranny-Francis, 2002) and went through key pages (homepage and first level menu options) of the two websites indicating a "yes or no" next to each



feature. Responses to the checklist were then used to compute an overall usability index for each site.

Furthermore, in order to increase the value of the usability reports provided to the museums and also as a result of the analysis of the first set of data, which indicated the importance of evaluation practices in terms of their impact on the value obtained from Web technologies, a review of the evaluation practices used in the case sites also took place. Thus, the web evaluation reports contained specific recommendations for the museums in terms of improving results from their current evaluation practices in addition to the results from the heuristic evaluation. The reports were sent to the gatekeepers at each museum and discussed at relevant meetings.

The most important contribution of this method was that the literature review, which was conducted with the aim to be able to evaluate the museum websites, helped the researcher acquire a good understanding of the evaluation practices used by both museums and their impact on the process of value creation from Web technologies. The method was also effective in providing further support for concepts that emerged from interview data regarding the impact that specific features of the websites had on the value creation process.

#### 4.5.5 Ethical considerations

One of the basic ethical issues during the research process is anonymity at the level of individuals and organisations. At the level of individuals, participants may be concerned with how they appear in the case report and whether their interests are affected by publication. From the researcher's side, anonymity is not desirable because a) it creates problems related to the validity of the data b) it does not allow comparison with previous studies that may have been conducted in the same organisation and c) it requires the researcher spending extra time disguising the individuals (Robson, 1999). However, anonymity was offered as an option to both organisations, as well as the individuals

working in these sites. The aim of the researcher was to avoid any other changes in order not to distance the case reports from the reality (Robson, 1999).

Other than the issue of anonymity the British Psychological Society provides a list with a number of other ethical issues that require the attention of social sciences researchers (Robson, 1999) during data collection. Some of these issues were relevant to the specific study and an effort was made to act in accordance with these guidelines. Thus,

- Participants were provided with enough information necessary in order to understand the nature of the research.
- In the light of experience of the investigation, or as a result of debriefing, the participants had the right to withdraw retrospectively any consent given, and to require that their own data, including recordings, be destroyed.
- The observation at the museum sites respected the privacy of the individuals. During any field observation the researcher provided information about her role at each site to all participants.

The chance of breaching confidentiality was also minimised by the fact that all of the interviews were conducted, transcribed and analysed only by the researcher and all data were stored securely.

#### *4.6 Data analysis*

##### *4.6.1 Grounded theory - "Glaserian" approach*

Grounded theory was the method of analysis for this study. Grounded theory is a primarily inductive investigative process in which the researcher formulates a theory about a phenomenon by systematically gathering and analysing relevant data (Glaser & Strauss, 1967 p. 1) (Glaser, 1992 p. 16). The approach is likely to be of maximum use when it is dealing with qualitative data of the kind gathered from participant observation,



from semi-structured or unstructured interviews, from case-study material or from certain kinds of documentary sources (Turner, 1981). It is least useful when dealing with large-scale structural features of social phenomena, such as demographic trends (Turner, 1981). As in most other qualitative research methods, data collection and data analysis occur simultaneously in the development of grounded theory. The reason for alternating data collection with analysis is twofold. It allows for theoretical “sampling on the basis of emerging concepts”, and it “enables validation of concepts and hypotheses as these are being developed” (Strauss & Corbin, 1998 p. 46). Provisional concepts and propositions that fail to fit the data can be discarded or revised during the research process.

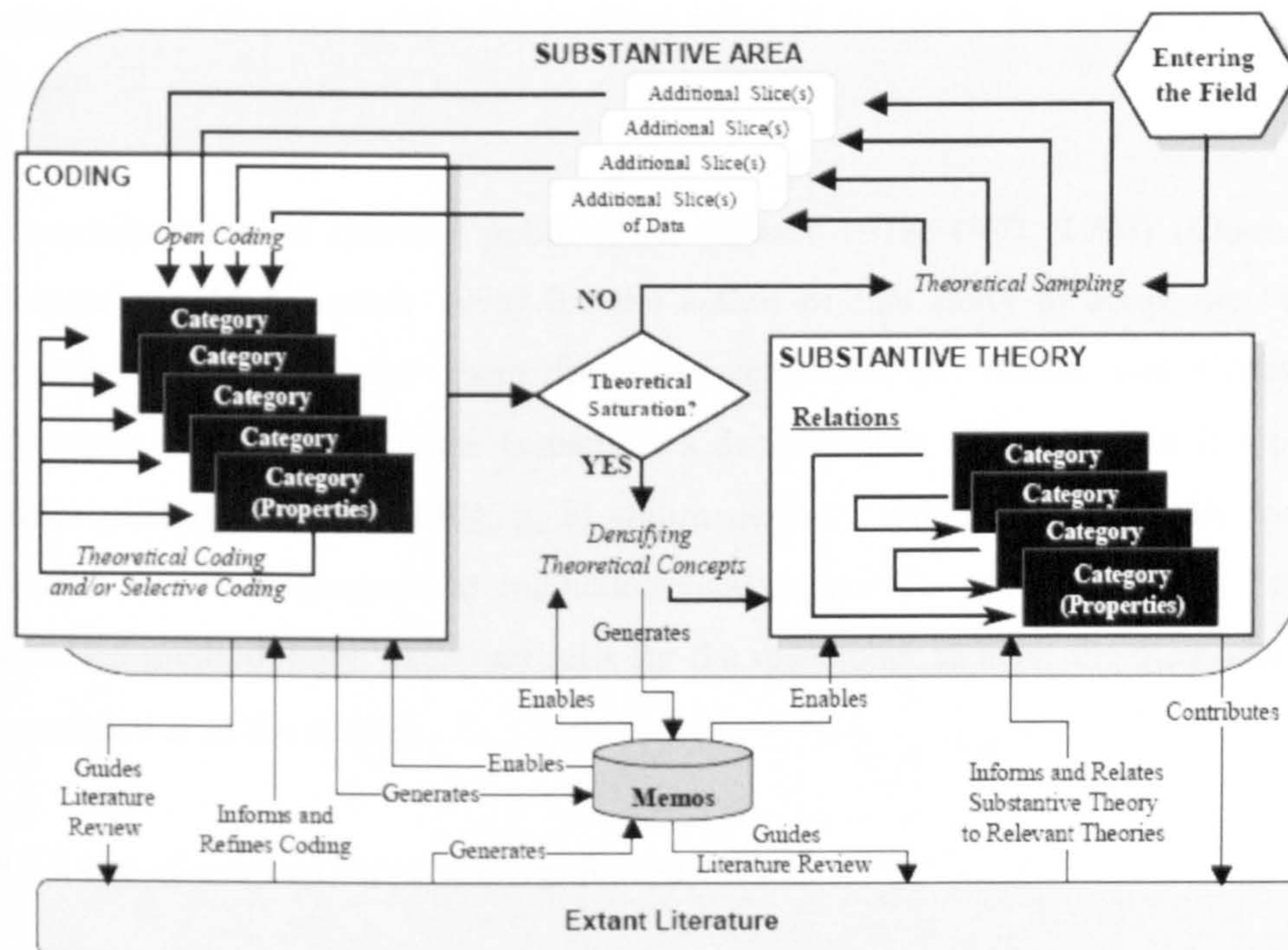
The researcher attempts to build a theory from the data using a “constant comparative” method of analysis (see Figure 4.2). The method involves four stages: generating categories and their properties; integrating categories and their properties; delimiting the theory (by the gradual solidification of the theory when new incidents don’t result in any theory modifications and by reducing categories to fewer more abstract ones); and writing the theory (Glaser and Strauss 1967, p. 105).

The first stage of the constant comparative method involves identifying concepts called categories and properties. A category is a conceptual element of a theory an abstract representation of something the researcher identifies as being significant in the data. A property is a conceptual characteristic or attribute of a category (Glaser and Strauss 1967, p. 36). As the constant comparative method proceeds, concepts tend to become integrated. The researcher develops a sense of how they relate to each other, and generates explanations about the phenomena being studied. These emerging propositions begin to form a theoretical framework, which serves as a guide to further data collection and analysis (Glaser, 1978 pp. 117-119).

As the theory develops, it crystallises around a core category that reflects the main theme of the study. The emergence of the core category delimits the research because only concepts that are related to the core are included in the theory. Data collection and



analysis becomes more selective and focused, resulting in a theory with a smaller set of higher-level concepts (Glaser & Strauss 1967, pp. 109–113). Data collection and analysis cease when the researcher achieves theoretical saturation, the point at which no additional data can be found that would add to the categories being developed and examined. All that remains then is to write up the emergent theory, drawing on the memos, which have been written about different categories during the study.



**Figure 4.2:** Grounded theory research process, adapted from (Fernandez, 2004)

Although the above mentioned description of the process of grounded theory is one that would be accepted by most grounded theory users, there are some disagreements within the research community about what the method is in principle, and how to put it into practice. These differences of opinion are largely the result of a public disagreement between the original founders of grounded theory, which took place in the 1990s. Since then the two main approaches to grounded theory are often called “Straussian” and “Glaserian” (Stern, 1994). Glaser’s (1992, p. 3) chief concern with Strauss and Corbin’s (1998) version of grounded theory is that it produces “a forced, preconceived, full conceptual description”, rather than allowing theory to emerge naturally. Glaser (1978)



suggests eighteen theoretical coding families to help researchers conceptualise how categories may relate to each other to become an integrated theory, whereas Strauss and Corbin (1998) focus only on one coding paradigm (axial coding). Glaser (1992, p.28) comments on axial coding: “There is not just one theoretical code that is a must in all cases: such as Strauss’ incessant and insistent focus on conditions. A pet theoretical code violates relevance and forces data. The researcher must be open to the emergence of whichever of the vast array of theoretical codes fit and work the substantive codes at the time.”

A consideration of relevant publications (Glaser 1978, 1992, 1998) (Charmaz, 2000; Fernandez, 2004; Locke, 1996) led the author of this study to adopt the “Glaserian” approach instead of the more formulaic approach of Strauss and Corbin (1998). However, in order to put the researcher’s decision into perspective, it is worth noting Miles and Huberman’s (1994, p. 5) argument that “...research is actually more a craft than a slavish adherence to methodological rules. No study conforms exactly to a standard methodology; each one calls for the researcher to bend the methodology to the peculiarities of the setting...”

#### 4.6.2 Use of existing literature in grounded theory

Grounded theory researchers are encouraged to begin their research with as few preconceived ideas as possible. The rationale behind this is to keep the researcher open to the concepts and relationships that will emerge from the data, and to avoid derailments in the form of assumptions about what ought to be found in the data (Glaser, 1992). “Although categories can be borrowed from existing theory, provided that the data are continually studied to make certain that the categories fit, generating theory does put a premium on emergent conceptualisations” (Glaser & Strauss, 1967). This stance on restricting the use of existing theory applies at the beginning of a grounded theory study. Once the analytic core of categories has emerged the researcher reviews the literature in the field with the aim of relating it to his or her work. “At the saturation point the analyst reconciles, judges and imbues his work with the field as he compares” (Glaser, 1978). A

grounded theory will combine “mostly concepts and hypotheses that have emerged from the data with some existing ones that are clearly useful” (Glaser & Strauss, 1967).

Thus, Glaser’s and Strauss’s formulation of grounded theory was never intended to encourage research that ignored existing empirical knowledge (Suddaby, 2006). They distinguished between theory grounded in extant research in a particular subject area, and grounded theory, but they observed a direct and necessary link between the two. The extent to which a grounded theory researcher can avoid preconceived ideas is a matter of degree. Any researcher, no matter how inductive, approaches a study with some orienting ideas about the phenomenon being studied, general research questions, hunches about where to look for answers, and so on (Miles & Huberman 1994, p. 17). Glaser (1978, pp. 44-46) describes a number of possible scenarios with regard to the degree of “openness” a researcher may have at the outset of a study. Thus, a researcher may begin a study with complete openness and virtually no problem in mind. Another possibility is for a researcher to enter the field with a defined problem area, a central research question, a general research perspective and a supply of initial concepts and research strategies. This approach is less than being completely open, “but still quite receptive to the emergent”.

Glaser (1998, p. 90) recommends to PhD students, who usually have to complete a literature review before starting field research in order to satisfy the PhD committee to “Give them the forcing they want and start the study. Then let the grounded theory emerge without forcing while doing the research. Soon what is being discovered will unforce the study. Preconceptions will be neutralized by what is being generated.” He also suggests: “... the researcher can write a paper on his literature review and publish it, in order to establish and state the assumptions he absorbed from the literature so they become data to constantly compare with what is really going on. This keeps track of the literature contamination impact.” (Glaser, 1998 p. 120). Suspending one’s knowledge of the literature by clarifying its assumptions and doing field notes on one’s experience to correct any preconceptions can also work (Glaser, 1998 p. 122).



In this study the relevant literature was reviewed in order to develop a better understanding of the research problem and come up with possible subject areas to cover at the interviews. However, the case protocol was used to keep control of the assumptions created as a result of the literature review and during the process of coding every effort was made not to let any preconceptions guide the analysis into specific directions (e.g. by not arranging quotations under pre-defined codes/concepts supported by previous literature).

#### 4.6.3 Grounded theory stages of analysis

Earlier in this chapter, grounded theory was described as a “constant comparative method”. This section will elaborate on that description with a discussion of the different stages of grounded theory analysis, which took place during this research and the way Atlas.ti and other analytic techniques were used. It is important to clarify that although for reasons of reporting/presenting there is a clear distinction between those stages, in reality some of the activities/tasks from each stage overlap.

##### *Open Coding (Atlas.ti)*

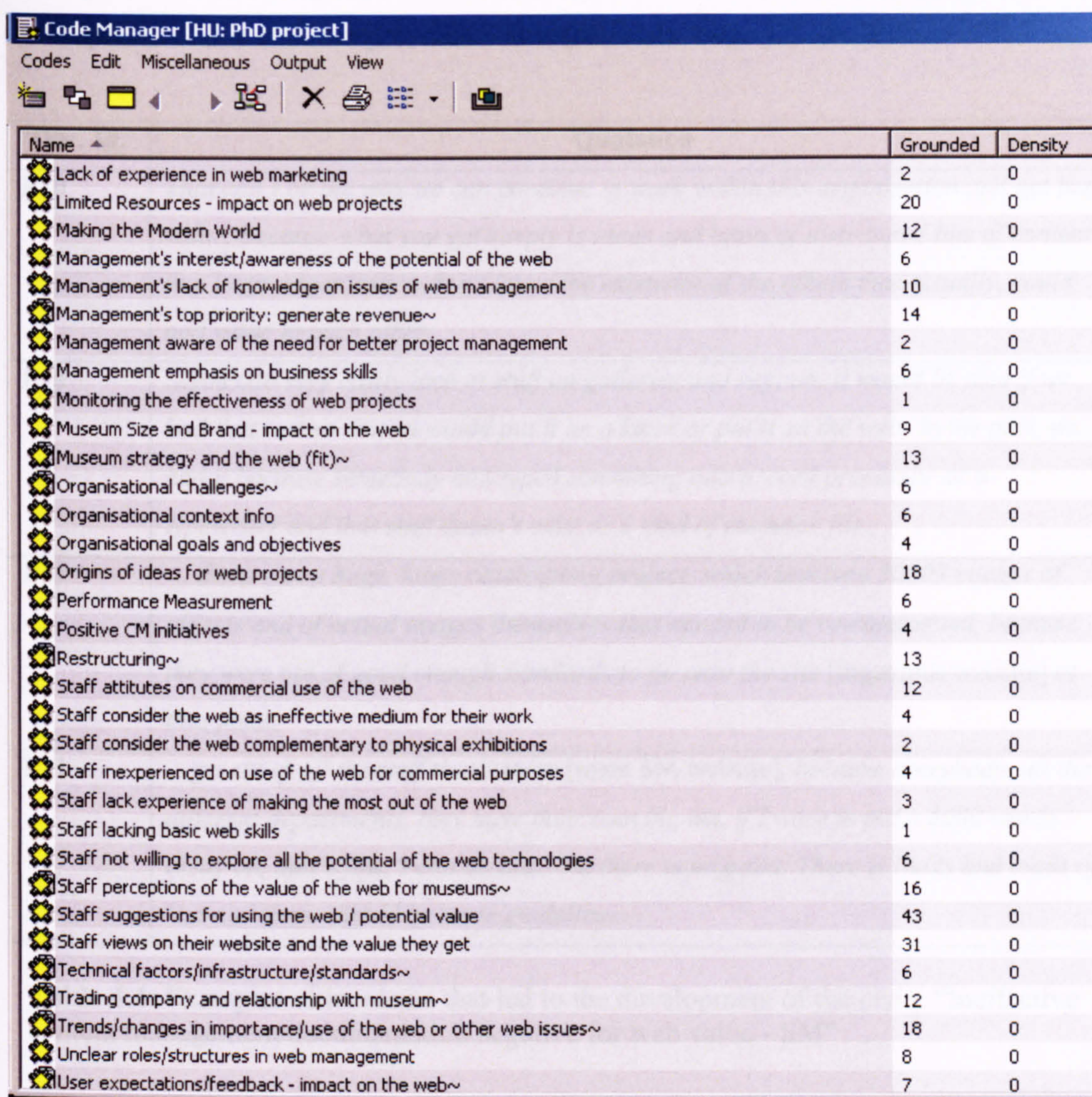
During the first stage of the analytical process the researcher had to go through the documents in Atlas.ti, line by line looking for “incidents”. Incidents can be found in a phrase, a sentence or two and seldom in as many words as a paragraph (Glaser, 1998). The search involved asking the following three questions, while comparing text segments and looking for patterns: What is this data a study of? What category or property does this incident indicate? What is the participant’s main concern? (Glaser, 1978). During this process of comparison, the researcher followed a number of the guidelines suggested by Glaser (1992) like:

- Give each discrete incident a conceptual name that stands for a phenomenon.
- Do not just label an incident but try to conceptualise a pattern among many incidents.
- Do not keep collecting more incidents if they indicate the same pattern and not new properties of it.

Incidents were compared with other incidents for verification, and with recently created codes/categories for establishing the best fit with the data (Glaser 1978, pp. 49–50). This



process of comparison led to the development of an initial list of codes/themes describing a variety of staff attitudes and actions, organisational roles, structures, processes and objectives (see figure 4.3).



Name	Grounded	Density
Lack of experience in web marketing	2	0
Limited Resources - impact on web projects	20	0
Making the Modern World	12	0
Management's interest/awareness of the potential of the web	6	0
Management's lack of knowledge on issues of web management	10	0
Management's top priority: generate revenue~	14	0
Management aware of the need for better project management	2	0
Management emphasis on business skills	6	0
Monitoring the effectiveness of web projects	1	0
Museum Size and Brand - impact on the web	9	0
Museum strategy and the web (fit)~	13	0
Organisational Challenges~	6	0
Organisational context info	6	0
Organisational goals and objectives	4	0
Origins of ideas for web projects	18	0
Performance Measurement	6	0
Positive CM initiatives	4	0
Restructuring~	13	0
Staff attitudes on commercial use of the web	12	0
Staff consider the web as ineffective medium for their work	4	0
Staff consider the web complementary to physical exhibitions	2	0
Staff inexperienced on use of the web for commercial purposes	4	0
Staff lack experience of making the most out of the web	3	0
Staff lacking basic web skills	1	0
Staff not willing to explore all the potential of the web technologies	6	0
Staff perceptions of the value of the web for museums~	16	0
Staff suggestions for using the web / potential value	43	0
Staff views on their website and the value they get	31	0
Technical factors/infrastructure/standards~	6	0
Trading company and relationship with museum~	12	0
Trends/changes in importance/use of the web or other web issues~	18	0
Unclear roles/structures in web management	8	0
User expectations/feedback - impact on the web~	7	0

**Figure 4.3:** Alphabetical list of codes: codes L-U (June 2005)

Some of the codes in the above list were quite broad, supported by a large number of incidents/quotations that resulted in several more narrow codes at a later stage (e.g. the code "limited resources impact on web projects"). Other codes in that list were quite narrow, supported by a small number of incidents that was gradually increased, as more



documents were examined. The code: “Ineffective content management/documentation negative for web value - SM”, describing documentation and content management practices in the Science Museum with a negative impact on Web projects’ development, belonged to the latter group. Several examples of the incidents that supported the development of this code are provided below (see table 4.4).

Doc. Id.	Quotation
P10	<i>That can't be the way we can continue to work within this organisation and get best value. Because what you get simply is loads and loads of distributed bits of content in a large organisation don't know the existence of the others that actually, could add value to each other.</i>
P10	<i>...you can very easily look at stuff on galleries and say: oh, it would be nice if we had that text so that we could put it on a kiosk or put it on the web. In the past, we had it because somebody had typed something into a word processor or a typewriter and that stuff doesn't exist as a kind of resource file.</i>
P15	<i>... there was a huge, huge, cataloguing project, which involved 30000 images of objects and of actual images themselves that needed to be re-catalogued, because they were not of good enough standards to go onto the site [Ingenious website] at that point.</i>
P21	<i>...get rid of all the stuff that's there [main SM website], because everybody, all the different departments, they have their own bit, me, if I were to put a 5000 words essay on, that's fine, I can do that, but there is no point. There is loads and loads of text and there should be some guidelines...</i>

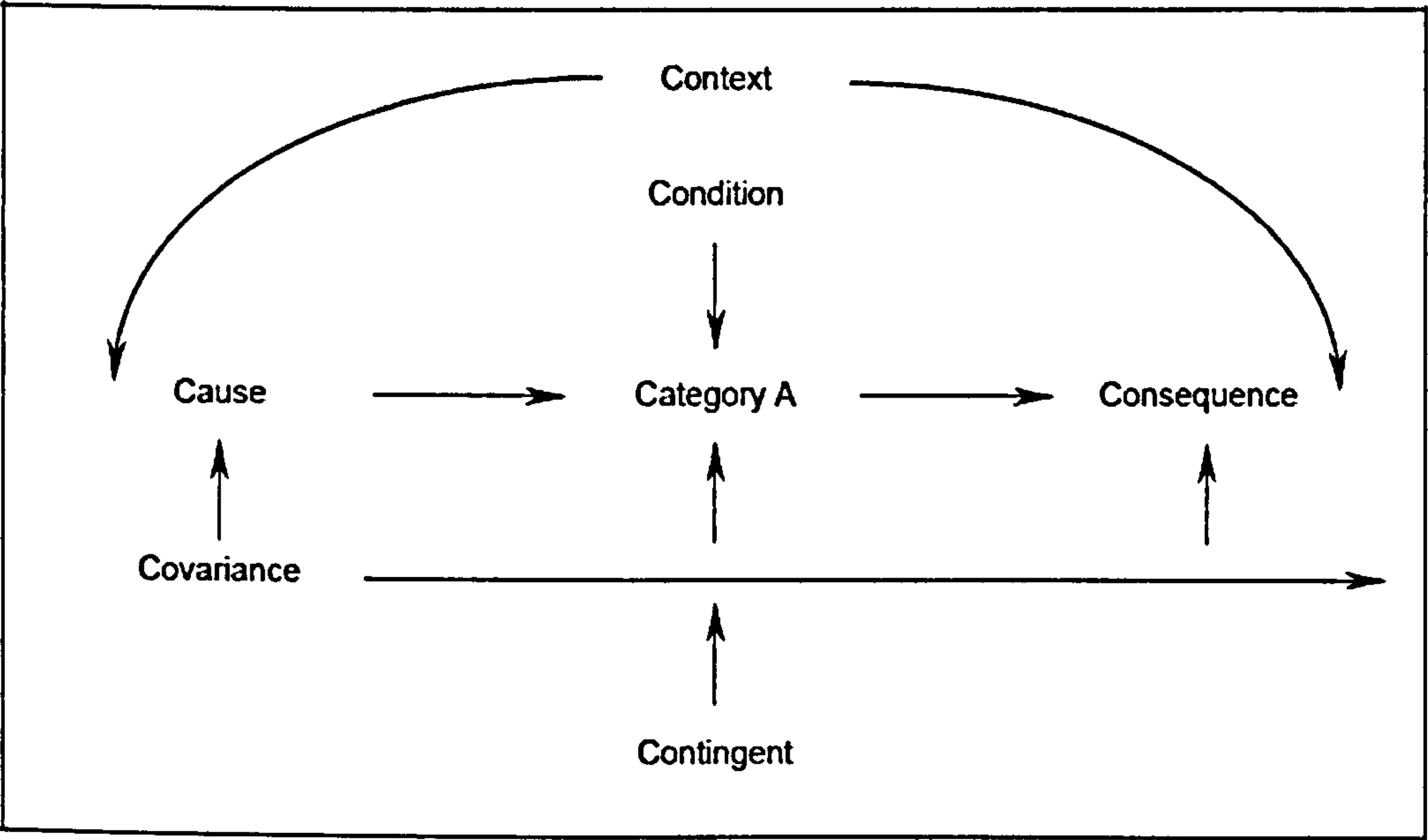
**Table 4.4:** Examples of incidents that led to the development of the code: “Ineffective content management/documentation negative for web value - SM”

The open coding proceeded rapidly at the beginning, but the initial codes had to be corrected by trimming and fitting. As Glaser (1978) explains, open coding proliferates codes fast, but it later begins to slow down, as the researcher has to verify that each code fits, eventually saturating the code and placing it in its true relevance among other codes. Using Atlas.ti, several codes were re-named, explanatory comments were added to describe the phenomenon they represented, whereas other codes were merged (due to

thematic overlap) or deleted (e.g. the code “dilemma of digitisation versus preservation” consisting of curators’ answers to an interview question was deleted, as this appeared not to be an issue for curators). This process continued, as more interview transcripts and other documents from both sites were imported into Atlas.ti, resulting in the development of a list of 118 codes within one year (see Appendix F).

*Theoretical Coding (Atlas.ti and manual techniques)*

At this stage, through a process of constant comparison, the codes that emerged during open coding were reassembled with propositions about the relationships between them. However, theoretical coding was not a distinct sequential step following open coding. The two phases of grounded theory proceeded quite naturally together in the study. Glaser’s Six Cs theoretical coding family (see figure 4.5) and a list of concepts from the IT value literature (see table 4.6) were used by the researcher in order to discover potential relationships between codes.



**Figure 4.5:** The six Cs, the most common theoretical coding family. Adapted from Glaser 1978, p. 74



<b>Organisational characteristics/infrastructure/roles</b>
Resources, size
Organisational Culture (Staff and management attitudes, politics)
Governance (processes, decision making)
Communication and working practices
Structure, roles, relationships
Risk management/ compliance (government regulations)
IT infrastructure and standards/guidelines (for re-using content, for IT vendors or applications)
<b>Organisational processes</b>
Web strategy/Planning
Approval prioritisation procedures for web projects
Web projects' analysis and design process
Post implementation issues (marketing of websites, ex-post evaluation of web projects)
Complementary investments (content management, digitisation procedures, change management)

**Table 4.6:** List of IT value concepts used for theoretical coding - based on (Hoque et al., 2006)

Glaser's Six Cs were useful in identifying relationships between individual codes at all levels, whereas the IT value concepts from Hoque et al. (2006) facilitated the development of a narrative by classifying codes according to their degree of relevance to different stages/aspects of the value creation process.

The "Family" tool in Atlas.ti, which creates clusters of codes, was used at this stage to organise codes under relevant groups and facilitate data handling (see Appendix G for a list of all the families). Two of the largest families of codes that emerged, referred to the organisational and IT context in the two case sites. The *Organisational context* family consisted of twelve codes regarding organisational activities, communication practices, financial operation, government impact on museum objectives, museum history, museum mission/objectives, planning and performance measurement issues, museum structure and staff training issues within the two sites, as well as evidence of operational

efficiency within the Geffrye Museum and the impact of a major restructuring process in the Science Museum. The *IT context* family consisted of ten codes providing information on IT budgets/team/procedures, IT infrastructure, IT mission/objectives, the Dana Centre Website (Science Museum), the Ingenious website (Science Museum), the Making the Modern World website (Science Museum), other Web issues (e.g. web design), Web-related trends within the organisations (historical details), Web content management practices and Website visitors' profiles. The incidents/quotations from those two families provided the main body of evidence for the development of Chapter Five (introduction to case sites) and supported several aspects of the narrative presented in Chapter Six.

The other families of codes referred to the impact of Web activities (the “where” aspect of the research question) and the factors that affected the process of value creation within the two sites (“how” and “why” aspect). The *Areas of value from Web activities* family consisted of five codes that corresponded to different aspects of the museum operation: a) Supporting existing services and providing new services, b) Marketing and widening access, c) Income generation d) E-procurement and e) Operational efficiency and networking. A number of other codes referring to aspects of the value creation process were categorised under the following families:

- *Complementary investments and change of processes*. It consisted of twelve codes describing changes in departmental procedures/staff workloads in support of Web activities within Geffrye, the encouragement of positive staff IT attitudes by Geffrye managers, issues of marketing support for websites, as well as evidence on the lack of complementary investments in support of Web activities within the Science Museum (e.g. ineffective content management and negative information sharing attitudes).
- *Geffrye limited resources impact on value*. It consisted of four codes providing information on the challenges arising from outsourcing web functions in the Geffrye Museum, as well as the impact that the limited Web budgets and staff resources had on the museum's Web activities.



- *Management and staff attitudes towards income generation.* It consisted of seven codes describing the way senior management and different staff groups viewed income generation through investments on Web-based systems.
- *Size and organisational structure impact on Web.* It contained information on the way the flat organisational structure of the Geffrye Museum and the availability of resources/strong brand of the Science Museum affected in a positive way the value the two museums acquired from their Web activities in different ways.
- *Web projects development and post implementation support (issues of sustainability and evaluation).* It consisted of eight codes referring to the involvement of senior management in the development of Web-based systems in the Geffrye Museum, the inability to use evaluation results to improve Web resources in the Science Museum, the lack of sustainability planning during Web development in the Science Museum, as well as other aspects of Web projects' development (e.g. staff roles and standards used) within the two sites.
- *Web projects planning and prioritisation.* It consisted of ten codes holding evidence on the lack of central direction in the planning of Web activities in the Science Museum, the influence that funding availability and gallery plans had on the prioritisation of Web projects within the Science Museum, the way Web activity was guided by strategic plans in the Geffrye Museum and the emphasis on the use of Web technologies for educational and marketing purposes in both museums.

The “Network” tool (creating graphic representations of relationships between codes or quotations) in Atlas.ti was also used at this stage to show existing links between the themes that emerged in relation to different aspects of the research question. The networks were mainly used to represent Glaser’s Six Cs kind of relationships between codes and to keep track of the evolving relationships as the analysis progressed (i.e. graphs would get updated automatically, as a result of changes in the codes/quotations involved). For instance, they were used to demonstrate the way different organisational factors affected different areas of value (see figures 4.7-4.9).



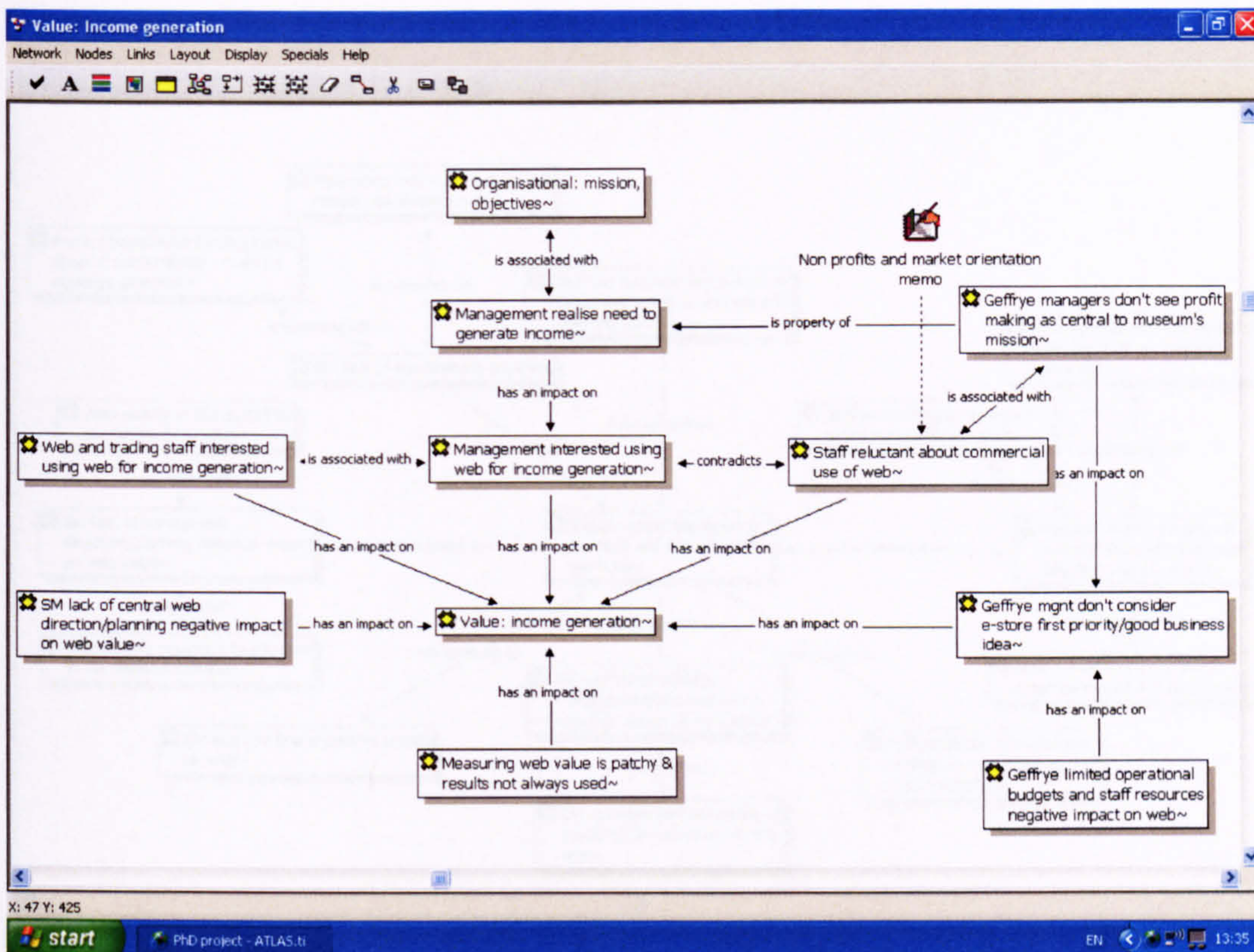


Figure 4.7: "Value: Income generation" network

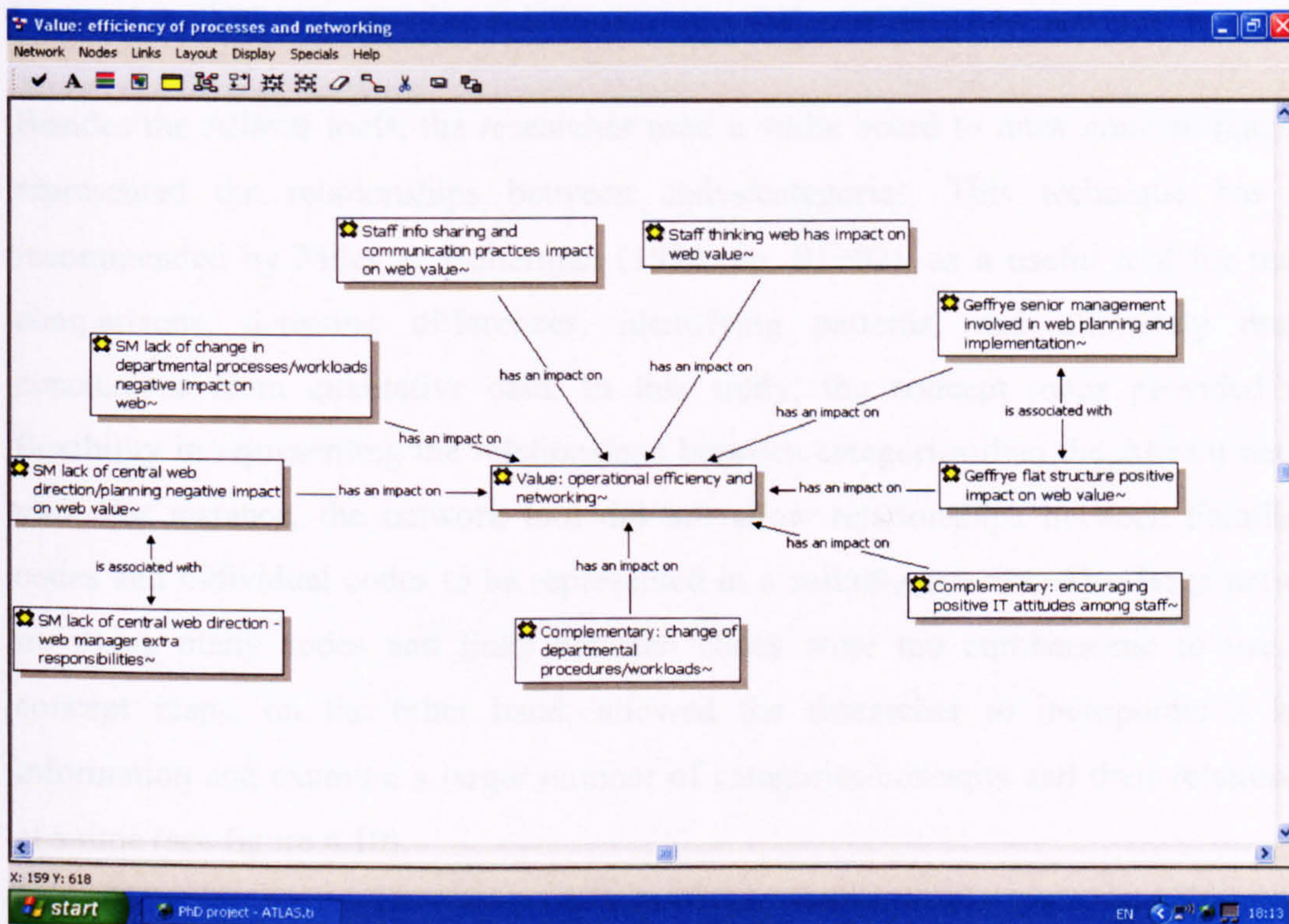
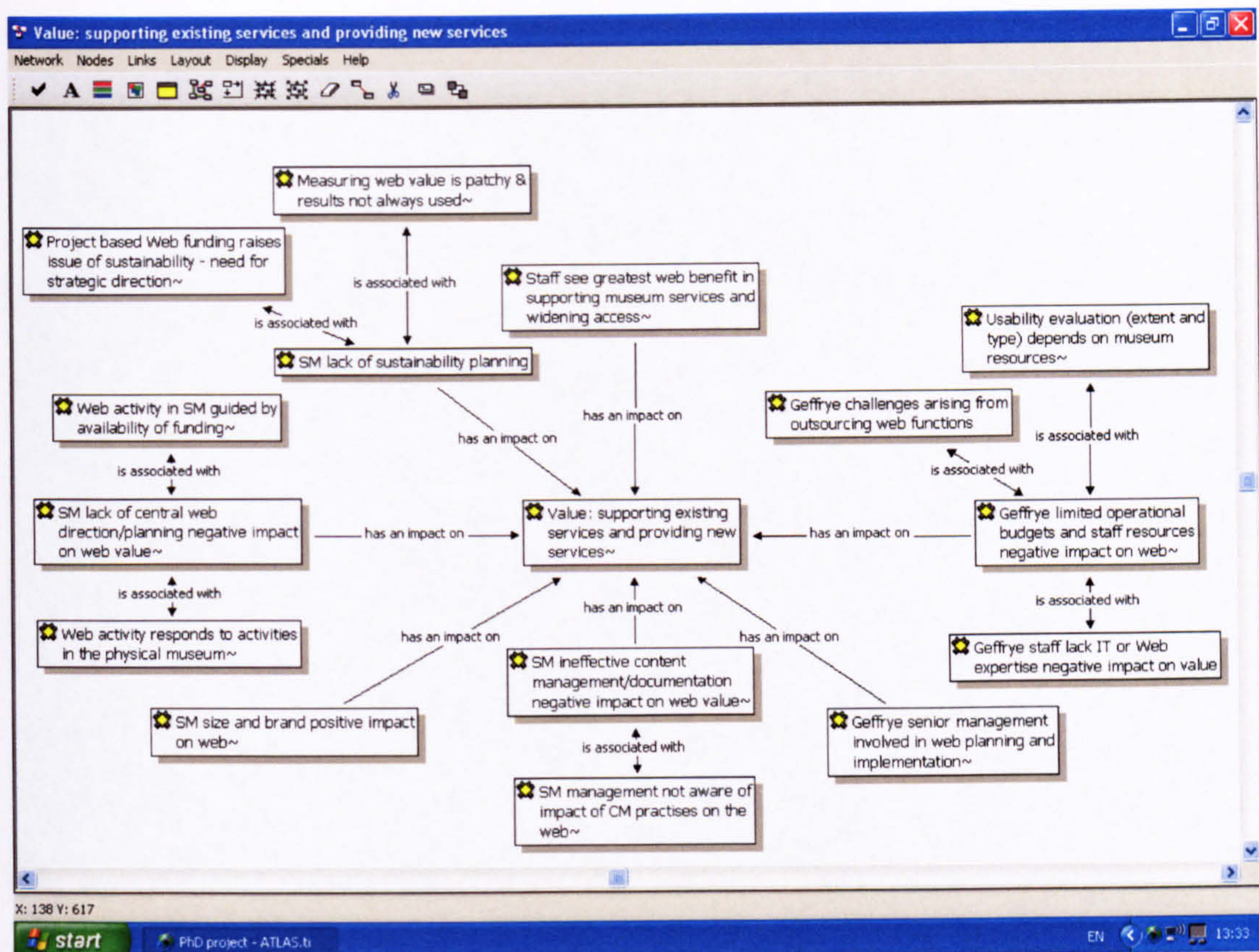


Figure 4.8: "Value: operational efficiency and networking" network

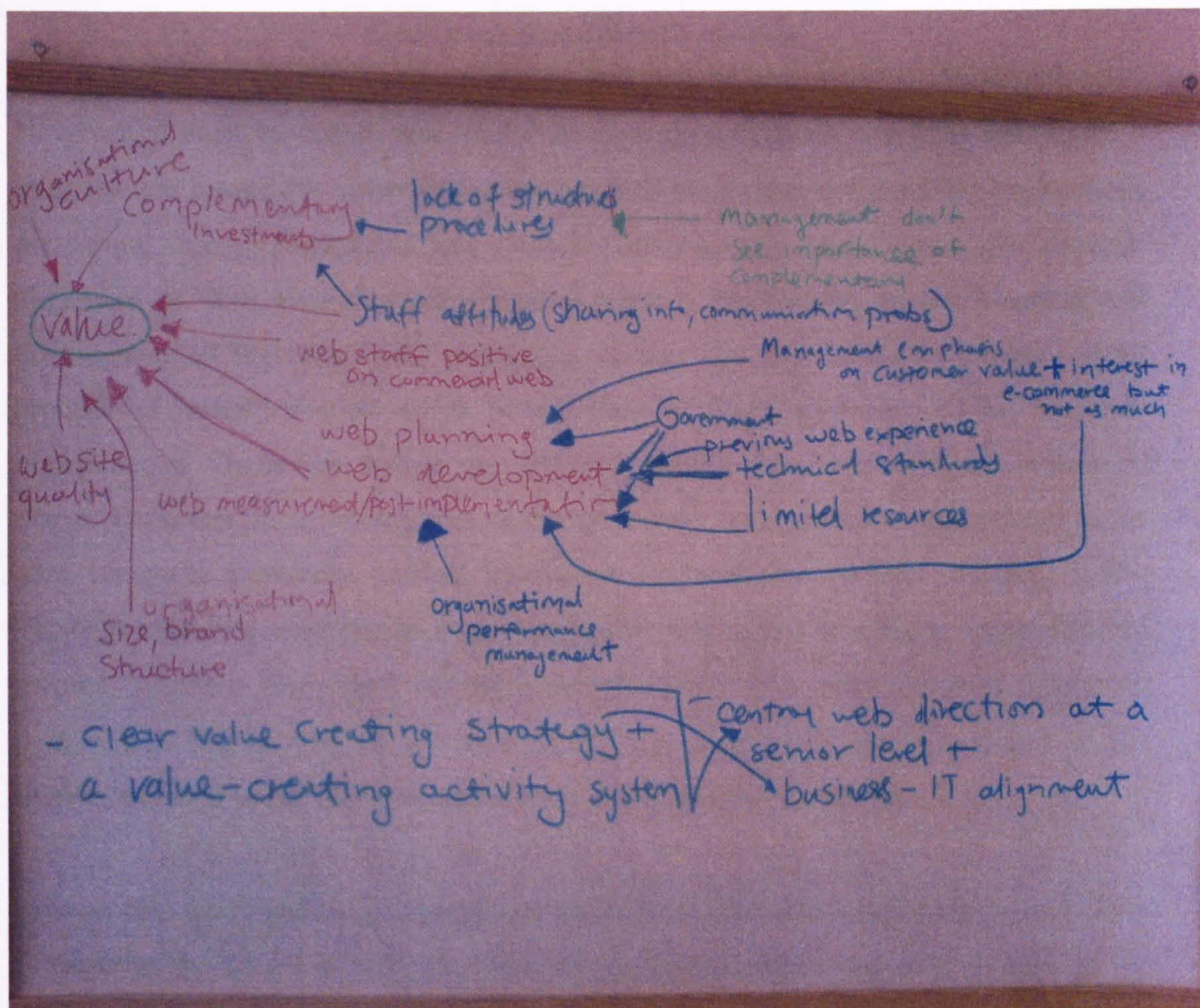




**Figure 4.9:** “Value: supporting existing services and providing new services” network

Besides the Atlas.ti tools, the researcher used a white board to draw concept maps that represented the relationships between codes/categories. This technique has been recommended by Miles & Huberman (1994, pp. 91–92), as a useful tool for making comparisons, detecting differences, identifying patterns, and ultimately drawing conclusions from qualitative data. In this study, the concept maps provided more flexibility in representing the relationships between categories than the Atlas.ti network tool. For instance, the network tool did not allow relationships between Families of codes and individual codes to be represented in a suitable manner. Also large networks involving many codes and links between codes were too cumbersome to use. The concept maps, on the other hand, allowed the researcher to incorporate a lot of information and examine a larger number of categories/concepts and their relationships at a time (see figure 4.10).





**Figure 4.10:** Drawing concept maps

Finally, another analytic technique used during the theoretical coding stage was the Atlas.ti “memo tools”. Glaser (1978) emphasises the importance of memos in the development of grounded theory as the ideal tool for theorising and writing-up ideas about codes and their relationships as they emerge during coding, collecting and analysing data. During this stage, the researcher composed memos to record new directions for literature search, links between existing literature and emerging concepts from the data, her thoughts on the process of analysis and first attempts on theory building.



### *Core Category and Selective Coding*

Glaser (1978) suggests that the core category can be any kind of theoretical code. However, it must be central and related to as many categories and their properties, it must reoccur frequently in the data and it needs to have clear and grabbing implications for formal theory. During the last stages of the analysis, two themes (the strategic alignment of Web activities and senior manager's involvement in the planning and development of Web activities) emerged as having the greatest impact on the overall process of value creation from investments in Web activities within the two organisations. These two themes met Glaser's criteria for a core category mentioned above. From this point, coding was delimited to only those concepts that related to the core category, a process defined by Glaser as "selective coding" (Glaser, 1998). Through selective coding the theory is boiled down, by saturation, more focused memos, selective theoretical sampling and the shift to a more focused theoretical perspective. The process of selective coding was also informed by a review of the literature related to the two core themes that emerged from the analysis.

This process continued until the two core themes had adequate level of clarity and depth of description. This was also the point when the researcher was able to explain the evidence from both sites in relation to those two themes. Myers (1995) described this as the point when: "the apparent absurdities, contradictions and oppositions in the organisation no longer appear strange, but make sense". The resulting grounded theory is presented in chapters six and seven.

### *Conclusion*

This chapter began with a discussion of the different research paradigms in social sciences, followed by a description of the main assumptions of the interpretive research paradigm, as well as its suitability for this study. The rationale for the use of case research, as well as the potential limitations of the method was then presented. Details on the selection of the two case sites, the use of a case study protocol and Atlas.ti software to facilitate data collection and analysis were provided in another section. A detailed description of the data collection methods used in this study (semi-structured

interviews, document review, observation and website evaluations) was also provided and the chapter concluded with a description of the stages of grounded theory that the researcher went through during the process of analysis.



# CHAPTER FIVE: INTRODUCTORY CASE STUDY

## CHAPTER

### *Introduction*

The chapter provides the reader with a description of the two case study institutions in order to put in context the main findings of the research, which will be presented in the next chapter. The logic underlying the structure of this chapter is based on a set of themes that emerged through the second stage of the analysis (theoretical coding). Those themes did not represent a direct answer to the research question (i.e. value obtained from web activities or factors that have an impact on the process of value creation). However, during the analysis it was found that many of them (e.g. organisation's financial condition, flat organisational structure, size of IT team and budget) affected the concepts, which represented the answer to the research question. Thus, it was considered vital to provide information on those themes in order to help the reader gain a better understanding of the relationship between the organisational and IT context of the two institutions and the main concepts/themes, which emerged as a result of the field research. The description of the two institutions will also provide the reader with the opportunity to evaluate the rationale behind their selection as case sites, as their similarities and their contrasts will be illuminated.

Divided in two parts the first section of the chapter describes the organisational and IT context in the Science Museum, whereas the second part provides similar information about the Geffrye Museum. Within each of the main parts, the history of the organisation, its size, its goals and objectives, its financial condition, its relationship with the government and other organisations, as well as information about decision making, performance management and internal communication practices is presented. For each museum, information about the IT context is also provided, including information on IT staff numbers and responsibilities, IT budgets and planning

processes, museum digitisation practices and use of other IT infrastructure, as well as some basic information about the museums' websites.

### *5.1. Science museum: Organisational and IT context*

#### **5.1.1 History**

The Science Museum is part of the National Museum of Science & Industry (NMSI), which also incorporates the National Railway Museum at York (<http://www.nrm.org.uk>), the National Media Museum at Bradford (<http://www.nationalmediamuseum.org.uk/>), as well as two smaller sites: the Wroughton site near Swindon (currently used as storage area for NMSI objects with a plan to open as Science Museum Swindon in 2010 subject to receiving £50 million funding from the Big Lottery Fund) and the Locomotion in Shildon (<http://www.locomotion.uk.com/>). The South Kensington Museum, which included the original Science Museum collection, as well as the V&A collection was established in 1857. The Science Museum was separated administratively from the V&A museum and adopted its current name in 1909.

Physical expansion occurred outside London with the establishment the National Railway Museum in 1975 and the National Museum of Photography (now the National Media Museum) in 1983. A former airfield at Wroughton, was acquired in 1979 both for storage purposes and to allow the development of collections of larger objects. In 1984 the Science Museum and its sister museums were devolved from direct Civil Service control to administration by a board of trustees. The phrase "National Museum of Science and Industry", which had been in use as the Science Museum's subtitle since the early 1920s, was adopted as the corporate name of the entire institution.

#### **5.1.2 Organisational size, goals and objectives**



At the time field research took place, the NMSI employed around 900 members of staff with Science Museum being the largest of the NMSI institutions. Physical visits to the Science Museum were in the area of a couple of million visitors per year. The Science Museum's main objective was to provide a forum for debate about society's relationship with science, technology and medicine. Hence, their mission statement placed an emphasis on the educational use of their collection: "to inspire and engage our audiences in the past, present and future of human ingenuity through interaction with our unique collections and cultural resources." The museum strategic priorities other than the ones directly related to the development, maintenance and use of their collections for educational purposes were: to enhance the museum brand, to increase earned income and improve operational efficiency, as well as to champion sustainable development.

The museum because of its size and the significance of its collection had an advantage over other UK museums (e.g. it could attract more funding from the government and the private sector because of its strong brand). Furthermore, the museum's position had been improved recently, as its activities had become relevant to public policy agendas right across government, including culture, education and skills, science and technology, transport and the environment. At the same time, just like the majority of UK museums, the museum had been facing increasing competition for visitors and visitor time (e.g. in 2004 the museum reached a plateau in attendances) and it had to deal with increased expectations by visitors for technology-rich exhibitions that had driven up exhibition costs.

### 5.1.3 Relationships with the government and other organisations

The Department of Culture, Media and Sports (DCMS) exercises control over the Science Museum in a number of ways. The Secretary of State makes appointments to the board of trustees, while basic controls and information requirements are imposed as a condition of the museum's grant-in-aid. Periodically, the DCMS agrees with the museum a Funding Agreement, which details performance indicators used by the

DCMS to evaluate the museum on a value for money basis. The majority of the performance indicators used by the DCMS to evaluate the museum's performance and decide on funding are quantitative measures (e.g. visitor numbers, number of venues to which objects from the collections are loaned, number of website hits). As a result of this, the museum's objectives reflected to a large extent the strategic priorities of the DCMS (e.g. increasing access to the museum's collection and modernising service delivery).

The museum had also been encouraged by the DCMS to develop partnerships with other organisations in order to broaden its outreach community. By the time field research in the museum started they had a lot of experience in partnerships with different kinds of organisations and for different types of projects. The Dana Centre's (new venue for adult audiences) programme of events had involved partnership with organisations like the BBC and Channel 4. Many museum exhibitions had been collaborative ventures, including a series of exhibitions on a medical theme in partnership with the Wellcome Trust and the exhibition "Exclusive! Tales from the Tabloid Frontline", which was a partnership with the Daily Mirror. In terms of web projects, "Making the Modern World" was the result of a partnership with a school and a commercial organisation. However, the Science Museum had also been increasingly concerned about the risks involved in consortium-led projects (e.g. because of the unspoken agendas of each stakeholder or the potential mismatch of visions) and in 2005, during a DCMS consultation that urged UK museums to set more partnerships, the museum responded with specific recommendations in an effort to address problems that arise in partnerships (NMSI response to DCMS consultation paper: Understanding the future, 2005).

#### 5.1.4 Primary sources of income and current financial condition

The Science Museum, as part of NMSI is an exempt charity, recognised as charitable by the Inland Revenue. However, the NMSI has a wholly owned subsidiary trading company, the NMSI Trading Limited (set up in 1988), which covenants all taxable



profits to NMSI. The Science Museum generates income from various sources, grant-in-aid, commercial activities, donations, corporate sponsorship and corporate partnership. Their main source of income is the grant-in-aid received by the DCMS (total grant-in-aid for all NMSI institutions was around 33 millions at the time of the field research). In addition to this, the Science Museum has several income generating activities like science nights for children, museum publications, school workshops and presentations for school groups, outreach (sending shows out to schools, festivals or community centres) and teacher's courses. In terms of corporate sponsorship, the relevant department (which is part of the NMSI Trading Ltd) seeks sponsorship, grants and donations from companies, trusts, foundations and public sector bodies. The museum also offers a Corporate Partnership programme; a membership scheme for organisations who would like to provide financial support to the Museum without being associated with a particular project or development.

Furthermore, the museum has a number of commercial activities, which are organised with the support of the NMSI Trading. Those activities include: a museum shop (renovated and doubled in size since October 2005), several museum cafes, an IMAX cinema, fee-charging temporary exhibitions, building exhibits for other museums and props for films, licensing (e.g. selling museum branded toys and games on the high street during the Christmas period, creating joint ventures with media companies to procure branded media and merchandising deals), as well as hiring out museum venues for family occasions or corporate events.

At the time of the field research, and despite the fact that most of their day-to-day operating costs were funded by grant-in-aid, the museum was reliant on partnerships with sponsors to provide the financial basis for their projects. The museum had core staff and expertise, the collections and their reputation but they did not have enough core funds to develop all the displays, events, websites, and their other activities. Furthermore, staff claimed that the long term decline in the real value of the museum's grant-in-aid had a negative impact to the museum's finances. During the course of the field research due to financial difficulties, Science Museum was forced to close some

galleries (e.g. the Flight Lab gallery closed because there were insufficient funds to repair, maintain and staff it) and relocate part of their library collection to facilities outside London. Furthermore, there was a recruitment freeze that followed a round of redundancies and led to disputes between senior management and the union over cost-cutting measures (resulting in staff strikes). In 2005, the museum management appealed for more support from the DCMS and agreed for an independent review of its financial situation. However, the museum didn't expect a significant increase of the grant-in-aid in the short term, and consequently there was a lot of pressure for the NMSI Trading to generate extra income.

#### 5.1.5 Organisational structure, decision making and control

##### *Organisational structure*

The organisational structure of the Science Museum is rather peculiar. Administrative functions like HR, Planning and Development (Planning and Development Unit), Finance, Estates (Sustainable Development) and ICT are “independent” teams supporting the NMSI family of museums and not only the Science Museum, though they are based in Science Museum facilities. The commercial, marketing, sponsorship and development activities of the Science Museum and the corresponding departments are part of the NMSI Trading Ltd. Both the NMSI national functions and the Trading Company managers receive direction from the Heads of all NMSI museums. The “traditional” museum departments like collections/curatorial, learning and audience development, multimedia, broadcast media and the web, as well as the galleries management are all under the responsibility of the Deputy Head of Science Museum.

During the time of the field research, the NMSI was coming out of a major restructuring project, which started in 2000 and affected mainly the Science Museum. The restructuring incorporated a reform of management and staff structures, with the aim to provide a “flatter” organisational structure. In parallel with reforms in the museum's structure, the NMSI integrated its business planning and their performance management processes. On the other hand, the changes in the organisational structure and the redundancies, which took place had a negative impact on the staff morale and it was



speculated that along with the NMSI's financial difficulties it led to the resignation of the Director in July 2005 (Midgley & Henderson, 2005; Morris, 2005; Radford, 2005).

*Decision making, performance management and communication practices*

A board of trustees, which includes between 12 and 20 members, is responsible for NMSI. The main decision-making body within NMSI is the Executive Committee made up of the Director of NMSI, the Head of each museum, the Chief Executive of NMSI Trading Ltd and the Heads of NMSI-wide functions: Human Resources, Planning & Development (PDU), Sustainable Development (Estates), Finance, and Information Technology. The NMSI Executive Committee is accountable to the board of trustees and it is responsible for resource allocation, leading strategic management and developing the museums' cultural agenda.

Regarding the process of strategic planning at the time field research took place, all the NMSI strategy-related documents, including the Science Museum strategic plans were created through a process run by the Planning and Development Unit (PDU). The PDU consulted with managers across the NMSI to develop a prioritised list of projects and activities that they wanted to carry out (providing information on costs and income associated with the project). The list then went through a consultation and revision process to establish, which projects and activities the museum could afford to implement with the available funding. The final list was then submitted for approval to the Board of Trustees. The PDU played a very important role in decision making within NMSI. Besides supporting the NMSI museums and national functions in developing their "business" plans, they also monitored the implementation of Balanced Scorecard as a performance management system throughout NMSI. Other PDU responsibilities included composing quarterly reports to the trustees, conducting reviews of the NMSI Trading functions, developing museum policies (e.g. Intellectual Property Rights policy) and carrying out different kinds of reviews (e.g. relocation of Science Museum Library).

Regarding formal communication within the Science Museum, there were regular senior management meetings, during which progress on objectives for the current year was discussed. There were also regular staff briefings by the Director of NMSI and the Head of Science Museum on strategic issues, whereas information on museum operational matters was usually circulated to staff by email or/and was uploaded on the Intranet, in order to provide the opportunity to museum staff to offer feedback. At last, an annual staff survey, which was part of the performance management process, offered another opportunity to museum staff to raise any concerns. However, staff interviewed expressed concerns regarding bottom-up and horizontal communication between different departments and especially between traditional museum departments and the national functions or the trading company:

*“I don’t really understand it [relationship with trading company] but I think that is saying something. If someone who has worked here for 3 years and now working at the centre of the organisation doesn’t really get it...”* PDU Project Manager (Interview 10/2/2005)

*“...Well, I’ve got quite a lot of experience in this horizontal communication and the lack of it.”* PDU Project Manager (Interview 10/2/2005)

#### 5.1.6 IT Context

##### *IT staff numbers and responsibilities, IT budgets and planning*

At the time field research took place, the IT team was one of the “national functions” that provided together with Finance, HR and Estates the core administrative support for the NMSI. The Head of IT was a member of the NMSI executive committee and participated in strategic planning for the whole NMSI, while she reported directly to the Director of NMSI. The IT team had 18 full time members of staff, who were based in the Science Museum. At the time the field research took place, the team had a maintenance budget of around 500,000 pounds to support wide area networking and other systems, as well as a capital budget in the area of 160,000 pounds.



The Science Museum web administration team was not part of the NMSI IT team. The team used to be part of the museum's marketing department until 2001 (under the management of the Trading Company Ltd), and was later moved within the multimedia department of the museum, which was under the management of the Science Museum Director. The team consisted of the web manager and 2 web assistants, who provided ongoing support for web-related matters. In addition to the web team, the Science Museum often had to hire external web consultants for the development of educational websites. The cost of any web-related projects was covered by specific project budgets, and was based on sponsorship from private companies or governmental departments. The Science Museum operational budget for web-related initiatives had been steadily increased to 80,000 at the time the field research took place (from 5,000 in 2001). This budget covered purchases of hardware and software but did not include any staff costs.

The NMSI IT team was responsible for the network support of the Science Museum website (dealing with network, servers, backup regimes etc), as well as the procurement of hardware and software on behalf of the Science Museum web management team. The web management team was responsible for the creation, maintenance and functionality development of the main Science Museum website, the Dana Centre website and a few of their e-stores. The team also had to deal with some content management issues and low level web design for a number of their websites. The team also had a general advisory capacity throughout the organisation in web-related issues. Individuals from a few Science Museum departments (e.g. education) had access to the web content management system and they were responsible for updating the relevant departmental pages on the main Science Museum website.

Regarding IT planning, the IT team had regular meetings to decide on the IT priorities; those consultations resulted in an annual business plan. Other than the IT business plan, the NMSI E-committee had a great influence on IT planning. The e-committee had members from all the NMSI institutions (including the individual museums' web administrators, representatives from the PDU and the visitor research group of the Science Museum) who met around three times per year to discuss major IT issues, as

well as any large scale web-related initiatives. The IT team's main long-term objectives as described in their business plans were in line with the NMSI objectives and they placed the emphasis on developing a resilient and reliable IT Infrastructure within NMSI, as well as on providing high quality support for NMSI users and products. Because of the NMSI's reputation, security and integrity of all networked systems was their main concern. IT strategic planning did not include any directions for web activities within the museum. However, the Web manager was working on a Web policy document at the time the field research started (though there were no results by the time the field research was completed in October 2005).

#### *Digitisation and multimedia development*

At the time of the field research, the content and the technical criteria used in digitisation initiatives depended on the available funding, technologies, and, where digital surrogates were concerned, to available underlying content. The museum had specific guidelines/policy for multimedia development, which covered all stages of multimedia projects from the stage of concept to the design, production and postproduction stages. Among other recommendations, their multimedia policy document suggested the use of a full business plan approach for planning multimedia projects. Although it wasn't possible to evaluate the level of use or the type of projects the guidelines applied to (i.e. large scale multimedia projects or all multimedia projects), during the field research; there was evidence that the museum's extensive experience in implementing a variety of multimedia and digitisation projects had increased the chances of successful future implementations.

#### *The Science Museum websites*

The development of the main Science Museum website had been organic. The first website was launched in 1994 and developed quickly a broad and deep hierarchy with many cross-listings. In addition to visitor information, there were approximately 12 navigation sections representing organisational activities and to some extent, the main divisional areas of the museum itself. Between 1997 and 1999, the Museum began to



review its online presence and sought to provide more integration to existing content as well as a more interactive and community based web experience. A major re-design followed in late 2000 (Figure 5.1) and until 2007, there were no major changes to the website other than some small changes, which didn't change the look of the website. In March 2007, after the field work in Science Museum had finished, major changes to the design, the navigation and the content of the main Science Museum website took place (Figure 5.2).

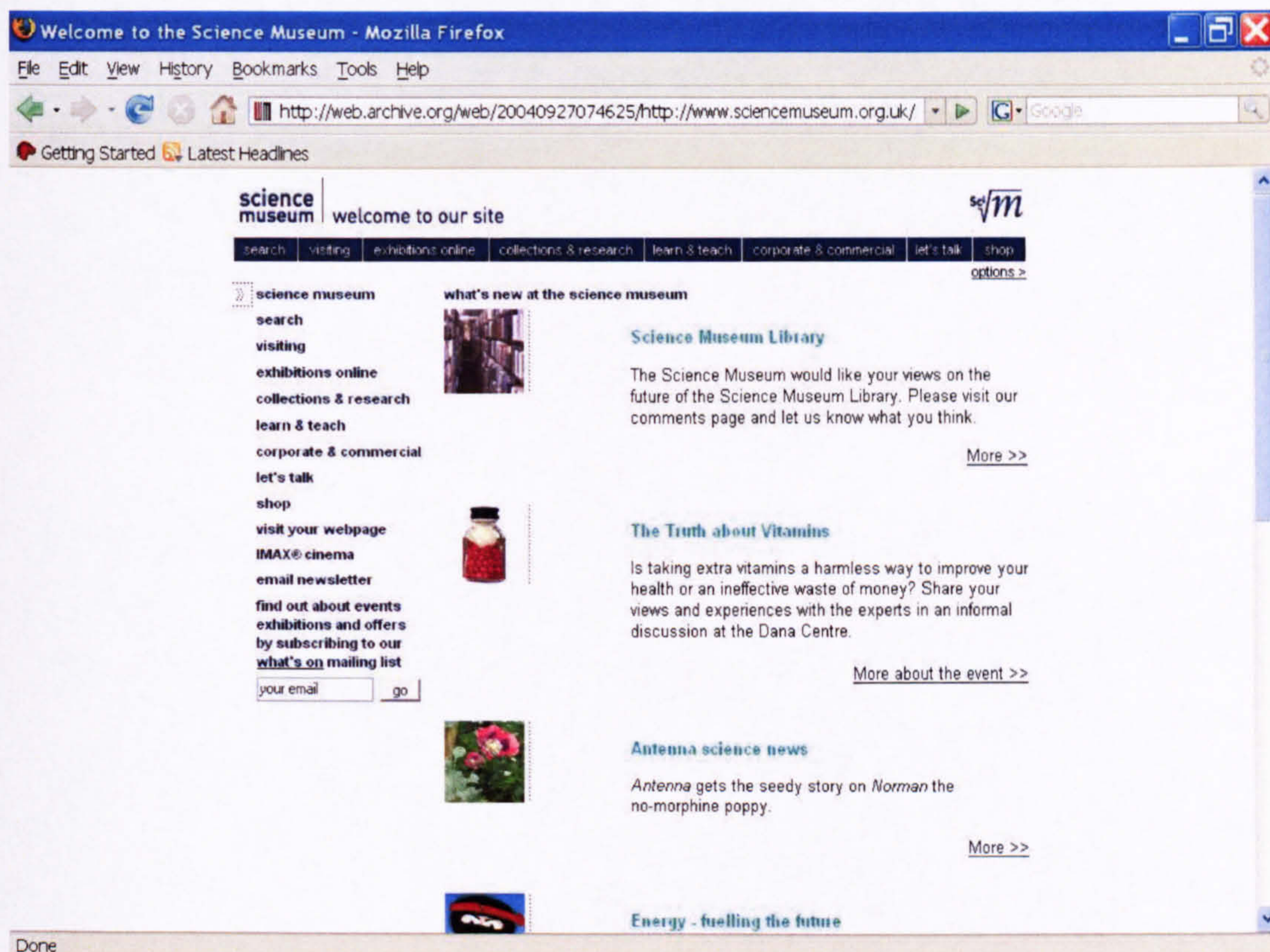
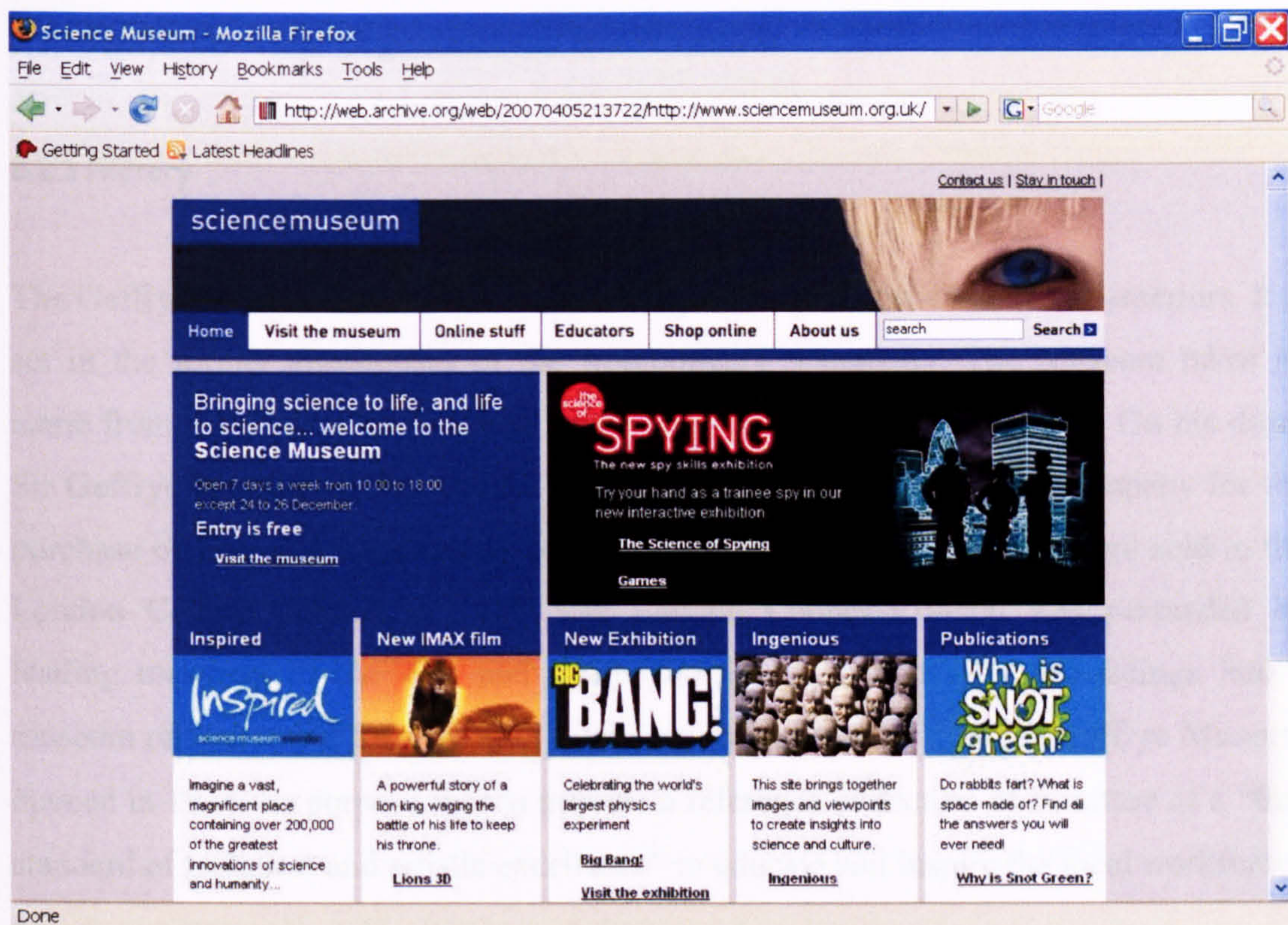


Figure 5.1: September 2004 – Main Science Museum website





**Figure 5.2:** March 2007 – Main Science Museum website

Other than the main Science Museum site, at the time the field research started in the museum two multi-million budget websites had been recently launched by the museum. The Ingenious website (<http://www.ingenious.org.uk/>) that was launched in late 2003 was a learning source for adults, funded by the NOF-digitise program at a cost of 1.4 million pounds, which included the digitisation of a large number of objects at all NMSI sites. The Making the modern world website (<http://www.makingthemodernworld.org.uk/>) that was launched in 2004 was a learning resource for students at A-level. It was funded by the Invest to Save Budget of the Treasury and its development was the result of a partnership between Science Museum, Mackenzie Ward Research and Peter Symonds College. The project budget for this website was in the area of 1.5 million. Finally, another important website supported by the Science Museum infrastructure was the site for the Dana Centre; a Science Museum operated venue that specialises in science events for adults (<http://www.danacentre.org.uk/>).



## *5.2. Geffrye Museum: Organisational and IT context*

### **5.2.1 History**

The Geffrye Museum specialises in the history of English, urban domestic interiors. It is set in the former almshouses of the Ironmongers' Company. The Museum takes its name from Sir Robert Geffrye who was Lord Mayor of London in 1685. On his death Sir Geffrye bequeathed the residue of his estate to the Ironmongers' Company for the purchase of land and construction of the almshouses. The almshouses were sold to the London County Council in 1911. The London County Council was persuaded by leading members of the Arts and Crafts movement to convert the buildings into a museum related to the local furniture industry. As a result of this, the Geffrye Museum opened in 1914. Its purpose was to provide a reference collection of furniture of a "fine standard of technical and artistic excellence" to educate and inspire the local workforce.

The Geffrye Museum developed under the successive administrations of the LCC (London County Council), GLC (Greater London Council) and ILEA (Inner London Education Authority). Following the abolition of ILEA, the government transferred the museum to the care of the Geffrye Museum Trust in April 1991. Since then, the museum had been through a momentous period of change with substantial improvements in displays and services and a £5.3 million building extension that was completed in November 1998. The extension doubled the size of the Geffrye, providing a new gallery for 20th century period rooms and displays, a temporary exhibition gallery and new education facilities, as well as a restaurant and an expanded bookshop.

### **5.2.2 Organisational size, goals and objectives**

The Geffrye Museum, at the time the field research took place, employed around 27 full-time and 16 part-time members of staff (2005 figures) and relied a lot on outsourcing for some of its main operations (e.g. using contractors for operations like IT network support). The museum also had a small group of dedicated volunteers, many of

whom belonged to the Friends of the Geffrye, who assisted with special projects and events, publicity mailings and garden maintenance. During the time of the field research, physical visits to the museum were in the order of 81,000 per year.

Other than the areas, which were directly related to the museum's collection (e.g. aiming to be a leading centre for the study of English domestic furniture and interiors as well as contribute to the vitality of the furniture industry) there were a few other elements of the museum's vision, which influenced the museum plans and affected strategic decisions. One of those elements was the emphasis on contributing to the social and economic regeneration of East London through the provision of resources for education and the encouragement of tourism. At the time of the field research, the museum attracted mainly local audiences (e.g. between 50% and 60% of visitors each year were from the three surrounding boroughs, Hackney, Islington and Tower Hamlets) and it had been actively involved in working with local community groups in Hackney and Tower Hamlets.

The size of the museum and the limited availability of resources also had an impact on their strategic directions. Thus, the Geffrye did not aim to become a major public attraction in terms of scale but instead placed the emphasis on the quality of the services they provided, by ensuring access to their collections was easy, welcoming and professional. Their aim was to offer their visitors a unique experience that was both educational and enjoyable. A commitment to the museum's educational role was evident from their mission statement "to encourage people to learn from and enjoy the museum's collections, buildings and gardens", a statement that placed emphasis on people and learning.

Another main area in the museum vision was influenced by the current environment in UK, where both the Government and the public encouraged not-for-profits to operate in an efficient manner. One of the main objectives of the Geffrye museum, mentioned in their strategic documents, was to ensure that the museum was well maintained and efficiently managed as it was considered a resource for the public good. They aimed to



play an active role in the promotion of museums by managing the museum's operation effectively and earning a reputation for good practice. Due to the financial pressures they faced, another objective of the museum was to generate additional income by increasing public awareness and the use of the museum's resources, services and facilities.

### 5.2.3 Governmental control, relationships with other organisations

The DCMS which provides the majority of the Geffrye's funding has a strategic relationship with the museum, based on the concept of earned autonomy. That is to say, the degree of scrutiny by DCMS depends on the extent to which the museum can demonstrate that it has "the house in order" and that they are managing their key organisational risks effectively. The museum's financial dependence on governmental funding has an impact on the museum's priorities, which in many ways mirror the key government priorities. Thus, at the time of the field research, the majority of the museum's activities, as well as plans for the future were geared to attracting wider audiences, improving access to the museum's resources and collections, and tackling social exclusion.

At the time the field research took place, there was a lot of pressure from the DCMS for efficiency savings and increasing earned income. This created a dilemma for the museum management as they had to use their limited resources to satisfy conflicting priorities set by the government (e.g. the DCMS encouraged the museum to increase the number of visitors from socio-economic groups c d and b, while at the same time pushed the museum to increase their earned income from the use of their facilities). In response, to those conflicting demands by the government, museum management seemed to concentrate their efforts to areas like increasing access, rather than areas like increasing earned income.

The Geffrye Museum is also a member of the London Museums Hub, a consortium of London museums consisting of the Museum of London, the Horniman Museum, and the

London's Transport Museum. The aim of the Hub is to build on existing strengths within partner museums in order to develop a concentration of expertise within the sector. This expertise is then disseminated to the regional museum community in order to deliver high quality museum services. A similar partnership exists in each of the eight other English regions, established under the Renaissance programme, which is funded through MLA (the Museums Libraries and Archives Council).

The London Museums Hub was formed in 2003, but 2004 was the first year in which funding for projects became available. In this first funding period the emphasis was on increasing the numbers of school-age children visiting museums, and thus the main impact has been on the education department of Geffrye Museum (e.g. a project which encourages pupils from a special needs school to visit the museum during their free time received a £2,000 grant). The funding from the Hub has created opportunities to develop capacity within the Geffrye museum and deliver an increased range of professional services to the public. As a result of this extra funding, the Geffrye museum began to upgrade their collections documentation system, at the time field research in the museum was being conducted, with the aim of making collections information available online.

However, at the same time, there were concerns from Geffrye staff about how the targets set by the Hub would impact on the achievement of the Geffrye's own aims and objectives, since there was no spare capacity to divert to the needs of the hub. Those concerns were raised because during the first period of Hub funding the focus was on projects involving non-hub museums as partners, which had been very demanding on key staff within the Geffrye museum. Another concern raised by the Geffrye staff was that although the Hub museums had to support each other in terms of sharing their expertise/experience, in reality the Hub museums due to limited resources could not dedicate much of their time/resources in supporting other museums (e.g. providing advice on digitisation issues).



#### 5.2.4 Primary sources of income and financial condition

The museum's income comprises of Grant-in-Aid receivable from the Department for Culture, Media and Sport, earned income, sponsorship and donations. At the time of the field research, their annual income was in the order of £2.5 million. Grant-in Aid is the museum's main source of income (totalling £1,811,000 for the year ended 31 March 2005). In that year, sponsorship and donations including funding received from the Museums, Libraries and Archives Council in respect of projects undertaken by the museum, as a member of the London Museums Hub amounted to £154,000, whereas a further £561,345 was generated by the museum in the form of revenue from the museum shop and restaurant, photographic library, museum hire and income from workshops, exhibition activities, other grants and donations.

The museum was quite active in pursuing donations/grants from a variety of small charitable organisations like the Ironmongers' Company, the Jonathan Vickers Charitable Settlement, or the Worshipful Company of Furniture Makers, as well as national organisations like the Heritage Lottery Fund or the National Art Collections Fund to cover a variety of activities from buildings' restoration to purchases of museum objects or children's learning activities. They had also received a considerable amount of funding from local organisations (e.g. Invest in Hackney awarded the museum a grant of £30,000 towards a feasibility study for the new Library and Learning Centre in 2003). The museum had not been as active in pursuing sponsorship from the private sector, although a Corporate Membership Scheme was in place and occasionally they submitted proposals for small educational projects to private companies like UBS or Bloomberg.

The museum was doing well in terms of generating income from filming and photography, as well as hiring their venues for a variety of events. However, they did not have the capacity to host large events, so their venues were hired mainly by small local organisations (e.g. City and Hackney Primary Care Trust, Hackney Community College, Ikea Croydon). They made a trading profit in the shop but by the time the field

research had finished they hadn't managed to make the restaurant profitable. The museum management considered that the main aim of providing services like the shop or the restaurant was to enhance the visitor experience, and not to make profit.

The museum's financial situation at the time field research took place was quite tight. Since 1998 the museum had doubled in size, attracted double the annual number of visitors and handled 50% more education visits. However, this had been achieved with no increases in curatorial, education or administrative staff and no increase in baseline grant. Since then, there had been greater demands on staff and resources overall, and without a significant increase in income it had been a struggle for the museum to deliver the essential services. From time to time the DCMS had provided additional grants for different projects to help the museum, but they still had to make severe cuts in expenditure in order to arrive at a balanced budget. The cuts included the loss of an assistant keeper post, cuts in the education budget, cuts in buildings' maintenance and gardens, severe cuts in marketing, as well as cuts in the staffing budgets for the restaurant (resulting in redundancies). The museum had managed to avoid severe year-end deficits by managing the budgets closely, by not filling vacancies immediately and by postponing maintenance works and replacement of obsolete equipment.

The museum was worried that these cuts would adversely affect the museum's performance and although they were trying to raise additional funds, they were worried those funds would be project-based funding and not for core services. Furthermore, grants usually brought with them the commitment to proceed with specific projects requiring matching input from the museums general funds. This further reduced resources available for core activities in a given year. As there was not much space for more efficiency savings and without the capacity of the larger London museums to raise a significant proportion of income from trading, donors and sponsors, the museum management was increasingly worried about potential cuts in staff and services.



### 5.2.5 Organisational structure, decision making and control

The thirteen Trustees of Geffrye have responsibility for policy, financial accountability and the overall management of the museum. The Geffrye Director is responsible to the Board of Trustees for the development of the museum and its day-to-day management. The board of trustees has quarterly meetings to discuss general museum management issues, whereas the board subcommittees (e.g. remuneration committee, development committee) meet occasionally to discuss issues like fundraising and events. In the case of large scale projects, like a gallery refurbishment, ad hoc committees are set up with trustees who are specialists in that area or are interested in the project, and they take the responsibility for monitoring the project budget and evaluating and discussing the project proposals.

The museum is organised under three departments, each led by a senior member of staff, who, with the Director, form the Management Team. The three departments and their main functions are: the curatorial (responsible for collections management, exhibition, research and publication, acquisition and disposal of artifacts), the Public Services (responsible for education, interpretation and publication, visitor services, including shop and restaurant, marketing and public relations) and the Finance and Administration Department (responsible for administration of personnel and finances, premises maintenance and security).

At the time of the field research, the management committee had fortnight meetings to discuss major museum issues and plans for the future. The results of those meetings were then filtered down to relevant departments, which also had regular meetings to discuss departmental matters. In terms of spending decisions, all expenses had to be approved by the heads of departments. Any expenses which fell outside of the departmental budgets needed the approval of the Director or the assistant Director and for projects requiring large scale investments the chairman of the trustees or sometimes the DCMS had to authorise the expenditure. As a result of the small size of the museum and the flat organisational structure, the Assistant Director was involved in day to day

marketing operations, activities planning in the education department and had a general overview of the museum shop operations (e.g. chooses merchandise for sale). The Finance Director also had to deal with day to day administrative matters (e.g. analysing web log statistics provided by the company that hosts the Geffrye website) due to lack of staff resources.

Another effect of the museum's flat organisational structure was that staff did not have a feeling of separateness, which sometimes exists in large museums. As a Geffrye member of staff described:

*"The thing about the Geffrye is that because we are so small, we are all working together and going - it sounds like a buzzword - going in the same direction, doing the same thing."* Shop Manager (Interview 26/1/2006)

In terms of formal communication practices, the museum had full staff meetings to discuss proposals for large projects, like new rooms and major museum exhibitions, on top of the regular departmental meetings. The director's reports with information about museum management decisions and plans for the future that were submitted to the board of trustees were also e-mailed to members of staff every couple of months. A lot of information/digital content of interest to more than one department (e.g. visitor figures, press releases, photos from museum events) was circulated by email or stored in public drives where it was accessible by all staff.

In terms of performance management, the museum used a set of numerical targets, which mostly covered areas deemed as important by the DCMS. The majority of those targets involved counting visitors to the galleries and the gardens, counting users of educational programmes and online visitors, or measuring income and expenditure. When the museum resources allowed it, the departments aimed to use qualitative evaluation methods. For instance, the education department had been working on its evaluation methods to provide useful measures of its performance and had started evaluating levels of satisfaction among pupils participating in the teaching sessions.



Although the museum did not use a holistic performance management framework, it had specific procedures in place for internal control. The Director had the overall responsibility for reviewing the effectiveness of the system of internal control. The review of the effectiveness of the system of internal control was informed by the work of a few internal auditors (appointed by the board of trustees and following government internal audit standards) and the executive managers within Geffrye. The internal auditors examined key areas of the museum's operation and provided reports on their efficiency and effectiveness; these reports were then submitted to the board of trustees. A Risk Management Policy was also in place, which explained the approach to risk management and the respective roles of the board, the audit committee, the management team and the director. An annual report on Internal Control and Risk Management was submitted to the board of trustees.

#### 5.2.6 IT Context

##### *Staff numbers and responsibilities, budgets and strategic planning*

The Geffrye did not have a dedicated IT team. Instead, the museum used the services of an independent IT consultant, who also supported other not-for-profit organisations, for an annual or daily rate, depending on their needs. They also used the services of an IT company to support the museum internal network. The company representatives provided support for the Geffrye network remotely, so there was no dedicated IT person based in the museum. Regarding the Geffrye website, it was hosted by a private company that was responsible for general maintenance, whereas a museum administrator was responsible for updating the content on the website.

At the time of the field research, the web administrator used to spend one fifth of her time dealing with website related tasks, and the rest working for the PR department of the Geffrye, as well as dealing with general administrative duties. She was responsible for updating the content on the website using the content management system and the press release manager. Geffrye staff from all departments passed information to her, so as to upload it on the website, though most of the time the web administrator had to

look for the required content. Any IT planning decisions were dealt with at the level of the museum management team and the main responsibility for any strategic decisions regarding the Geffrye website was with the Assistant Director.

In terms of budgets, the museum did not have a set annual IT budget other than the annual website hosting account (£4,000 per year at the time of the field research) and the annual fee for the company, which supported their internal network. The cost of any IT projects was usually covered by dedicating specific amounts from the Geffrye annual budget or external sponsorship. For instance, they made a special provision in their budget for the development of their main website in 2003, which was in the area of £20,000. A couple of years later, the cost for the development of the Kids Zone and the events calendar on the main website (£15,000), came out of the Geffrye's education and PR departmental budgets.

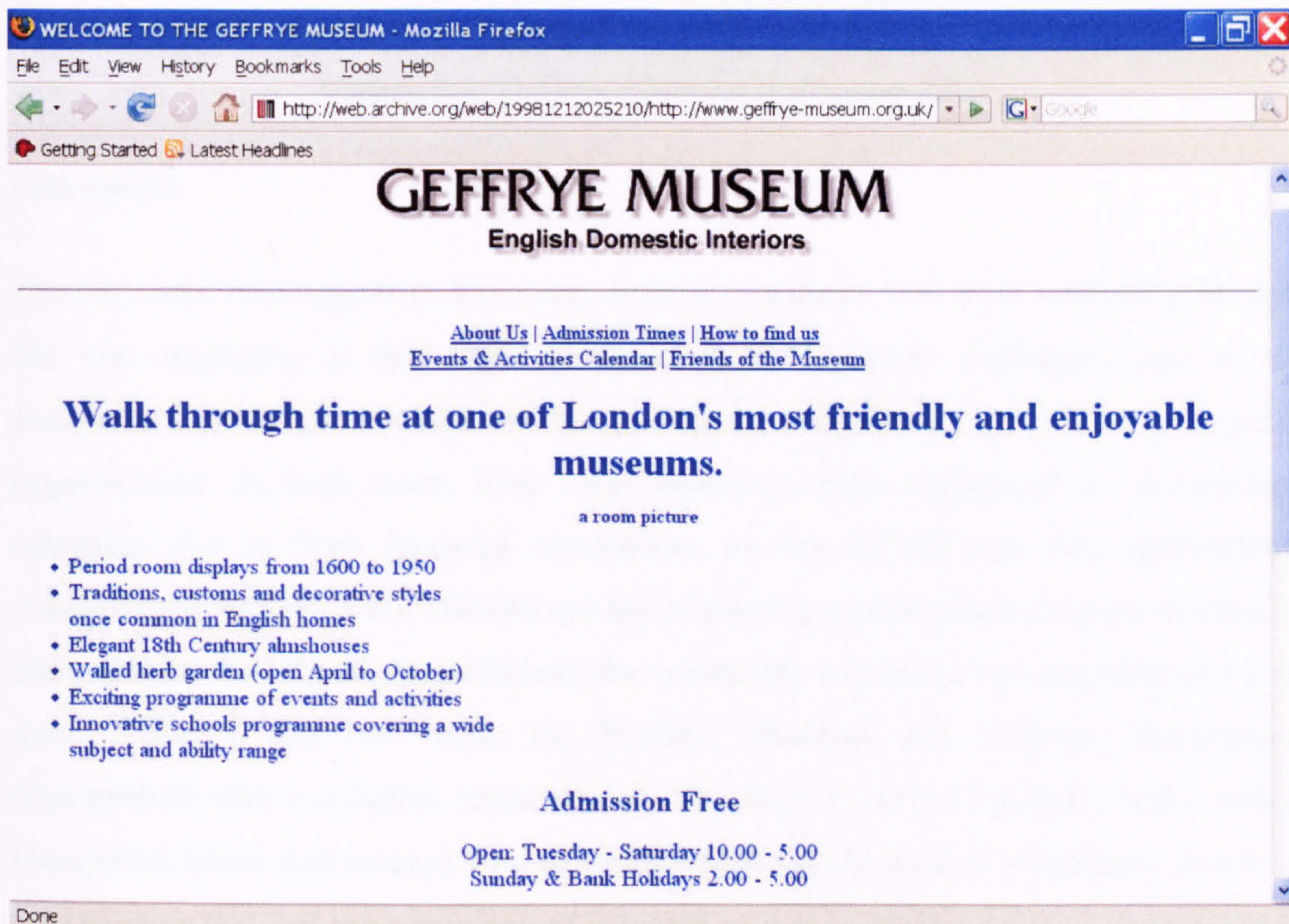
#### *Digitisation and multimedia development*

The Geffrye museum had little experience in multimedia projects. The museum had to rely on outsourcing for the creation of any multimedia material, as there were no qualified staff within Geffrye, who could contribute to those types of projects. The lack of internal expertise, on one occasion, resulted to a museum touch screen application becoming absolute and to a missed opportunity of re-using the digital content. During the time of the field research, the Geffrye embarked on their biggest IT project aiming to digitise their collections and consequently make the information available online. As part of this project, they had to change their collections management system and transfer their records to another that would allow them to upload digital content easily and to provide access to collections' information via the Web. The first step was to provide access to collections information for all museum staff through the Intranet and at a later stage to make some of the information available online through the Geffrye website.



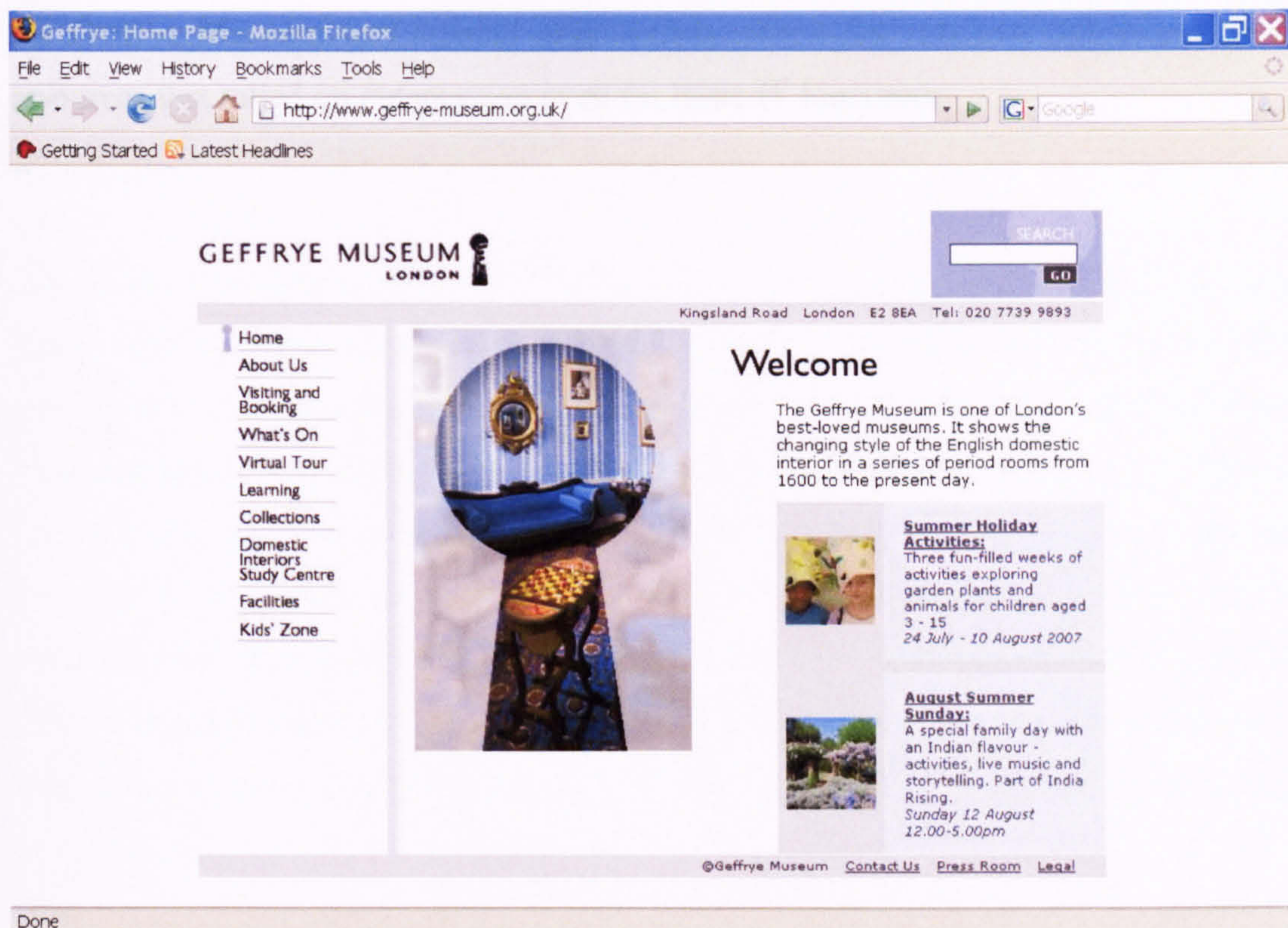
### *The Geffrye website*

The Geffrye museum had a web presence since 1997 (Figure 5.3). However, the first website was not developed or maintained internally. The website was developed and hosted free of charge by an IT professional with a personal interest in the Geffrye collection. The particular individual created a few pages for the museum (a homepage and an events page), which he used to update on a monthly basis. Gradually, as the first website was not supported by a content management system, it became too tricky to update regularly, and it eventually went out of date. The Geffrye had been planning a website redesign for a while before the launch of their current website by Big Picture Interactive in September 2003 (Figure 5.4). Since then, the only major additions on the Geffrye website have been the introduction of the Kids' Zone (September 2004), the Advent Calendar and the Xmas e-cards (December 2004); all of them developed by Big Picture Interactive.



**Figure 5.3:** Geffrye Museum website in 1998





**Figure 5.4:** Geffrye Museum website in 2006

## *Conclusion*

The two case sites appear to have very little in common. The main similarity between the two museums is that both of them faced financial challenges due to the economic/political environment and the increasing competition from other not-for-profit organisations. In both cases, their main objectives were influenced by government priorities, due to their financial dependence on the DCMS and their performance management systems were tailored around measuring performance in areas deemed as important by the DCMS. Nevertheless, the conditions within the two organisations were quite different. On one hand, the Science Museum was a large, bureaucratic organisation with a complex organisational structure, a trading company and a widely recognised brand that created a lot of opportunities in the area of e-business. It was an organisation that had the advantage of a decent annual IT budget, as well as in-house IT expertise and previous experience of large size web-related projects. On the other hand,



the Geffrye Museum was a small organisation with a flat structure and minimum IT resources that relied on outsourcing even for basic IT functions.

## CHAPTER SIX: CASE STUDY FINDINGS

### *Introduction*

The previous chapter explained how the two museums operated in a wider context. Their aims and objectives, financial performance, relationship with the government, management and communication practices and their IT infrastructure and processes were discussed. This chapter continues with the presentation of evidence collected from the two case sites. It provides a set of critical findings, which articulate a detailed response to the main research question (i.e. where, when, how and why value is obtained from Web activities), as well as the researcher's analysis of those findings. The chapter is restricted to the presentation of the findings from both sites in the form of a narrative, without comparing them with existing literature; a task that is the aim of the next chapter.

The narrative includes references to two types of themes, which emerged during the process of analysis; areas where the two museums obtained value from their Web activities and factors that affected the process of value creation. The benefits derived from the Web activities of the two organisations, involved four aspects of the museum operation:

- Support of museum services available on site and online provision of educational services (i.e. aspects of the museum operation directly related to their educational mission, including widening access to the museums' collections).
- Income generation through e-stores, subscription based access to online resources, online donation tools and other online features addressed to the museum public.
- E-procurement
- Operational efficiency and internal communication.



The value obtained in those areas varied in the two organisations, due to a set of factors that affected the planning, development and post-implementation phases of Web projects. In the Science Museum, their strong brand and the amount of resources and expertise available within the organisation had a positive impact on the total output of Web activities. However, a number of organisational factors hindered the value they obtained from those activities. Those factors were:

- The lack of changes in processes and staff attitudes necessary to support the development and use of Web-based systems like:
  - The lack of adequate editorial control of the museum's main website, which affected the usability of the website.
  - Inefficient museum-wide content management practices that made the development of Web resources expensive.
  - Negative staff attitudes towards income generation and information sharing that resulted in a number of missed opportunities for commercial use of Web resources, as well as in limited use of the museum's Intranet.
  - The lack of changes in processes to support new Web resources, which led to increased staff workloads and staff dissatisfaction.
  - The lack of relevant staff skills necessary to support the marketing of Websites.
- The lack of sustainability planning, which resulted in missed opportunities to maximise value from Web activities in the long term (e.g. limited use of evaluation results for the improvement of web resources and lack of planning for long term marketing support of websites).
- Several problems in the process of prioritisation of Web projects that led to inefficient use of the museum's resources (i.e. decisions were based on the availability of funding and museum gallery plans instead of the potential value of projects).
- The lack of strategic direction in the planning and development of Web activities, which had as a result the inefficient use of the museum's resources (i.e. funding and staff resources were directed to different web projects without examining the

project's contribution to the museum's mission or potential synergy between different web projects).

In the Geffrye Museum, the limited resources and staff expertise restricted the number and scale of Web projects. However, the following factors had a positive impact on the value the museum obtained from those projects:

- The flat organisational structure that facilitated the changes in support of Web projects.
- The positive staff attitudes regarding the use of Web-based systems (encouraged to a certain degree by museum managers).
- The senior management involvement in the planning and development of Web activities that brought a broad perspective into these processes and resulted in better use of available resources.

The chapter is comprised of two parts corresponding to the evidence collected from each case site. Within each of the two main sections, the narrative is arranged around the four aspects of museum operation that benefited from the museum's Web investments, namely, support of traditional museum services and provision of online educational services, income generation, e-procurement and operational efficiency.



## 6.1 Science Museum

### 6.1.1 Supporting traditional museum services and creating new online services

#### *Supporting traditional museum services and enhancing the museum's brand image*

The most basic way in which museums can use the Web is for marketing their traditional services and facilitating their provision at the physical space. This level of commitment requires limited production of new content and for some services it is the appropriate, perhaps the only, way of delivering them online. A website at its most basic form can provide information about the activities of an organisation to audiences beyond any geographical limits and operate as a very effective marketing tool.

The Science Museum website provided access to documents like annual reports, agreements with the DCMS, and information about the activities of different departments (e.g. list of services offered and contact details). The information was useful to individuals and organisations with an interest in supporting financially or otherwise the museum's activities and served general marketing purposes. In a non direct way, the website, and mainly the number of online visitors were also useful in convincing the DCMS (main sponsoring body) that the museum was making progress in widening access to its collections, which was one of the main priorities of the department:

*"A useful internal tool and perhaps helps us with the government things like hitting targets..."* Curator in Engineering (Interview 18/4/2005)

Maintaining the impression that the museum was doing a lot of work towards the achievement of DCMS targets was very significant for museum managers. This aspect of value derived from the use of Web technologies was the only one (along with income generation), which was mentioned in the museum's strategic documents. The information provided in those documents was not in the form of measurable Web objectives, as there were no strategic documents guiding Web development in the museum. Instead, those references were in the form of general statements about the benefits from the museum's Web activities.

Besides providing details on the museum operation, both the main website and the Dana Centre website provided information to facilitate visits to the corresponding venues. This included information on exhibitions and other events, their associated costs, information on the museum facilities available on site (e.g. bookshop, catering facilities), as well as booking information for the general public and teachers/schools. Visits to the museum by teachers/schools were also supported by online material for use in the museum galleries or in the classroom after the museum visit:

*“We develop new activity sheets and notes for teachers about using the museum, so printed material, but not necessarily printed, most of them go on the website for them to download.”* Educational Resources Manager (Interview 8/11/2004)

The information provided online was widely used by members of the public and educators. According to an online survey conducted by the museum’s Visitor Research Group in 2003, the most popular reason for visiting the main website was to find information for visits to the physical site. Staff from the Education department also claimed that the majority of the teachers, who had visited the museum had used the relevant online resources prior to their visits.

Although both the main Science Museum website and the Dana Centre website provided useful information to potential visitors to those venues, several staff expressed concerns about the way this was done. In particular, they claimed that the quality of the main website was not of the same standards as the new websites (Ingenious, Making the Modern World, Dana Centre) and that it failed to reach the high quality service offered in the actual museum:

*“...it’s doing the job it was always originally supposed to do, which is to tell people where to come and how to get the tickets and what we’ve got in but actually it could be a far more powerful resource than it actually is.”* Head of IT (Interview 19/4/2005)

*“I don’t think that the Science Museum website especially the education area is particularly attractive or “whizy” ...I think when it was put together it was a nice formula, a while back, and technology has evolved and what people expect*



*from websites has evolved.” Educational Resources Manager (Interview 8/11/2004)*

An evaluation based on user testing, which was conducted by the museum’s Visitor Research team in 2002 identified the need for changes to the main website. According to that report, online visitors found the layout of the website dull and conservative and the amount and level of information inconsistent and confusing. Several sections of the website (e.g. Exhibitions on line) were not updated regularly and there were misleading titles to different sections, as well as titles that users could not understand. In terms of navigation, users appeared to have little idea of the structure of the site and the existing map and search facility were so difficult to find and use, that most users thought they were not available. Although the report indicated several issues that needed to be addressed, there were no major changes to the main website more than three years after the publication of this report. The interviews with the Science Museum staff confirmed several of the issues, which had been identified by online visitors in that report:

*“The main Science Museum website is really dull and I will be the first person to say ...” Web Manager (Interview 17/6/2004)*

*“...there is much content online that people would like to interact and engage with, it may not necessarily be easy to find. ...You go onto the website to try and find out some things and you stumble across the first page, you go along the next page and you find something else as well, and you can’t look through it ...”*  
Dana Centre Programmes: E-content Coordinator (Interview 22/10/2004)

*“...there still things lurking in there that literally are a decade old.” Web Designer (Interview 18/4/2005)*

The usability evaluation of the main website, which was conducted by the researcher for the purposes of this study through the use of a checklist, raised similar issues. For instance, a few of the highest priority tasks for visitors to the site, as indicated by the Web logs and an online visitor survey (conducted by the Visitor Research Group in

2003) were not given a prominent location on the homepage. Thus, although the main reasons for visiting the Science Museum website were: information on visiting the physical site, information on new exhibitions and information on science and technology issues, there were no direct links to all three areas from the homepage. In the case of information on new exhibitions, the relevant section was under: Visiting/Special Exhibitions/Current Exhibitions. Furthermore, under “Visiting” there was also a link named “What’s on” (containing information about museum talks and similar events) that would have been confusing for users, who needed information on new museum exhibitions. Other issues that emerged were the lack of an input box for search queries on the homepage (instead there was a link to a separate search page) and the lack of visibility of one of the most critical homepage elements (one of the navigation bars was “below the fold” at the most prevalent window size).

A few members of staff in the Science Museum claimed that the lack of resources was the main reason behind the limited use of results from usability evaluations, which would have improved the museum websites. However, others talked about the advantageous position the museum had in comparison to other museums regarding their general IT support and Web management budgets, as well as the IT expertise available within the museum:

*“The technology, yeah, it costs money, but then we have staff whose job that is [ensuring the main website is of high standards] and I don’t know what else they are doing, which is a higher priority than that.”* PDU Project Manager (Interview 10/2/2005)

*“Funding is obviously an issue, it always is, but we are pretty self-sufficient and we’ve got a very good range of skills so we would do a lot of stuff technically, we would build stuff for pounds that most museums would probably pay 10-15 grand in order to get this...”* Web Manager (Interview 17/6/2004)

The expertise available within the museum was useful not only for the development of Web components but also for evaluating them. The Web management team was responsible for analysing and reporting to managers the results from Web Server Logs



and the Visitor Research team coordinated the user testing of online educational resources and conducted online visitor surveys of the museum websites. All large-scale web projects had user testing built in the development process and summative evaluation was included in the project budgets of websites like Ingenious and Making the Modern World. The Visitor Research team had a lot of experience in researching museum audiences (measuring general satisfaction and learning outcomes of gallery resources) and the review of the museum's evaluation practices conducted for the purposes of this study found that their experience was useful in conducting user testing of the new websites.

It gradually appeared that the problem was not as much the lack of resources within the museum but the way they were using those resources. For instance, although the museum was very active in terms of conducting usability evaluations of their websites (especially user testing), the overall process of measuring the actual value/impact from Web activities was "patchy". Most of their methods of measuring value concentrated on areas like usability, outcome measures (objectives set at the beginning of projects, like number of online photos), as well as quantitative targets in response to government priorities like widening access (e.g. number of website hits). However, there was not much activity in measuring the impact of Web technologies to other areas of the museum operation. Project reviews necessary for evaluating the efficiency of the Web development process were not a standard practice and there was insufficient planning regarding the use of results from summative evaluations:

*"We're trying to make it standard thing [project reviews]. We did it for Ingenious in a more rigorous way and Making the Modern World for some reason we didn't do it so fully. But basically we had a big meeting with all the people involved from the Science Museum side to discuss what we felt had gone well, what not so well. And I guess that was written up and I am not quite sure what happened to it."* PDU Project Manager (Interview 10/2/2005)

*"But you have to be careful about how that information [summative evaluation] is used, because otherwise you could just do it and then it kind of stands there;*

*it's just a report... Sometimes you do a summative and make recommendations and if there is money, change the actual website but that's not such a common thing. Actually, you know, if you want it finished, it's finished."* Head of Visitor Research (Interview 20/9/2004)

In the cases where the museum had plans to conduct summative evaluation or project review after the completion of a Web project; those activities were not accompanied with the necessary funding for the implementation of any changes. Summative evaluations and project reviews appeared as components of Web project proposals in order to increase the chances of securing funding from external sponsors. However, the museum in most cases had no plans of improving the Web products/services beyond the end of the project period.

The majority of the funding for the support of Web activities was project based, coming either directly from the government or from other sponsors. The funding was mainly used by the museum to cover development costs, formative evaluation and initial marketing costs. In order to support the new Web activities in the long term the museum would have to use its operating budgets to cover areas like marketing and general maintenance. However, other than the case of Ingenious, where the project plan contained some information on sustainability issues (long term IT staff costs), there was no evidence that Web project planning within Science Museum had any consideration for these issues:

*"I would have to cover expenses [for long term marketing] from the ongoing operational budget, which is under pressure every year. So, I don't have it. So I go and bid for it, I make a case for it and I either win the money or I don't."*

Head of Marketing (Interview 6/9/2004)

The need for new websites to include long term maintenance costs in their project proposals and have length of life identified in advance was discussed in an NMSI e-committee meeting (January 2004) but instead of taking direct action it was decided to refer the issue to the PDU. By the time field research in the museum ended there had been no progress on this issue. One of the consequences of the lack of sustainability



planning was components, which were added to the main website through the years were never updated and made it difficult to navigate through the website.

Other than the lack of sustainability planning, another factor that reduced the chances of improving online features after their launch was that the process of prioritisation of the Web spending within the museum did not follow standard practices. Decisions on new websites or changes to existing websites were made on the basis of their potential of attracting funding. Several staff discussed their ideas for Web projects with the Web management team and others submitted proposals for Web projects to the PDU asking for advice. However, at the end, the main factor against which proposals for web projects were assessed was their potential to secure external funding:

*“...largely they depend on the opportunities available, so you wouldn’t think: right, what internet project could we do next? An opportunity will come up and there would be a source of sponsorship at a location and we would fit the project around that, that funding.”* Head of IT (Interview 19/4/2005)

Web projects with an outreach element were more likely to get funded because they supported the government agenda and online components of museum galleries or temporary exhibitions in science or medicine were likely to secure sponsorship from private companies specialising in the same subject area.

Web projects like the re-design of the main website (despite being recommended by usability evaluations) or additions to the main website regarding the work of museum departments stayed behind, because of their limited chances of securing external funding:

*“Older content, older pages don’t necessarily have the care and attention they need to. ...When it’s top lights, top level show, wow kind of thing, then you get a little bit more attention, I think, whereas if it’s not a new place and you want to transfer the old bit, there’s got to be a lot of action behind it.”* Dana Centre Programmes: E-content Coordinator (Interview 22/10/2004)

Although funding from departmental budgets and the Web management budget would often be assigned to Web development (in support of gallery or exhibition development

projects with a web element), the spending lacked consistency and was influenced by internal politics:

*"The web, it depends, it has been a victim of favouritism, because it partly has to respond to who's got money. If you've got a good idea but no money to fund it then it won't happen. If you've got a bad idea but 100000, actually you have a better chance."* Web Designer (Interview 18/4/2005)

Besides the lack of sustainability planning for online services, which resulted in a huge amount of out of date content on the main Science Museum website and the lack of standard practices used in prioritising Web activities, which made the re-design of the main website a difficult task, another issue that affected the quality of the main website was lack of adequate editorial control. Staff from different museum departments had access to a VBScript application, which allowed them to edit the content available in the relevant departmental section of the website, whereas general publishing control was with the Web management team. However, the arrangement was not very effective. There were no guidelines to help staff write in a manner suitable for Web publishing and the Web management team, probably due to their involvement with more exciting tasks (developing new websites), did not seem to have editorial control over the information available in the different sections of the main website:

*"Because everybody, all the different departments they have their own bit, me if I were to put a 5000 words essay on, that's fine I can do that, but there is no point. There is loads and loads of text, and there should be some guidelines."* Schools Outreach Manager (Interview 22/10/2004)

*"some editorial control would be interesting to try, ...I know certainly with the Dana one, we have a lot more of that, in terms of what actually goes there, in terms of text, in terms of what links we will use, that's sort of put in place, because we know that will support our events."* Dana Centre Programmes: E-content Coordinator (Interview 22/10/2004)



*Developing added value services or creating new services for research & education*

Beyond supporting traditional services, the Web enables museums to enhance the services they offer through an online dimension or to develop stand-alone online services. The new services can support museum audiences that cannot visit the actual museum or are looking for additional learning opportunities online. The resources provided online might include short courses, searchable online collections of objects, quizzes, collections of audio or video clips and flash-based interactive galleries or games. The provision of online services of this kind can be resource intensive due to the cost of maintaining both old and new means of delivering the service.

At the most basic level, the Science Museum websites were used as an extension of the learning services already provided within the museum. The content created by museum staff (textual or audiovisual), which was available online could be used by the public for a variety of educational purposes without the need to visit or even contact the museum:

*"There is also SSPL, our picture library at the NMSI website, search on databases and you can search for things and obtain low rate, screen resolution images of things, often for school projects and just for reference purposes..."*

Curator in Engineering (Interview 18/4/2005)

The searchable online collections' facilities available on several of the Science Museum websites (e.g. Ingenious, Making the Modern World) were a great service for researchers/academics and other individuals with an interest in the museum's collection. Those online facilities increased awareness among those groups of individuals of the objects available in the museum, which in turn affected different aspects of the traditional museum operation (e.g. licensing, museum loans, academic research). Those facilities also provided information on objects, which due to practical constraints had not been previously displayed in the museum space:

*"...we've got gigantic storage full of things that people don't have any access to and it's quite difficult to access those areas you can't physically take people there, there is a lot of issues about that. So in that way we can give them access to our stores."* Curator in Medicine (Interview 16/3/2005)

*“Then there is the whole issue of the conservation of objects and being able to put up objects, which are too fragile to be on display or too fragile to be in a public area.”* Collections E-content Coordinator (Interview 16/9/2004)

Web technologies allowed Science Museum to offer educational services to people who would not normally use the museum on-site learning facilities and consequently reach new audiences:

*“... a project called NotSchool.net, a web learning community and essentially this community is where children who can't attend mainstream school for any reason, the local education authority can nominate them and they get loads of computing equipment and access to the web and access to this exclusive web community called NotSchool. So the kids have to sign a contract to say that they will take part in some of the learning activities on the website. ... So a person in my team spends two and a half days per week developing science content and works one to one with the children via the Internet to get them to complete projects that they can then be accredited for and if they go and get a job once they leave NotSchool...”* Educational Resources Manager (Interview 8/11/2004)

The use of Web technologies by the Science Museum offered not only the chance to increase the number and types of educational services provided but also the opportunity to enhance the impact of those services on learners. The Web is an ideal medium for developing stories that offer multiple perspectives on the objects in a museum's collection. In this medium, the users can choose their own path through the content, have access to images and animations of the objects, and can also contribute their own perspectives. The Science Museum as an organisation was aware of the exciting opportunities offered by the Web in the area of learning:

*“The web has the capability to allow people to explore their interests from lots of... get lots of different ways into the museum's collection in ways that they can't in the physical environment.”* Educational Resources Manager (Interview 8/11/2004)



*“...reinterpreting the objects, which you can do much more successfully in some ways on the web, than you can do in an exhibition.”* Collections E-content Coordinator (Interview 16/9/2004)

They had invested a lot of resources on producing a massive amount of digital content for learning purposes for both adults and children. Several of their educational websites received international awards. Only during the time the field research in the museum was taking place, the Ingenious website received the Best New Launch award from the Association of Online Publishers (November 2004), the Making the Modern World Online was handed the Best Overall Museum website award at the international conference of Museums and the Web (2005) and was praised by sources like The Teacher and BBC News Online and the Energy website received the Gold award for Website Multimedia in the International Visual Communication Awards (2005).

The Science Museum used the Web, including Web 2.0 technologies to go one step further and engage its audiences in the creation of knowledge. The use of web tools to encourage participation from the public was first encouraged under the STEM initiative in 1997. The STEM Project (Students' and Teachers' Educational Materials) was an Web competition, which encouraged school visitors to create a website based on a particular gallery, exhibit or online exhibition with the purpose of creating a database of resources to be used by other students and teachers. The project resulted in over 1,000 resources being archived on the main Science Museum site by the end of 2003. Later the InTouch project allowed gallery visitors to create their own web pages when they visited the Wellcome Wing gallery and resulted in the creation of 170,000 personal web pages.

The latest project, which aimed to encourage participation by the public, was the Dana Centre website. The website supported a new Science Museum venue, which aimed to provide contemporary science events for adults. The venue was built using the latest engineering and communications technology (the facilities included web cast, web cam, wireless, kiosk, projection, moveable stages and wired rooms), which allowed the Web management team to build real time connections between the physical, and the virtual

space and to enable the public to actively influence the direction of the Dana Centre. Dialogue with the public was fostered through online discussion boards and was filtered through the physical space via live web kiosks and projections:

*“The main tools that we try and use ... that’s online boards, where users have the rare opportunity to actually go online and actually start up conversations, answer other people’s discussions and debate on whole areas of stuff. The second part I would say very much so is the web casts. What we are trying to do is have live web cast and also web cast archive as well, so people can find out about past events. We have live web cast, where people can actually participate by emailing questions during the events as well.”* Dana Centre Programmes: E-content coordinator (Interview 22/10/2004)

Feedback and ideas from on-line participants were used to set the directions of many of the centre’s activities and technological experiments.

Both staff and users (according to results from usability evaluations of the Dana Centre website, Ingenious and Making the Modern World) believed the Science Museum was doing well in terms of the quantity of educational material offered and the design of the new websites. Staff were enthusiastic about the potential use of the Web for learning purposes and were thinking of the next steps in this direction like making existing online resources more effective by adding extra content and providing personalised access to online content:

*“The other thing that would be nice to do is when a teacher signs in and says I am teaching this age range, then all the information they would want would kick in. Because at the moment it is categorised in things like primary, so they might be teaching all different age ranges in that.”* Educational Resources Manager (Interview 8/11/2004)

However, despite the use of external funding, the development of those online resources came at a high cost for the museum, in terms of the human resources involved in the development of those projects, as well as the resources required to support those services in the long term. The lack of central direction in the process of planning the



development of those online services resulted in inefficient use of museum resources. Consequently, it reduced the ability of the museum to support the development of new Web activities.

The lack of complementary investments in museum wide content management systems and processes made the development of online resources expensive. The majority of curators in the Science Museum did their authoring in Word and saved their work to their local hard drives. The content they created was stored in a form that could not be easily used for other purposes and was in danger of being lost or corrupted due to lack of back up procedures:

*“When a curator is asked to complete an enquiry, at the moment, that data has been all somewhat lost and we are looking to maybe creating a kind of database, which then the curator will put the information and then I can output that information on the Web.”* Collections E-content Coordinator (Interview 16/9/2004)

In the cases where museum staff worked on the development of Web resources there were no systems or procedures in place that would facilitate the re-purposing of the content beyond the launch of the particular web resource:

*“We need to actually organise the parts into a more coherent whole. This could take place at several levels, ... Technical joint effort, we can’t achieve any of that, unless the database over there can talk to the database over here and also content and metadata, as in standards.”* Web Designer (Interview 18/4/2005)

A museum wide content management system (technical platform and procedures) would have made the process of developing Web products/services more efficient and as a result less expensive. For instance, on one occasion where the Web management team developed a system for a gallery based on a single XML-based content source, allowing content to be re-purposed to both Web and gallery kiosks, it was found that entire gallery stories could be built and published in 15 minutes. According to the Web management team, the same activity would have taken 2-3 days before the implementation of the new system.

Another issue that affected the overall production of online educational resources was the fact that the development of those resources was guided by the activities taking place in the physical space and not a museum wide Web strategy. The majority of the museum's Web activities supported the openings of new galleries/exhibitions based on the museum's Master Plan (strategic plan for the development of museum space) or were inspired by existing museum galleries. Funding for each of those Web projects was provided by the relevant exhibition/gallery budget. One of the problems with this arrangement was that there were limited chances of developing innovative Web resources that were not related to a museum gallery:

*"I think the kind of responding to the museum only gets you so far and we are going to continue to push and to innovate, actually being able to do online only exhibitions or online exhibitions that very much talked to the physical space, whether the virtual space, I think it is very much the way ahead."* Web Manager (Interview 17/6/2004)

Furthermore, due to this arrangement, there was no consistency in terms of the quality of the online resources produced, because different budget holders dealt with the web element of the gallery in a different way. Decisions on the level of spending were made by the individual budget holders after negotiations with the Web management team:

*"So if it is kind of a really small exhibition people will be happy with having a couple of standard pages on the site, no costs, no money. If they are exhibitions like Titanic or Lord of the Rings then that comes itself with a bigger budget and we then say: look, what you actually need here is a micro style forum, a separate design, a site and that can cost you typically between 10 to 15 K"* Web Manager (Interview 17/6/2004)

Some managers were satisfied having a couple of web pages on the main website for no extra cost, whereas other managers were prepared to spend a larger percentage of their budget to make sure that the online element would be of the same standards as the actual museum gallery or the temporary exhibition. Some managers would plan the development of the web element of the exhibition from the point of the conception of



the exhibition idea, whereas others would ignore the web component until just before the gallery opening:

*"... The Head of Education and Learning has made sure there is a substantial bid for a quick progress on that [web element of LaunchPad galleries]. So that's going to have a focus that's very weby rather than being just an echo of what there is in the real space."* Web Manager (Interview 17/6/2004)

*"People need to be thinking about online components, right at the beginning of their budgets, right at the conceptual level of their projects: we are doing this, this is how it will work in a gallery, how is it going to work on the web? because at the moment, it tends to follow. Thinking takes place, everything gets built, everything is wonderful, right, nothing is on the web, which means that web presence in its own light is often sub-optimal to the result and also the web presence's contribution to offline is also not optimal."* Web Designer (Interview 18/4/2005)

The fact that the development of online educational resources was not linked to the overall museum objectives through a museum wide Web strategy created problems not only in rationalising the museum's spending on Web projects but also in achieving maximum value from specific Web projects. Although the objectives for the online resources were clear at project level (project deliverables), the potential value of those projects to the organisation as a whole was not clearly defined. An example of a project where the loose link to the museum strategy resulted in missed opportunities for maximising value in the long term was the Making the Modern World Online website.

This project was a partnership of Science Museum with two other organisations, supported by external funding in the range of over a million pounds. In terms of the procedures used to guide the development of the website everything seemed to be in place and all organisations brought a lot of relevant experience in the project. The project was managed by a project board, comprising senior members from Peter Symonds College, the Science Museum and Mackenzie Ward Research and had a

designated operational manager in each organisation. The roles and responsibilities of each organisation were set out in a formal contract and the project was managed according to the Prince 2 methodology. The project board monitored the creation of a detailed project specification, implementation plans and milestones, along with procedures for ongoing and final evaluation. Evaluations of the learning modules included questionnaires given to accompanied surfs and the use of learner focus groups.

The teachers from Peter Symonds College wrote the learning modules, working alongside a team of Science Museum curators who created the stories and scenes. The Web management team of Science Museum was not responsible for managing any aspects of the project, but had some input on accessibility and design and contributed in the development of procedures/guidelines for website development (e.g. how many prototypes to use, what form of evaluation is necessary), which were later to be used in other museum projects. The Project Board had monthly meetings to monitor progress and formal minutes and action points were kept for the duration of the project.

The result was an award-winning educational website and a lot of resentment among museum curators about the way MWR influenced many of the content related decisions. Curators complained that the company influenced the direction of the project in such a way that the content available on the website was not up to the museum standards and it became difficult for the museum to update it in the long term:

*"They had designed their own software to help with the interactive part of the site, so they were also involved in the content, ... So that aspect of the partnership didn't quite work. The roles were not clearly demarcated. Another way of putting it is that, I sort of speak for myself really rather than the whole museum, but I felt like that, their educational values didn't quite gel with ours. They weren't that adventurous, in a way they weren't about making it fun, whereas as a museum we always try to breach the gap between formal and informal."* PDU Project Manager (Interview 10/2/2005)



*“... nice people but hopeless and they were actually into designing the website without content management system for us, you know, updating it and improving, expanding, it is really, really difficult...”* Curator in Engineering (Interview 18/4/2005)

The development of the website followed standard practices and the project management experience of the MWR was an important factor for the success of the project (achieving the objectives of the project, with the available resources and within the specified time frame). Thus, the problem was that the museum was not clear about what they needed to achieve as an organisation from this partnership. The idea for this project was the museum's response to an opportunity for funding, based on a concept from an existing gallery. The website supported the museum mission in a sense that it was an educational resource. However, it was not part of a wider strategic plan for the development of online resources and the museum ended up with a nice website but limited opportunities for future development:

*“The key lesson we learnt here (it looks obvious now, but it was a revelation at the time) was to align - 100% - all our strategic thinking with the goals of the organisation, literally drawing lines between what the wider business wanted to achieve and what web could do to support those goals.”* Web Manager (Interview 17/6/2004)

#### 6.1.2 Income generation (B2C aspect of e-business)

At the time field research took place, the Science Museum had several e-stores for the sale of different categories of items. The Sciencemuseumstore.com was the main merchandise selling e-store, which replaced their old e-store in October 2004. The new infrastructure behind the Sciencemuseumstore.com, allowed the integration of all functions of the e-store from online purchasing to call centre operators and back end administration (including sales statistics and customer profiling). However, it was quite an expensive solution and as different aspects of the service were outsourced, integration was not an easy procedure. The online store engine and the software for the

agent interface for orders taken through the call centre were provided by ShopCreator ([www.shopcreator.com](http://www.shopcreator.com)). The museum's call centre function that supported both the museum's mail order service and this e-store was outsourced to Dataforce. Finally, any orders taken online through the [sciencemuseumstore.com](http://sciencemuseumstore.com) or via the Dataforce call centre were automatically fed through the ShopCreator software to another company (iForce) for packaging and distribution.

Besides the main Science Museum e-store, the museum had another site hosting the Science and Society Picture Library collection ([www.scienceandsociety.co.uk/](http://www.scienceandsociety.co.uk/)), providing access to images available within all NMSI museums. The site provided information about purchasing the rights for publication of material from the picture library (including contact details and prices), as well as an online facility for the purchase of prints. The picture library website was built by the Web Management team and the back end administrative support was provided in-house by a small team. The third online transaction facility available in the Science Museum was the museum publications' e-shop. The website allowed people to purchase museum publications (e.g. museum guides, exhibition catalogues). It was built and maintained by the Web Management team (the catalogue and the basket features of the website) but the actual online transaction facility was outsourced (they used a basket solution that passed users through to payment at a "brandable" checkout provided by secure hosting: [www.securehosting.com](http://www.securehosting.com)). Finally, there was the IMAX club membership and online ticketing site, which was built and maintained by the Web management team (although again online transactions were supported by an external provider).

Although links to all the e-stores were provided from the main Science Museum website, there were no links from one e-store to the other and each website had its own style and layout, creating the impression that they belonged to different organisations. The back end administrative support for those sites was either provided by small teams within the Trading Company or outsourced (for the [sciencemuseumstore.com](http://sciencemuseumstore.com)), whereas the responsibility for updating online content was with the Web management team (in the cases where there was no content management system to update the websites). The



general monitoring of their operation in terms of the revenue they generated was the responsibility of managers from the Trading Company.

At the time the field research took place, museum staff were not happy with the existence of several e-stores, or the revenues that the e-shops generated overall. After the field research in the museum ended, in 2007, the IMAX and the publications' e-store closed down due to the limited number of transactions they generated and as part of a major re-design of the museum's main website, whereas the service for the online purchase of prints from the Science and Society Picture Library was completely outsourced to MemoryPrints (<http://www.memoryprints.com/>). Although there was not enough time to evaluate the success of the new infrastructure behind the [sciencemuseumstore.com](http://sciencemuseumstore.com) by the time field research in the museum ended, the other e-stores were very basic both in terms of design and in terms of the infrastructure behind them. This could explain to a large extent their limited success. One of the senior managers talked about the museum's profits from running a successful mail order service and claimed that the problem with the museum's e-stores was that they did not receive the same attention from the museum management both in terms of the amount of resources invested and the planning behind their development:

*"... We don't make a lot online, because our site really has only been developed for this Christmas. It's what I would call an apology for a site...We've got to have a really focused and really strong retail offer, if we think we can make money out of that."* Head of Marketing (Interview 6/9/2004)

Besides the e-stores, another income generating Web activity that the museum was involved in was the encouragement of corporate sponsorship. The main website provided information about the sponsorship department, as well as an online form that interested companies could fill in, so as to be contacted by the sponsorship team. However, according to the Head of Sponsorship and Development the level of interest expressed by companies through the website was very low, compared to the results of direct marketing methods that they had been using. The level of sponsorship by individuals generated through the website was even lower, as there was no facility on

the main website for online donations. Any individuals interested in donating would have to ring the relevant museum department or visit the museum. In a non-direct way the amount of sponsorship generated through the website was also affected by the lack of information about the activities of different museum departments:

*“...at the moment the page we’ve got isn’t very exciting, so we want to show to people what we do, which might then encourage them to sponsor us.”* Schools Outreach Manager (Interview 22/10/2004)

The museum had also experimented with fee controlled access to digital content, a couple of years before the beginning of field research, with no success. They had been involved in Fathom (<http://www.fathom.com>), a directory of online courses and multimedia lectures created by fourteen universities and cultural institutions including the London School of Economics, the University of Chicago, and the New York Public Library. The initial aim of Fathom had been the provision of free online content in parallel to fee based access to accredited online courses and seminars. The fee controlled access model proved unsuccessful in terms of generating sufficient revenue to make the service sustainable (MacLeod, 2004). In 2003 Columbia University (the leading project partner) had to close down the project and decided to provide access to the Fathom archive for free (Nation Update, 2003). Although the Science Museum had been prepared to create online content for subscription based services like Fathom, in other areas it missed opportunities for generating income by not making educational material available for online purchase:

*“The Tate has just produced some learning resources, which you download from their website and they are images and the sort of things that you can use on the whiteboard in a classroom and you buy them. That’s something that the science museum hasn’t gone down... That route of producing web-based resources that you have to buy access to them.”* Educational Resources Manager (Interview 8/11/2004)

The value obtained from the museum’s income generating Web activities was considered both by staff and managers unsatisfactory. Although the museum had the



advantage of having a well known brand and the required staff resources and internal expertise to invest in this kind of initiatives, there were problems in the process of transforming the use of their online digital assets to actual financial benefits. The Head of IT provided a description of the situation within the museum:

*"... There is no commitment in this organisation to make money online. I think everybody wishes they can do it, but when there is an opportunity, actually maybe it is lack of experience or lack of resource, we are not doing it. So everybody thinks we should be doing it but nobody is actually doing it."*

(Interview 19/4/2005)

The main reason behind those problems seemed to be the lack of strategic direction in planning income generating Web activities and the reluctance by staff from the traditional museum departments to investigate the commercial opportunities presented by Web technologies.

The museum management had a positive attitude towards investing in activities with the aim of generating revenue. This attitude to a large extent was the result of the financial difficulties the museum faced. Key strands of the Science Museum business plan related to increasing profitable contribution, funding and investment. Relevant museum initiatives included the provision of additional retail space, improving the catering offer and enhancing the facilities to sell visitor attractions such as IMAX, simulators and their temporary exhibition programme. Web activities were recognised as another area with the potential for income generation. In several strategic documents the museum indicated its aim to provide online quality learning products free for the user (funded by government), combined with imaginative, consumer-oriented products that can generate income. Senior managers were willing to invest in e-shops, as well as other activities like the commercial licensing of digital content:

*"Obviously sales via the web are more cost effective than those via more traditional channels, so the more we can convert to the web, the better."* Head of Retail and Brand Development (email 23/10/2004)

*"At senior level, I think we are quite happy to explore other predominately third*

*party revenue type opportunities.”* Head of Marketing (Interview 6/9/2004)

Although senior managers were willing to invest in e-commerce they were not involved in the planning or the development of any of those projects. Instead, they considered e-commerce as another function of the Trading Company. Although the Trading Company aimed to support the strategic plans of the Science Museum, it was also responsible for supporting the commercial activities of the other NMSI museums. As the Science Museum did not have a Web strategy and the museum strategic plans did not contain anything other than general statements regarding the use of Web technologies for income generation, there was not much to guide the activities of the Trading Company in this area. Instead, the museum's activities in this area were the result of initiatives by the Web management team or the pressure by senior managers to explore the potential of the Web in this direction and not the result of a clear strategy:

*“It's very fragmented and actually what would make a difference to that would be if we had a Head of web for NMSI...We really need some consistency and continuity, we really do, and an NMSI head of web would do that for us. So if we need to become more commercial, we probably need to link together all the commercial opportunities... it's a big problem, I believe.”* Head of IT (Interview 19/4/2005)

Not only there were no clear objectives regarding investments in web-related commercial activities, but also there was no suitable evaluation of those online services, that could help them decide on areas in need of improvement. The Visitor Research Unit was responsible for conducting usability evaluations of all the museum websites but they had no responsibility for evaluating any of the revenue generating online services. The sales-oriented museum departments (Trading Company Ltd) did not measure the effect the website had on increasing the income they generated from their core activities:

*“It's very difficult to do that and actually my role at the marketing side of things, I am constantly trying to assess what generates the most business for*



*us... It's very difficult to keep track of where the enquiries originally come from."* Senior Sales Executive (Interview 22/10/2004)

And the managers of the online revenue generating services, although they were recording the number of transactions and the revenue, they had concerns regarding the use of those figures for decision making (i.e. they were worried they could have been spending as much or more money to provide the services as they had received in revenue):

*"We always tried very hard to assess and report real costs against our real income but the truth is that many of our costs were subject to the museum's own cultural priorities. In addition, the costs of the service to non-commercial users from each of the museums [NMSI sites] was not factored into the equation."*

Science and Society Picture Library Manager (email 20/9/2004)

Several opportunities to generate income were also missed because there was no collaboration between Trading Company staff and staff from traditional museum departments during the planning and development of web activities. There were no representatives from commercial museum functions involved in the planning process of large scale educational websites and as staff from the traditional museum departments had no interest in commercial activities, there were no attempts to create online commercial features to accompany educational websites. In cases where there were opportunities for commercial licensing of digital content, no department would take the responsibility for exploring those opportunities. Relevant issues would sometimes be a topic for discussion at e-committee meetings among web managers, IT and museum education staff but would then be referred to the Trading Company, which in most cases would not take any action due to doubts about the profitability of those initiatives. An example of this situation in the case of Ingenious was provided by the Web manager:

*"When we were putting together Ingenious we started talking about whether there was value in the content we were writing for Ingenious. ...I just had an email from an organisation that came to us, which said, we really like to contract on x section of Ingenious and it will be really relevant to put on our site, is that something that you can do? So I think, there is possibly some money*

*in it .... The museum said well, it has nothing to do with that. That's a trading company thing, because it involves selling stuff. Let's ask the trading company to pay for that, three or four grand is not much money, let's ask them to pay for that consultancy job [to find out how much they should charge for the content]. Trading company said we are not interested, we don't think it's worth anything, you pay for it and we got stuck."* (Interview 17/6/2004)

Although the Web manager was happy to support any web initiatives that could lead to income generation, he did not have a broad knowledge of the organisation, or the power to implement the necessary changes. His initiatives often met the disapproval of other museum staff; disapproval, which was the result of a wide-spread reluctance among staff from the traditional museum departments to engage in income generating activities:

*"When I arrived to this museum I put a couple of things from sciencemuseumstore.com on the homepage. I had about 5 emails from staff saying, this is preposterous, take it off."* Web Manager (Interview 17/6/2004)

Staff from those departments were aware of the opportunities presented by Web technologies for income generation but they considered that any commercial use of the museum's resources would be in conflict with the museum's mission:

*"We have a very particular position in the market, where we have to maintain a reputation of being educational value first, so we couldn't go being like business, because we would lose".* Head of Visitor Research (Interview 20/9/2004)

*"The government was asking, what is the way forward for museum websites and some people were worried that we shouldn't just give all our information away, publish everything about our collections for free. Because then that will mean that we miss out a commercial opportunity. But in the Science Museum, in NMSI, most people seem to feel that, no we should put it for free."* PDU Project Manager (Interview 10/2/2005)



### 6.1.3 E-procurement (B2B aspect of e-business)

The purchase order and payment functions of procurement were fully automated in the museum through the use of “Access Dimensions”. The use of the software had led to a reduction in paper handling and human error, as no orders or invoices needed to be circulated for authorisation and it had also improved control of expenses as managers had direct online access to financial information. The museum had been using purchasing cards to pay for services (e.g. cleaning, catering, advertising), goods (e.g. books, officer equipment and supplies), membership fees for associations and staff travel expenses for several years before field research in the museum started. Many of those transactions were conducted by members of staff online through suppliers’ websites. On several occasions and as part of the tender process, the museum’s main website was used to advertise supply opportunities and to issue tender documentation. The purchasing cards and the advertising of supply opportunities online were thought to contribute in a reduction of procurement costs according to a review conducted by the PDU in 2004.

Museum managers were interested in automating other parts of the procurement process through the use of B2B e-commerce. For this reason, they participated in an e-auction organised by the DCMS procurement team, and they were one of the eight London museums, which in November 2004 set up a formal Museums and Galleries Procurement Group with the aim to share information on procurement issues. At the time the field research took place, there was a plan to expand the functionality of the Access Dimensions system to include an e-procurement module and to start using the Zanzibar portal\* in 2006.

However, the development of systems and procedures to maximise the potential offered by greater use of e-procurement was restricted in the museum by the lack of financial resources available for the enhancement of existing systems, as well as the set up and

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\* The Zanzibar portal is a service that allows public sector buyers to trade with their suppliers using the Internet and was set up by the government agency OGCbuying.solutions (<https://www.zanzibarportal.gov.uk/>)

subscription costs of services like the Zanzibar portal. In a review completed by the PDU for the National Audit Office regarding procurement processes within NMSI, the museum claimed that the main obstacle regarding the implementation of e-procurement was that these systems required front-loaded investment to provide savings and efficiencies in the long term and the museum's financial situation made those investments prohibitive.

#### 6.1.4 Operational efficiency and internal communication

One of the departments that benefited from the development of the Ingenious and Making the Modern World websites, which were launched around the time the field research in the museum started, was the documentation department. The Science Museum had a wealth of material in storage; material that due to limited staff resources had often been catalogued with only a basic amount of information. The funding for the digitisation process, which was included in the development budgets of the two websites provided the museum with the resources they needed to do more research on museum objects and to record the results in ways that facilitated use within and outside the museum. The digitisation process resulted in the creation of audiovisual records of scientific objects "in action", which would be available for future generations:

*"I was involved in Making the Modern World Online, ...when they were going to design something they wanted to see if it works, so one of the things was you would plug it in and hope it works. There is always a bit of risk there, it can be ruined but then again it's such a great thing if it works. If they can see it that one time and they can film it, then probably it's worth the risk and it stays there for ever."* Curator in Medicine (Interview 16/3/2005)

The online availability of the digitised content resulted in improvements/changes on the data collected about objects, due to feedback from external sources:

*"... right now I am actually working on some captions from Ingenious about American or Canadian Indian or Inuit objects and as soon as we put those pictures and objects up on the net someone from the Canadian ministry of*



*culture wrote back to us and said: actually we are not very happy with what you've said, it's not good enough, you have to find out more. That sort of told us off, that we are not good enough, so now I am starting the process of correcting that and finding out more about the objects."* Curator in Medicine (Interview 16/3/2005)

The impact was not limited to expanding curators' knowledge about museum objects and improving existing museum records. Staff experience from the Ingenious digitisation project made them realise the benefits of introducing new approaches in their documentation practices. Thus, for every new acquisition, they decided to include in the documentation process a digital photograph of the object. Those photographs could be used in the future for a variety of purposes including the development of multimedia or Web products.

The information about museum objects available on the Ingenious and Making the Modern World websites, was used by staff from different museum departments in their daily activities. Curators directed users with specific enquiries to the information available on the websites, thus reducing the amount of time needed to answer those enquiries:

*"...quite often if people ask specifically about objects, often if we are lucky, they are on Ingenious or they ask about a type of object. Say for instance, I want to know about x-ray machines in the 1930's. Then we can send them the link and say look this is on Ingenious..."* Curator in Medicine (Interview 16/3/2005)

Staff from the Education section were using the Ingenious and Making the Modern World websites to search for material to be included in handouts for the museum's teaching sessions. The digital photographs and the text on museum objects available online were already tailored for use by the public. Staff did not have to spend time making changes to content, which would otherwise be available only for internal use (e.g. content available on the collections management system). Other than the new websites, staff from the education department used pages they developed on the main website to promote specific events:

*"...what we did was to send an email out to all of our colleagues in the sort of*

*learning community and asked them to send it out to all of their colleagues. That email had a link into a page on our website, it had a formal invitation. So if you and I went to the website, we wouldn't have found that page but everybody who received that email then had a link to the website."* Educational Resources Manager (Interview 8/11/2004)

The commercial museum departments (Trading Company Ltd) also benefited from the online facilities. The main Science Museum website provided a lot of information about museum venues available for hire (e.g. charges, description of the venues, general availability, catering and electronic equipment hiring), including a copy of the relevant museum brochure in the form of a pdf file. Representatives from different organisations were able to check the suitability of the venues before enquiring about a potential booking. The result was a reduction on the total number of enquiries that reached staff in the Events department:

*"If we didn't have that information on our website we would have probably double, triple that number of enquiries. They would take us a lot of time and they might not end up bringing any business."* Senior Sales Executive (Interview 22/10/2004)

Staff in the Events department were so satisfied with the use of the website that they were advocating the purchase of an additional module for their booking system that would allow them to link their system with the main Science Museum website. The new module would provide users with real time access to information on the availability of the venues.

The Human Resources department also used the main Science Museum website to advertise job vacancies. In this way, they were able to reach internal applicants, as well as a large number of external applicants for a cost lower than the cost of advertising posts in the national press or museum journals. However, the process of advertising museum posts online had not been very efficient:

*"So each time a job comes up in the Science Museum, internally they send around 800 emails with the job description attached, ... where we need to get to*



*is when they put a new job on the Compound which is a job/vacancy database, click, go to some Web samples and click, that's the usability that we need to get to.*" Web Manager (Interview 17/6/2004)

Instead of making the process of recruitment more economical, uploading information about job vacancies on the main website became an extra step in the recruitment process, requiring more staff time. The HR department also failed to use the opportunities offered by Web technologies in attracting volunteers. Although they used the main website to provide contact details for people interested in volunteering, they provided no information about the potential benefits for volunteers that could have encouraged the public to join the museum.

Some individuals in the Science Museum managed to use the available Web technologies to improve the efficiency of their operations, while others failed to do so. The main reason behind that was that the development and implementation of Web technologies was not approached in a strategic way. Investments in Web technologies were not accompanied by changes in processes and working practices that would have encouraged staff to make the most out of those technologies. Some museum staff were aware of the opportunities offered by Web technologies and they decided to embed the use of those technologies in their daily activities. However, many others continued to work in the same way as before:

*"I think they know [staff] there might be opportunities but they are not prepared to go the extra mile to work out exactly what those opportunities are.* Web Manager (Interview 17/6/2004)

*"...I think we're having very early problems, we need to get where people are familiar with the idea of a website."* Head of Visitor Research (Interview 20/9/2004)

In some cases, the implementation of Web technologies resulted in an increase in the demand for specific museum services. The Ingenious and Making the Modern World websites generated in-depth enquiries by users about objects that featured in those websites. However, the development of those websites was not accompanied by any

changes in staff numbers or departmental structures that would have helped staff make the best use of those websites:

*“the number of websites has gone up and the number of curators has gone down like that [pointing downwards]. ... I think, look, the real problem with increasing access to museums is that there is more people wanting stuff from us, but we are actually less capable or we have less resources on the ground actually to meet that requirement.”* Curator in Engineering (Interview 18/4/2005)

Furthermore, the benefits from websites like Ingenious and Making the Modern World were limited for museum staff, as they had not been designed to support staff with their day to day tasks. Although their main objective was widening access to the museum's collections, awareness of their potential impact to the work of museum staff at the planning stage would have initiated simple modifications that would have resulted in obtaining value for staff, as well as widening access. One of the curators explained what happened in the case of Ingenious:

*“We've got objects on Ingenious but what we haven't got always is the object number in our catalogue [collections management system], which means people writing and saying: oh, I saw this on your website, can I borrow it for my exhibition? And actually, I can't identify the object easily. The only thing that I can find on Ingenious is the picture number that's got to do with our picture library. But then it's difficult to find exactly what object is that, because we have several objects that look almost the same. So that's actually a bit of a problem sometimes, that we can't easily link our object catalogue to the Ingenious website. It's a bit of a nuisance really, making life a bit more difficult.”* Curator in Medicine (Interview 16/3/2005)

Project managers were mainly interested in developing those websites within the specified budget and time frame and not in maximising the value of those websites for the museum overall. As there was no Web strategy or other arrangements in place to encourage project managers to think of the wider implications of their projects at the



stage of planning, any opportunities to obtain value beyond the narrow project objectives were lost.

A museum wide Web strategy would have also encouraged museum managers to think of potential Web projects to improve operational efficiency within the museum, instead of investing only in projects for education or income generation purposes. None of the strategic museum documents that were examined or the interviews with senior managers contained any reference on the potential of Web technologies to improve internal operations or any plans to invest in this area. The only exception was the development of the Intranet, which was treated as an IT infrastructure investment. The project was funded by the IT budget, it was under the direction of the Head of IT and it was one of many projects included in the IT strategic plan.

The existing NMSI-wide web-based Intranet was one of the main tools for top-down communication. It was used by museum management to inform staff about the latest developments (e.g. to encourage them to participate to staff surveys or inform on progress in dealing with major IT problems). Some museum staff also used it to look for information on museum departments and staff members, to download HR forms and to check the museum catalogue/ collections management system. Although senior managers considered its development first priority, the overall level of use by museum staff was quite low. The poor maintenance of the Intranet pages was one of the reasons for its limited use (e.g. staff reported broken links and out of date items), but this was solved with the recruitment of an Intranet manager towards the end of 2004. However, Intranet use levels remained low despite the efforts of the Intranet manager due to the limited amount of information that was available on the Intranet pages:

*“If someone asks me about the outreach team, I can look the outreach team up on the Intranet and I can find a bit of information about them, but it’s very limited, so you still have to talk to them, get hold of them”.* Curator in Medicine (Interview 16/3/2005)

*“...there is some type of information that nobody has put on the Intranet. So that’s one thing to do. But maybe it’s also about somehow providing more of a map of what is on the Intranet. The Intranet is a bit incomplete, well, it’s very incomplete.”* PDU Project Manager (Interview 10/2/2005)

This was largely due to the fact that staff were not willing to provide information about their work on the Intranet. Their concern was that by making available information about their activities or by providing access to the products of those activities to everybody in the museum they would become vulnerable:

*“...everyone would like immediate access to everybody else’s information but they still somehow think that if they give out their information they are losing some power that they have.”* PDU Project Manager (Interview 10/2/2005)

*“...it’s very difficult [sharing content] because of ownership of the content, in a sense that people have different databases and it’s very political. I mean political within the museum, they use themselves that content, they are scared they are going to lose their role, their authority, their job.”* Collections E-content Coordinator (Interview 16/9/2004)

The information available on the Intranet could have been used by anybody in the museum for a wide variety of purposes, including those interested in scrutinising the activities of one of the departments or the work of particular staff members.

The negative staff attitudes towards sharing information affected several areas of museum operation and resulted in duplication of effort and lack of coordinated dissemination:

*“Yeah, an example would be, say there is someone in one of our museums, who is doing a project. They have to write, whoever is sponsoring them, they write reports about how they are doing with the project. There is someone else in the sponsorship department who is trying to tell that sponsor about the wonderful things we are doing, as they need to know how well that project is doing. And then, there is also me, who has to write reports to government about all the*



*wonderful things we are doing. So that's already three people and like you said that can lead to duplicating work, where we could be sharing it more. And on an informal way when people are a bit intelligent about those communications then they do think to ask people but you still need to create a culture...*" PDU Project Manager (Interview 10/2/2005)

Museum management seemed to be aware that there was a need to streamline and integrate the museum's various data-gathering activities for reporting purposes. However, the way they chose to deal with this issue (e.g. invest in an Intranet manager post and the relevant technical infrastructure) did not seem to have the desired effects.

## 6.2 The Geffrye Museum

### 6.2.1 Supporting traditional museum services and creating new online services

#### *Supporting traditional services and enhancing the museum's brand image*

The Geffrye museum was aware of the potential value of the Web as a tool for general marketing purposes. Although the museum did not have a strategic plan to guide the development of Web activities, other museum strategic documents contained information on the use of their website for marketing purposes. The museum's website was recognised by both the senior managers and the trustees as a medium for increasing the number of visitors to the physical site, reflecting the museum's corporate profile and enhancing the museum's brand, increasing accessibility to the museum's collection and developing new audiences. As a result of it, funding was directed to Web development in support of those objectives.

The museum's website provided organisational details (e.g. museum's history, annual reports) and information on the activities of the museum departments. Individuals or organisations with an interest in the museum could easily access information on the museum's activities and its financial condition and make decisions about supporting the museum. The information available on the website could reach new categories of users who would not normally visit a small museum like the Geffrye, whose venues attracted mainly local audiences:

*"I am sure that lots of the younger kids use it as well. Rather than asking for more information they are more likely to google us and have a look on the website, so again a new audience that way."* PR Officer (Interview 30/11/2005)

*"We get quite a few requests for information from Japan and places that before it would have been difficult for us to have reached."* PR Officer (Interview 30/11/2005)

The use of the website as a marketing tool had a positive effect in many areas of the museum operation; some of those areas will be examined in the following sections.



However, one of the most obvious ways in which it affected the museum was in achieving one of its main objectives, that of widening access to its collections. The indirect effect of that was that it helped the museum with its efforts to persuade the DCMS (the museum's main sponsor) that it was making progress towards the achievement of one of the priorities of the department. The figures on the number and types of website users were reported to the government department, as indicators of progress on the issue of widening access to the museum's collections.

The website was also used to facilitate visits to the physical site. The museum made available online their public programme including all the educational activities for families and adults, the general lectures and the study days:

*"We get a lot of people who will phone up and say I looked up your museum on the Internet and we found every information that we could possibly want about opening hours, travel arrangements, what's in the museum, what's on, everything."* Shop Manager (Interview 26/1/2006)

The information provided about the public events taking place in the museum was thorough and every effort was made by the Web administrator for it to be updated regularly. The online material also included details about the museum galleries for teachers in order to facilitate school visits. The relevant content was limited compared to the printed material that was available for teachers on their visit to the site or the teachers' resources available on the websites of large museums like the V&A. However, at the time the field research was taking place, the museum's educational team was in the process of developing new downloadable resources for teachers:

*"... it is called Tudors for teachers and basically it's background information on the Tudor period for teachers, so that's very different audience and it's quite a traditional format, images, words etc. So it is more of a downloadable document probably..."* Head of Education (Interview 22/11/2005)

Although the information provided for school visits was limited, teachers reported that it helped them decide on visiting the museum as well as book their visit (through an email option that was available on the website). Some seasonal aspects of the website had also been very successful and had attracted a lot of attention by the public. A

pecially designed Advent Calendar with images of objects from the museum's collections that was launched in December 2004, led to the museum being voted Website of the Month by the 24-Hour Museum (<http://www.24hourmuseum.org.uk/>).

The additional content provided after the re-design of the website led to a gradual increase in the number of website hits and a marked rise in the number of enquiries from schools. Within one year it was clear that the website had also brought more schools in the museum:

*"...with the holiday activities around 8-10% are probably website users, so they say they've seen us on the Internet."* Head of Education (Interview 22/11/2005)

As there had been no marketing support for the launch of the new website, its success was, most probably, due to the clear layout, navigation and content labelling, which characterised its design. Staff were satisfied with the design and the evaluation conducted by the researcher for the purposes of this study did not raise any concerns with that aspect of the website. The evaluation found that the main usability and accessibility guidelines were followed by the Big Picture Interactive, in designing the website and the effort that museum staff put in creating content suitable for web publishing was effective. The market research and the careful screening of web design companies that senior managers completed (the first screening had no result and they had to re-advertise after a year), as well as their involvement in the development of the website (there were at least four prototypes before deciding on the final design) had the desired effect. Finally, users had the same opinion about the Geffrye website, which was evident through the positive feedback that museum staff received.

However, the absence of summative evaluation of the main website raised the possibility that some areas in need of improvement could have been missed:

*"I tend to think that the facilities is a confusing section in the menu, because you've got the shop, you've got the filming and photography...I had feedback from people saying I find that is a bit confusing, where those items are and sometimes, when people phone I just say ok, go to facilities, go to shop and talking them through the website, so as to get to something."* Web Administrator



(Interview 25/5/2006)

The managers in the museum recognised the need for more evaluation, so as to tailor the website in a way that it would increase user satisfaction but their limited staff resources were the main obstacle to their efforts:

*"... my way forward for the Geffrye would be to user test every section, while it's being created and when it's launched in a year later, as much as I can afford and manage, because it's not just money, it's people."* Assistant Director (Interview 15/12/2006)

*"...we can't afford to have visitor surveys too often..."* Head of Finance and Administration (Interview 25/5/2006)

User testing sometimes requires spending an hour with an individual going through the use of online resources and online visitor surveys require a lot of preparation to come up with a reliable instrument. The museum did not have a Visitor Research Group and any surveys or user testing had to be completed by people in the Education department, which was very small and did not have any experience in evaluating online resources. Even in the cases where museum staff had recognised specific areas for improvement, their limited resources (i.e. the web administrator had no Web development skills) and their dependency on the Big Picture Interactive for any major changes to the website, slowed down the process of improvement:

*"But we don't really properly list what we do for disabled visitors or an access guide or things like that. So that's an area that we can improve on and there is no reason why we couldn't or shouldn't and again, it's often a funding thing or staff time thing."* Head of Education (Interview 22/11/2005)

#### ***Developing added value services or creating new services for research & education***

The Geffrye museum management were aware of the opportunities presented by the Web in maximising the educational potential of the museum. Museum strategic plans contained information about providing online access to museum resources for learning purposes. The plans for a special learning website for children based on the most

popular educational programmes that were run at the museum had appeared concurrently with the plans for the re-design of the main website in 2002. A site for adults had also been planned at the same time in order to encourage life-long education. The learning websites that had been planned aimed to allow access to the museum's resources by schools and individuals across the world and they were seen by managers as a major development in the museum's educational outreach.

At the time of the field research, the Geffrye website had a dedicated Kids' Zone with several interactive activities (e.g. designing a garden in a 19<sup>th</sup> century style) and downloadable resources (e.g. recipes, wordsearch activities) for children aged between 6 and 11. The website was designed to allow schools to use it as part of their coursework related to the National Curriculum, as well as for home use by children and families. It was developed and hosted by the company that designed the museum's main website with funding from the Heritage Lottery Fund. The web administrator was responsible for updating it on a regular basis with activities developed by the education department. In order to increase its level of use, the Kids zone was advertised in printed promotional material that was sent to schools. The educational content available on the website was limited but the graphic design and the interactivity seemed to be very effective for children. Since its launch in September 2004, it attracted many positive comments from children, parents and teachers (according to evaluations conducted by the education department) and it received a high number of hits.

The development of online educational resources like the Kids zone was not seen by staff as a new service separate from the rest of the museum's educational output but as one aspect of the museum's integrated educational service. Museum staff were aware of the opportunities presented by Web technologies in using the same core material to provide learning experiences for different audiences and in different forms:

*"...you can put the same core material up but with different kind of faces, so different levels and accessibility. So, you know, the virtual tour for a certain type of web browser, who just wants to know about the Geffrye and the way it will feel when they come and then you can use some of the same information, object*



*information in something for children in a quiz ...*" Assistant Director  
(Interview 15/12/2006)

The opportunities for multiple uses of the museum's educational content and the resulting integration affected not only the online museum services but also the educational services offered on-site. The website mascot "Sam" from the Kid's Zone was used to link the online learning activities with the ones in the museum galleries. The mascot appeared in printed documentation and gallery labels that contained information for children, as well as in an email newsletter on school activities:

*"Sam the dog is looking like a news reader and it will have maybe some pictures from previous holiday activities and telling people what's coming up."* Head of Education (Interview 22/11/2005)

Despite the interest from managers and staff to use Web technologies for educational purposes, at the time of the field research, there were no other learning resources available on the Geffrye website. The website did not have an online facility for searching the museum collection and or any educational material for adults (other than the information provided at the virtual gallery tours). The planned learning site for adults had not been materialised by the time the field research in the museum ended. The main reason for the small amount of educational material available on the Geffrye website was the museum's limited resources:

*"It could give more [the website], but then that would involve a lot more input, a lot more time and money and a lot larger site, which obviously costs more."*  
Shop Manager (Interview 26/1/2006)

The development of online educational activities requires a lot of resources both financial and human. The museum's operational budgets could support small Web projects (Advent Calendar, Christmas E-cards) but were too small to cover the costs for the development of online educational resources. The museum depended on external funding for the implementation of large scale Web projects. Web projects that aimed to cover the educational needs of young audiences were more popular among potential sponsors (e.g. DCMS, Heritage Lottery Fund) than other types of web projects:

*“... often you can get funding perhaps to do something for children, it can be, say, slightly more difficult to get funding for general adults.”* Head of Education (Interview 22/11/2005)

Thus, the museum managed to find funding so as to develop the Kids Zone but had to continue looking for more external funding in order to develop educational resources for other types of audiences. Furthermore, due to the lack of in-house Web development skills, the museum had to hire external expertise in order to develop any online resources. The development of any online resources would have to be negotiated as a separate project with external organisations or individuals, which demanded a lot of staff time (i.e. drafting an agreement on top of any other staff involvement during the development process) and involved extra costs.

Online educational resources also require ongoing financial and IT support beyond their launch. Although the museum could support the development of online educational resources with external funding, it did not have the infrastructure to support many of those services after their launch. Staff shortages meant that some learning activities on the Kids Zone were not updated on a regular basis:

*“... we are supposed to feed her [Web administrator] quizzes every sort of three months and she then uploads them. But we have been a little bit short staffed recently, so we haven't been keeping up.”* Head of Education (Interview 22/11/2005)

The small size of the educational and marketing departments (i.e. a few staff members each) also meant that the museum could not afford the adequate marketing of the available online resources:

*“...we could do better publicity [for the Kids Zone], but at this point, given all the other work we have and all the other demands we have, and all the other things we are trying to do even just in the press and marketing department, even just in the learning and education department, I think it's probably the right level.”* Assistant Director (Interview 15/12/2006)

The support of online educational resources in the long term was also subject to the



typical risks involved in outsourcing services. In the case, where the museum would decide to assign the development of an online resource to a company, other than the one, which hosted the main website, there were risks related to the need for the two organisations to cooperate:

*"... all the major elements are there in the original project [online facility to search the museum collection]. I just think the divide aspect, I mean, I am still not sure how it's going to connect up these two companies, how they are actually going to manage it, we will see..."* Collections Manager (Interview 25/10/2005)

The museum could also be faced with the need to make changes in the service they provided, due to decisions made by the company, which hosted the website. Although the contract with the company specified the level/types of services provided, there were issues that were difficult to specify and consequently difficult to include in a contract (e.g. website design). Maintaining consistency on those aspects of a service that depend on individuals, their skills or their interactions, when there is no control over the selection and recruitment of those individuals presented a risk for the museum:

*"But that's always the way, when there is a tool bespoke and not just an off the shelf package the big worry is that the person, who is very involved leaves the organisation and you may as well be dealing with a new company the next day, having said that, that is a worry."* Head of Finance and Administration (Interview 25/5/2006)

Another risk of outsourcing for the museum was that it could be faced with extra costs every time the company would decide to make changes in the technical specifications related to the support of the website, as in the case of replacing the content management system:

*"Pig Picture have changed their CMS system to, I think, it's DotNet, and they are kind of pushing for us to do the same ... We've been in disagreements with them because basically they quoted us for this three page thing that we have designed something at, can't remember now... So they are arguing that well, it's expensive to do it, but if you come over to this [the new CMS], then we will do it."* Web Administrator (Interview 25/5/2006)

Despite the risks involved in outsourcing, museum managers were overall satisfied with the quality of the services the company provided for the required fees. The relationship with the company was considered successful largely due to the fact that the detailed planning and the involvement of senior managers in drafting the agreement prevented major disasters and placed the foundations for a smooth collaboration. The museum could not afford to hire staff with the same level of expertise that external consultants could bring to the support of the museum's Web services in exchange of a fee. Museum managers realised it was important to plan their Web activities carefully, as they had to deal with external organisations/consultants and any changes at a later stage would cost them valuable resources:

*"...there is a contract [for the technical support of the website], which I think is quite detailed, which the Assistant Director did with the management team. I think you need it, you need quite a firm structure because I am pretty sure, once the firm has got the job and they've done the initial work, there is that danger of thinking: maybe, we can now charge them a fortune if they need us".* PR Officer (Interview 30/11/2005)

Although other museum staff were involved in the development of online educational resources (education staff and Web administrator), the Assistant Director had the main responsibility for managing the relationship with the company in the long term.

The relationship of the Assistant Director with the Big Picture Interactive and the development of online educational resources within the museum was guided by the museum strategic plans:

*"So we knew what we wanted to do in the long term, we had the short term plan with the homepage and we've added on things, but then there is the longer term plan with the artefacts and the transparencies and the shop, which is to be done. So I think they [Big Picture Interactive] have a quite clear direction from us, which makes it easier."* PR Officer (Interview 30/11/2005).

Museum strategic documents from 2002 included plans for the re-design of the main website (completed in 2003), the development of the Kids Zone (completed in 2004)



and an adult educational site, as well as the creation of an online search facility for collections information, which was still in progress by the time field research in the museum ended. The development of Web resources for research and learning purposes within the museum was not only guided by the museum objectives but was also consistent with the vision that senior managers and the trustees had about the museum:

*“There is a Geffrye style, which involves typeface, in a way, colour patterns, the mood we are trying to evoke and extract and everything. There is a style and I think the director would speak of it in that way as well... the Geffrye brand has been taken into account, to make sure that it [the website] fits with who we are and how we want to reach people...”* Web administrator (Interview 25/5/2006)

Although the museum depended on external funding for Web development and this affected to a degree the types of projects that were implemented (e.g. the Kids Zone was the first educational resource to be implemented due to funding availability), it was the museum objectives that provided the direction for Web development. Small additions of content to the website could be initiated by any member of staff and implemented by the Web administrator without the need to go through any controls other than a basic editorial control by the Web administrator. However, any major changes in the content or the layout of the website had to go through the Assistant Director:

*“she liases with the management team, she is involved with the funding etc, so she knows what money we have, what needs to be done at grassroots level and then she will tell us what is possible”* PR Officer (Interview 30/11/2005).

The Assistant Director made her decisions on prioritising those requests/proposals on the basis of their potential value for the museum overall and the availability of museum resources. The main criterion on which she based her decisions was the projects' contribution towards the achievement of the museum mission and not their chances of securing funding:

*“... we never ever do the latter [write proposals to take advantage of external funding opportunities], in any way, anywhere at the museum, for anything, ever,*

*and I never would. No, we have a project and then we decide where to go and we try to get it [funding].” Assistant Director (Interview 15/12/2006)*

The government agendas had an impact on the museum’s strategic direction but they did not affect directly the process of Web development within the museum:

*“The truth is we get the majority of our funding from central government ... but we don’t wake up every morning like a government department and think: oh, we’ve got to be promoting this government agenda.” Assistant Director (Interview 15/12/2006)*

The result was that the museum managed to direct their limited financial and human resources towards the implementation of Web projects that the museum needed most. Any decisions to seek funding for Web projects that would appeal to external sponsors without having a clear idea about the value of the proposed Web resource for the museum or a plan for its long term sustainability would have resulted in inefficient use of the museum’s resources. The museum would have to direct their resources towards the development and long term support of those projects and by doing that they would have limited their capacity to support projects that could be more significant to the museum but less attractive to external sponsors.

#### 6.2.2 Income generation (B2C aspect of e-business)

The museum’s website at the time the field research took place did not have any online transaction facilities. There was one web page on the main website, where they advertised a few items available at the museum store, mainly in connection to temporary exhibitions on a rotating basis. The majority of the items advertised were produced by the museum (e.g. museum publications) and they were not just merchandise available at the museum shop. The relevant web page provided the contact details of the shop manager, so that interested parties could place an order by phone or email. This solution was quite basic and could not be regarded as an e-store but the shop manager was satisfied with the interest it generated from users:



*“So it’s slightly cumbersome and slightly informal but it seems to work. I mean we get people who say I saw this on your website, so it does work.”* (Interview 26/1/2006)

The shop manager’s satisfaction with the online facility was mainly due to the fact that the web page had no extra cost for the museum and it did not result in any significant changes on staff workload, instead of the actual sales it generated.

Furthermore, the website did not have any tools to allow individual donations or any web pages to encourage corporate sponsorship, despite the fact that museum staff were aware of the opportunities for income generation in the area of online sponsorship:

*“There are lots of museums like the V&A that have information about what their coming projects are and their plans for the future and “help us to do this”...and we’ve got none of that.”* Web Administrator (Interview 25/5/2005)

As the educational content that was available online was limited, the museum could not justify fee controlled access to any parts of the website and there had been no efforts in the past to create digital content for subscription based access either individually or in collaboration with other organisations.

The senior managers in Geffrye were interested in the potential uses of Web technologies for income generation, mainly due to the museum’s deteriorating financial condition, and the government pressures to increase the income they generated:

*“And the other area, where we are keen to go ahead if we could and we have been encouraged to is to exploit the commercial part of, the possibilities of it [the Web], to have services and sell services on there.”* Head of Finance and Administration (Interview 25/5/2006)

For this, there had been a plan for the development of an e-store since 2002, when the re-design of the Geffrye website was planned. The plan for the Kids section of the website materialised in 2004, and the museum was making progress in digitising their collection in order to make it available online. However, there was no progress on the e-store until the field research in the museum was completed. The main reason for the lack of progress was that the development of an e-store was considered by managers a

very risky investment, whose benefit would not necessarily be of significant value to the museum.

Senior managers in Geffrye were responsible for planning and evaluating the potential benefits of any Web activities. The result was that they were able to weight the costs required for the development of an e-shop and the potential impact to existing museum operations (e.g. increase of workload for shop staff) against the potential profit from an e-store and choose an option, which minimised the financial risk:

*"I don't think it will ever warranty the investment we have to put on these systems to be honest at the moment, because our shop sales are very very small ..."* Head of Finance and Administration (Interview 25/5/2006)

The Geffrye museum did not have a strong brand (that would guarantee a lot of customer demand like the Tate Gallery or the V&A) or the internal expertise and infrastructure to support an e-store. The museum did not have any experience in operating a mail order service, which would have been useful for managing the e-store. It did not have any staff with web development skills to support the maintenance of a new website, the technical infrastructure to support online transactions or a large museum shop team to provide the back end support for an e-store:

*"... what we do is what we can manage, and in terms of the commercial side that's probably the biggest consideration. Because once you go into merchandising over the web you've got to support it and it's got to be an instant response. That really is quite demanding because we've got one shop manager and the rest of the shop staff are part timers."* Head of Finance and Administration (Interview 25/5/2006)

The infrastructure for the e-store would have to be outsourced and that required more resources than the re-design of their main website. It would have been difficult for the museum to find external funding to support a project of that type and even if funding was available the museum would have to support the maintenance of the e-store in the long term with their operational budgets.



Furthermore, the development of an e-store was not considered central to the museum mission. As the museum had limited resources and all web proposals were assessed according to their contribution towards achieving the museum's objectives, the specific project had not been high enough in their priority list in order for it to happen:

*"I think it is absolutely something that we talk about, we will probably talk about it a lot this year, but it hasn't been a priority. The other uses of the web have been the priority, information and content about what we are."* Assistant Director (Interview 15/12/2006)

By minimising expenditure on projects not central to the museum mission they aimed to spend more of their resources on activities that they had value for the public. Their interest in income generating Web activities was mainly the result of the financial pressures the museum faced and not the belief that those activities could be an important aspect of the museum operation:

*"No museum essentially... we all have to raise money, we have shops, we all do all sorts of corporate things to raise money but none of us see ourselves as money makers primarily."* Assistant Director (Interview 15/12/2006)

*"... the e-shop, which I think would be good just to get income in. But this is less about the future of the museum and its direction...."* Web Administrator (Interview 25/5/2005)

The commercial services available on site, like the restaurant and the shop were maintained because they were considered an integral part of the museum services (visitors expect to find them within a museum) and not because of their potential to generate revenue. The shop made very limited profit and the restaurant was financially damaging for the museum. Managers and staff in the museum were aware of the opportunities presented by Web technologies for income generation but were reluctant to go to this direction for reasons related to their organisational values:

*"I suppose the only thing we don't try to do... we try in a very quiet way, we try to encourage the audience to support us, to become a member of friends or maybe a donation, but we don't really flash a light at that and that's a bit of... a*

*sort of cultural decision really.*” Head of Finance and Administration (Interview 25/5/2006)

### 6.2.3 E-procurement (B2B aspect of e-business)

The museum had been using a purchasing card for several years before field research started. The card had been available for use by all heads of sections and had been used mainly for purchasing supplies online (especially IT equipment). Staff, who had been using the purchasing card, reported that the use of the card had led to a reduction in transaction costs. Furthermore, staff responsible for departmental budgets used the Office of Government Commerce website (<http://www.ogc.gov.uk/>) to check lists of preferred suppliers in order to increase procurement savings. However, other than checking preferred suppliers and using the card for online purchases, the museum did not use any other e-procurement methods.

Senior managers in Geffrye were aware of the opportunities offered by the Zanzibar portal (<https://www.zanzibarportal.gov.uk/>). However, they believed that because of the small size of the museum and consequently their procurement spends, the volume of potential savings would not justify the required investment:

*“If you were to try to list the number of all of these payments of about 10000 pounds of value in a year, you would get a very small sheet of paper...”* Head of Finance and Administration (Interview 25/5/2006)

The cost of joining the e-market included a set-up fee and an annual subscription fee. Although the pricing depended on the annual procurement spend of the participating organisation, the cost of joining was considered by managers in the Geffrye prohibitive for small museums:

*“It’s a big extra cost for us and I don’t think it’s conceivable in any way that we could save enough money to make that viable... Some of these initiatives that are going on are very laudable but they are really aimed at the big... the V&A, the Tate Gallery and the National History Museum. They’ve got huge budgets and have a department handling procurement that can sort of force out economies of scale...”* Head of Finance and Administration (Interview 25/5/2006)



#### 6.2.4 Operational efficiency and internal communication

The digitisation of the Geffrye museum collection, which aimed to make the relevant content available online, resulted in the “cleaning” of the records contained in the museum’s collection management system and initiated a review of the museum’s documentation processes. The core documentation procedures (e.g. objects entry, acquisition, cataloguing) were re-written and where appropriate were automated in an attempt to ensure that they supported the changes resulting from digitisation:

*“... I have to make the database system work with our procedures. So there is a whole raft of things to do with how we work with the collections that need to be sort of meshed in with that system ...”* Collections Manager (Interview 25/10/2005)

The improvements/additions on the information collected about the museum objects affected in a positive way all museum operations that involved the use of those records, including academic research, museum publications and the selection of merchandise for the museum shop.

The need to include information about the activities of the education department on the website encouraged the department to establish the use of digital cameras for recording museum events and to formalise the relevant process:

*“We have to ask permissions from teachers to use their photos and we formalised that process. ... It could be used in a variety of different ways including the Internet and they have to sign. So that’s one change in procedure and the use of a digital camera and having that software...”* Head of Education (Interview 22/11/2005)

The digital photos were stored in a public drive, where they could be accessed by all museum staff and used in a variety of ways (e.g. the children’s email newsletter, the events section of the website and printed publications).

The museum due to their limited resources did not have any complex features on their website (e.g. online access to collections information). However, staff from most departments seemed to make good use of the basic facilities available on the museum's website. Museum staff had been using the website to answer enquiries by the public. Basic enquiries about visiting the museum or specific museum events could be answered by directing people to the relevant web page. In this way, staff were able to spend more of their time answering complex enquiries. The online information about the material available in the shop, especially the museum's publications, reduced the number of calls that the museum shop received about the availability of recent museum publications. Consequently, museum staff spent more time dealing with enquiries related to actual purchases.

In a similar way, the information provided on the Geffrye website reduced the workload of the marketing department. Individuals could find information about the museum's galleries and other facilities online before contacting the department with a specific request (e.g. booking a venue for filming). Organisations interested in hiring museum venues for seminars were able to get most of the information about the venues (e.g. capacity, charges, catering information, and cancellation policy) from the website before contacting the relevant department to make a booking:

*"... it cuts down on the time we spend describing these to them, if someone rings up cold and says: oh, what do you have? And you go: there is this room, there is a garden, and there is blah, blah. Now, they will ring up and say, I know all about you"* PR Officer (Interview 30/11/2005)

The information provided online was also very effective (hiring museum venues was one of the most profitable museum activities) and it came at a very low cost for the museum that could not afford to use any other marketing methods to advertise those venues (they did not have dedicated staff dealing with hiring out museum venues).

The website was also used to provide information about volunteering. The online details included information about the potential benefits and a volunteer form, which could be printed out, filled in by potential volunteers and posted to the Head of Education. The



actual online feature for attracting volunteers was very simple (i.e. static text, a photo of existing volunteers involved in museum activities, a volunteer form as a pdf file). However, it provided a good starting point for anybody interested in volunteering (the volunteer form contained information about the nature of the tasks involved) and to a reasonable extent it relieved museum staff from the task of providing basic information to potential volunteers and posting volunteer forms. In a similar way, administrative staff benefited from advertising museum vacancies on the Geffrye website.

The museum also had an internal network. The implementation of the network could have been triggered by the development of the new website a couple of years before the beginning of field research:

*"We didn't use to be networked before, that was the other thing, I guess, that may have happened kind of hand in hand with the new website."* Head of Education (Interview 22/11/2005)

Staff were a bit reluctant to use the networking technologies at the beginning. However, by the time field research in the museum started they were using online diaries to record their activities and the available public drives to store information for use by several departments:

*"the programming for education is obviously in the education department, so it's getting the information from them. They take photographs of kids activities and upload it on the Intranet, on our server and then I pluck them out of the way and we try a couple on."* Web Administrator (Interview 25/5/2006)

Simple tasks like arranging meetings had become easier and staff described the new way of collaborating as "cleaner" and more effective.

Although there were plans for implementing Web technologies within the museum, none of the planned projects aimed to improve primarily the internal processes or communication within the museum. Managers seemed to be aware of the potential value of Web technologies for marketing, educational and commercial purposes but they did not seem to be aware of the potential of those technologies to improve operational efficiency. As a result of this, there were no arrangements in place for evaluating the

impact the website had on the operations of different museum departments (other than measuring the number of hits on sections of the website corresponding to different museum departments). Thus, the benefits that the museum obtained in this area were not due to strategic planning but rather the result of staff initiatives and the involvement of senior management in the implementation of Web technologies.

As it has been mentioned previously, the Assistant Director was actively engaged in the implementation of those systems. Due to her role she had an extensive knowledge of the museum operations and a broad perspective, which made her realise the need for integrated use of those technologies. On several occasions, during the development process of those projects she identified the potential impact of those technologies on different aspects of museum operation and made changes in order to maximise the value obtained, despite the fact that those changes hadn't been originally planned. For instance, the main objective of the digitisation project in the Geffrye was to make information about museum objects available to users through the website. However, the museum also decided to use part of the funding for this project to provide internal access to the Collections Management System through a Web platform. In this way, anybody in the museum would be able to access information about museum objects from their desktop:

*"it would be hugely important for staff, ... open perhaps the way we use the collection as well. Because I don't know if we are doing tea cubbies, I know there is a lot of tea cubbies in the store, but I don't know what kind of condition they are in or what period they are from, and all of that information will be there on my fingertips, so that's going to be a really big and important development."* Head of Education (Interview 22/11/2006)

Although the project was still in progress when field research in the museum ended, a survey of the staff requirements for the new system had already been conducted and it seemed that the end result was likely to improve operational efficiency throughout the museum.



The museum's flat organisational structure also meant that the Assistant Director was directly involved in the decision making process of several museum departments (e.g. education, marketing, shop, website management). Her knowledge of the internal workings of different museum departments allowed her to implement changes in processes and departmental structures in order to make better use of Web technologies:

*"It [the museum website] obviously added a huge additional layer of work for the press department... so I had to re-jiggle around the tasks and the workload in that department."* Assistant Director (Interview 15/12/2006)

*"As a result of having the website we have had to change the procedures, because you get enquiries on the website, so we had to decide who was going to take them, whether one person or lots of people and we finally have agreed that different departments take the enquiries that relate to their department."* Assistant Director (Interview 15/12/2006)

Without those changes in procedures and the re-organisation of the staff workload, the use of the available Web technologies within the Geffrye Museum could have been either a meaningless addition to the daily activities of staff or even worse a demoralising factor due to the associated increase in staff workload.

Other than the changes in departmental processes and staff workloads, senior management also encouraged staff to use the main website for their day to day activities. Although the implementation of changes depended on the availability of resources, suggestions for additions/changes on the main website were welcomed by museum management:

*"...We encourage people to think that way really, because otherwise things could happen and we miss an opportunity."* Head of Finance and Administration (Interview 25/5/2006)

The encouragement of positive staff attitudes regarding the use of Web technologies by managers was facilitated by the ability of staff to respond quickly and flexibly to the changing circumstances. This ability was fostered by the museum's flat organisational structure, the existence of trusting relationships and minimal bureaucracy. Those

organisational characteristics helped staff embed seamlessly the use of Web technologies in their day to day activities:

*"the change in procedure is building in the time to give the updated information to Mandy [Web administrator]. Because it's just another person that we have to make sure that we keep in the loop, but I don't think that matters. I guess when we are working on the projects we just have to designate some time to that."*

Head of Education (Interview 22/11/2005)

*"...we pull the website into it [marketing], every leaflet, every business card, everything, e-mail, it's at the bottom. So that really works as well, just having it completely tied in and we did that quite early on."* PR Officer (Interview 30/11/2005)

## *Conclusion*

The two museums followed different paths in the planning and development of Web activities and that affected the scale and types of benefits they obtained from those activities. The Science Museum due to their IT infrastructure, the expertise available within the museum and their previous experience with multimedia and digitisation projects produced a great number of online educational resources. Management and staff were excited with the opportunities offered by Web technologies in achieving their educational mission. However, the lack of a museum wide content management system, problems in prioritising Web project proposals and the lack of planning beyond project level resulted in inefficient use of the museum resources. Consequently, it reduced the opportunities to develop new educational material for the Web and to maximise the value obtained from existing online resources in the long term. The strong Science Museum brand and the expertise available within the Trading Company allowed them to experiment with e-commerce, however the lack of strategic direction in the planning and development of e-commerce activities, as well as the negative staff attitudes against the commercial use Web technologies were a major obstacle in making e-commerce a profitable museum function. In a similar way, the museum missed many opportunities



in improving efficiency and communication between different departments, because management was not aware or interested in investing in web activities for this purpose. Their lack of involvement in the planning and development of web activities meant that a number of changes in processes and structures that were required to support staff in making the best use of available web technologies were never accomplished.

On the other hand, the Geffrye museum due to their limited resources could not afford to develop large scale online educational resources or an e-store. However, the senior managers' involvement in the planning and development of web activities resulted in efficient use of the museum's resources, as Web priorities were set according to the museum objectives. It also created the right conditions that enabled staff to embed the use of Web technologies in their daily activities. Finally, the only aspect of the museums' operation, where both organisations followed the same path, regarding the use of Web technologies, was procurement. Both museums made the strategic decision not to implement e-procurement methods like joining online marketplaces, due to an uncertainty about potential benefits and the size of the investment that was required.

## CHAPTER SEVEN: DISCUSSION OF FINDINGS

### *Introduction*

This chapter provides a discussion of the case study material presented in chapters five and six. Whereas in the previous chapters the findings were presented in detail in order to allow the reader to scrutinise the results of the analysis, the narrative provided in this chapter provides the reader with a foundation for further reflection on the findings, and the consequent derivation of theory. The discussion in this chapter is the result of a further interpretation of the findings. It provides a more in-depth analysis of the evidence from both museums in an integrated way and it is enriched by references from the relevant body of literature. The two core concepts that were generated by the analysis process (the strategic alignment of Web activities and the engagement of senior management in the planning and development of Web activities) are re-introduced and discussed further in this chapter as distinct theoretical concepts.

In the first part of this chapter the value from the use of Web technologies for the support of museum services available on site and the online provision of educational services is discussed in detail. This part of the discussion refers to evidence from both case sites presented in sections 6.1.1 and 6.2.1. The second part of the chapter provides an explanation to the evidence collected from both museums regarding the contribution of income generating Web activities to the museums' performance/mission (data presented in sections 6.1.2 and 6.2.2). The third part is an evaluation of the impact of e-procurement activities within the two institutions (based on evidence from sections 6.1.3 and 6.2.3) and in the fourth part a discussion of the impact of Web activities on operational efficiency and communication within the two museums is provided (referring to data from sections 6.1.4 and 6.2.4). Finally, the last part of this chapter contains a detailed discussion of the two core theoretical concepts that emerged during the analysis (strategic alignment and engagement of senior management in the planning and development of Web activities) and their relationship to the rest of the research findings.



### *7.1 Supporting traditional museum services and creating online educational services*

The use of Web-based technologies to support the museum's educational mission and to widen access to the museums' collections was believed to be by all participants in this study the greatest benefit of Web technologies for museums. This aspect of value appeared as the main objective of Web activities in the strategic plans of both museums (along with income generation but at a much smaller scale). There are several reasons, which could explain that. The use of web technologies for educational purposes is directly related to the museums' mission. The International Council of Museums provides the following definition of a museum:

*"a non-profit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment."* (Available at: <http://icom.museum/definition.html>)

Museum staff are familiar with the opportunities presented by Web technologies in improving the educational services they provide to their public. Since the late 90's there has been several studies in museum journals on the issue of providing online educational products (Drori, 2004; Karp, 2004; Muller, 2002b; Muller, 2002c; Semper, 2002; Soren, 2005; Steinbach, 2003) and by browsing through the proceedings of the main international conference on the subject of museums and the Web (<http://www.archimuse.com/conferences/mw.html>), it is obvious that the majority of the articles presented since the late 90's refer to the use of Web technologies for learning purposes. Web activities with an educational aspect were not controversial among staff in both case sites; rather they were acceptable and encouraged by museum managers (particularly since they were accompanied by external funding). Both the government and private sponsors appeared to have a strong interest in supporting museum activities with an outreach aspect. Thus, both museums were encouraged to direct their resources to this type of activities.

The fact that this area was recognised as a strategic priority for both museums resulted in the majority of the spending for Web activities being directed to educational/research related Web projects. In that sense, the two museums were no different than most UK and US museums, which treated investments in online educational programs as higher priority than the development of online income generating facilities like e-stores (Bearman & Trant, 2005). However, the output of Web activities, at least in terms of quantity/scale, depended on the resources available within the two institutions. The Science Museum due to its strong brand, internal expertise and IT infrastructure was able to develop several online educational resources, whereas the Geffrye museum due to limited resources could not follow the same pattern. The production of online educational resources in the Geffrye was constrained by budget. The majority of not-for-profit and public sector organisations face the same constraints regarding investments in IT (Bennet Thatcher, Brower, & Mason, 2006; Saidel & Cour, 2003). A survey by Cunningham (2001) found that the typical charity has only one person concentrating on IT, and 37% have nobody in this role, buying in outside help as necessary. In terms of museums, very few, if any, spend 1% of their budget on their web presence, despite the fact that for many museums the number of online visits is larger than visits to the physical site (Bearman, and Trant, 2005).

Although the availability of resources affects the total output of Web activities, it does not necessarily affect the value obtained from those activities. In the case of online educational resources, there are two dimensions through which the concept of value can be examined. The first one is the issue of the impact of the online educational resources to learners. An assessment of the learning effectiveness of the resources developed by the two museums by the author was beyond the scope of this study. Instead, the emphasis was on evaluating the extent to which the two museums conducted this type of evaluation. Assessing the educational value of an online museum resource can be complicated as the museum audience is so diverse in terms of age, interests, knowledge, and motivation that what the visitor wants from a learning experience is essentially unknowable in advance. Consequently, it becomes difficult to decide on the learning outcomes on which to measure the effectiveness of the resource. Previous studies have



made use of learning theories, as well as web design concepts (Brown, 2007; Clarke, 2001; Marchessault, 1997) in order to provide methodologies for evaluating the learning impact of online resources.

Relevant research, as well as the literature in IT value point to the fact that any technology whether Web based or not has more chances of being successful if users are involved during the process of development (Kohli & Devaraj, 2004). Both museums seemed to be equally interested in creating user-focused online resources. Their interest was the result of a user-centred culture present in both institutions and the fact, that most of those online resources were funded by external sources (sponsors often required evaluations to be part of project proposals). In both museums the teams involved in the development of online educational resources established user requirements at the beginning of their projects, had a clear idea about who they were trying to reach (age groups, level of education), and what the product/service would provide to those audiences. Depending on available resources, they consulted target users throughout the development process with front-end and formative usability testing to find out what the users needed.

Previous studies found that many museums do not incorporate regular user evaluation into the development of their websites (Haley Goldman, M. and Haley Goldman, K., 2005) and that they do not evaluate the learning impact of online resources to their users (Bishoff & Allen, 2004; Harley, Henke, & Nasatir, 2006). The findings of this study on the issue of user testing in both museums did not contradict the results of previous studies; rather they provided an explanation. Firstly the lack of availability of basic IT resources in the case of small museums (like the Geffrye) makes it difficult to conduct user evaluation of the websites and in the cases where museum resources allow user testing to be conducted, the testing centres on issues like interface and technical platform usability (like in the Science Museum). Most of the web evaluation conducted within the Science Museum was usability assessment and output assessment (the latter focusing on, for example, the number of Web hits or number of digital images created). The museum did not do much in terms of assessing the impact of those online services

to their audiences. Although longitudinal outcomes assessment is difficult to implement successfully in short periods (like the duration of a typical project), the cost of long-term outcomes assessment should be included in the planning of Web activities (Bishoff & Allen, 2004).

However, this was not the case in the Science Museum. The museum faced problems not only in planning long term outcomes assessment of their online educational resources but even using the results of summative usability evaluations. This point brings the discussion to the other aspect of value from online educational resources. This aspect involves the level of efficiency regarding the use of organisational resources for the development of those projects. Even in the cases where an online educational resource has achieved the desired learning impact, it is still necessary to examine if the result (in the form of contribution to the museum's educational mission) was worthy of the costs involved and if the same impact could have been achieved with a lower level of investment. The same process is necessary not only at a project level but also at the organisational level. A project can meet all of its deliverables on time and on budget and therefore be a success in a strict project management sense. But if the wrong projects are selected and resources are applied haphazardly, the true organisational objectives will likely not be met.

The proposals for large scale websites in the Science Museum included statements on sustainability, but the statements focused on the preservation of the digital objects, associated metadata, and the website as a fixed online publication. With the exception of the Ingenious project proposal, which contained some information about the in-house IT resources required for the long term support and updating of the website, there was not much thinking about the organisational sustainability of Web projects at their planning stage (e.g. length of life for online facilities, long term marketing costs, long term outcomes assessment costs, costs for changes to the original product based on summative evaluation results). However, sustainability planning is very important in terms of both achieving maximum value from a Web resource in the long term and facilitating the process of planning new web activities (through an improved awareness



of the indirect costs involved in supporting existing online facilities). Outcomes assessment should guide the development of new web activities (Bishoff & Allen, 2004) and long term marketing support is necessary to ensure that online educational resources attract enough visitors to justify this channel of delivery (QUEST, 2000). In the case of Making the Modern World Online, staff involved realised at the end of the project that they hadn't arranged marketing support for the long term and that it would be very difficult to make changes to the website, as it was not supported by a content management system.

The lack of planning beyond the end of a web project, within the Science Museum, also meant that there were limited opportunities of taking advantage of potential synergies between different web projects. The project director of Making the Modern World in a report by the Invest to Save Fund (Thornton, M., Quadri, K., and Collins, K., 2007) stated: "Although not originally incorporated in the project scope, concrete steps are also being taken to take advantage of possible synergies from integrating functionalities across other on-line publications and services provided by NMSI." However, taking advantage of those synergies is a very difficult task after the project has been completed (e.g. due to issues of compatibility and limited availability of funding), instead those issues should have been taken into account at the planning stage of the project and used to guide the development of the website.

The loose connection among the different web projects and between them and the museum objectives also meant that the Science Museum missed the opportunity to maximise the value obtained from online educational resources by not supporting them with other investments in infrastructure (both technical components and organisational processes). Previous studies have shown that organisations should transform their old accumulated resources (such as technical platforms, databases, and legacy information systems) to the Web in order for new investments in Web technologies to become productive (Hoogeveen & Oppelland, 2002; Kohli & Devaraj, 2004). Other researchers have proved that investments in training and process redesign (Kohli & Devaraj, 2004; Powell & DentMicallef, 1997), as well as organisational change management initiatives

running concurrently to systems implementation (Sherer, Kohli, & Baron, 2003) have a positive impact on the value obtained from IT. Despite the evidence about the need for complementary investments to support IT investments, many not-for-profit organisations and the public sector do not seem to think about those investments at the stage of planning the new systems (Bennet Thatcher, Brower, & Mason, 2006; Cats-Baril & Thompson, 1995). The result in the best cases is inefficient use of existing resources and in the worst cases limited functionality of the new information system.

In the case of the Science Museum the lack of a suitable museum-wide content management system made the development of online educational resources an expensive procedure. Different departments followed different processes for the creation and storage of content, which made it difficult for their colleagues from other departments to access the available content and use it for the development of printed or online products/services. Although the development of online educational resources was mainly funded by external sources and not the museum operational budgets, better content management procedures would have allowed them to spend more of that funding to other aspects of the project. Furthermore, the adoption of a museum-wide content management system does not have to be an expensive exercise, if the requirements are carefully planned in advance, and suitable processes and training are provided to museum staff (Rellie, 2006).

The lack of planning beyond the duration of individual projects in the case of online educational resources within the Science Museum affected another area, that of project prioritisation. Decisions on what web resources to develop and what level of investment to assign to each project were affected by internal politics and the lack of strategic direction characterising all web activities in the museum. First priority were Web projects with good chances of attracting external funding, as well as projects that accompanied museum galleries or temporary exhibitions. Any projects not belonging to those categories had limited chances of gaining the approval by the museum management despite their potential value for the museum. Furthermore, the level of spending on each project was not based on its degree of importance for the museum, but



on the individual preferences of staff, who had budgeting responsibility for gallery/exhibition development (as many Web projects were supported by those budgets).

Many organisations have reported that the process of prioritisation for IT projects is usually politically driven (CIO Insight, 2004). Obviously, departmental managers have incentives to support those projects, which are designed to support their own area of accountability rather than those that facilitate the achievement of the overall organisational objectives. The process of prioritisation is not easy and is fundamentally based on judgment and consensus. However, most organisations recognise the importance of rationalising their spending on the development of information systems. Several studies have found that clearly identified IT priorities (Powell & DentMicallef, 1997), effective means of prioritising requests for IT expenditure (Tallon, Kraemer, & Gurbaxani, 2000), and a well-developed explicit strategic investment rationale (Chatterjee & Grewal, 2002) have a positive impact on the value obtained from IT investments within organisations. The process of prioritisation of IT investments can be more efficient and effective if an organisation encourages the development of sound project proposals and has solid processes for evaluating and comparing these proposals, as well as a clear IT strategy (Glaser, 2006).

Project proposals should include information about the development costs, as well as costs associated with the ongoing technical support required after the end of the project. They should also include information about any additional training or staff changes required after the implementation of the project. Other than potential benefits from the project, the risks of not doing the initiative and any risks associated with the project implementation should also be included in the proposal. Managers should decide on projects based on a scoring approach, evaluating the different components of the proposals (e.g. strategic alignment, benefits, costs, risks). Furthermore, it is suggested that the group responsible for IT projects prioritisation should include a well-balanced spectrum of the organisation's senior leadership (Glaser, 2006). This balance enables all viewpoints to be heard, whereas the senior level of the participants adds a broad

strategic and operational perspective to the decision-making process. The team responsible for prioritising IT projects should also identify the resources available within the organisation, what these resources are currently engaged in and what they might be reallocated to do instead, before deciding on what projects will be completed and when.

The process of prioritisation described above was, in general terms, followed for IT projects in NMSI. The IT team had a clear strategic plan with detailed information on the projects planned for each year and their contribution in achieving the museum's objectives. The Head of IT was a member of the NMSI executive team and the e-committee had representatives from different museum departments encouraging cooperation between the IT team and museum managers during decision making. The PDU unit had project management experience and they were able to offer advice on relevant issues. Thus, the problems in planning were limited in the area of Web development and they did not characterise all IT activities within the museum. The discovery that despite the availability of expertise and infrastructure that could have supported the planning of web activities, there was no planning beyond the level of individual projects was puzzling. It also contradicted the findings of another study, which found that the depth of strategic thinking regarding Web issues among cultural heritage organisations generally correlated with the level of Web activity within the organisation (QUEST, 2000). As the Science Museum was very active in terms of Web development it was expected that their experience from previous web projects would have led to the adoption of a strategic approach to guide the planning of Web activities.

A possible explanation for the lack of planning of web activities within museums was provided by Bishoff & Allen (2004). They suggested that the perceived need for museums to prove they are one of the leaders in a relatively high-risk digital environment acts as a disincentive for planning online initiatives beyond the project level. Hall Aitken (2001) also claimed that because enhancements of information systems within not-for-profit organisations were often funded through specific project-related applications, planning is particularly difficult. A survey (QUEST, 2000)



suggested that a similar situation existed within cultural heritage institutions in UK. They found that only among a handful of organisations Web spending had its own central budget line; in most cases it was either non-existent or lost among other departments and that made planning very difficult. However, this study with the example of the Geffrye Museum shows that although the nature of funding that supports the development of online educational resources in museums encourages project based thinking; museums can still find ways to approach the development of those resources in a strategic way.

It gradually appeared that because the development of online educational resources started from the documentation department within the Science Museum (the people who created the content for those online applications), museum management saw it as an extension of the services provided by those sections in the museum and not as a strategic tool. Science Museum managers were aware of the Web products and services that museum teams produced, but as they were not involved in the development of those products they were not aware of the conditions surrounding their development. Project managers for obvious reasons presented the results of Web projects in the best possible way and as the majority of the funding for those projects was external there was no attempt by senior managers to get involved in the planning of those projects. The Head of IT was aware of the situation due to her close relationship with the Web Management team, however due to internal politics and the demands of her own post she was not able to provide strategic direction for Web related issues. The absence of a Web strategy and the lack of senior management involvement in the implementation of this strategy left Web development in the Science Museum without a clear direction.

The situation in the Science Museum is not unique among museums. Saxton & Game (2000) found that the development of their first website for many museums had been driven more by “us too” than by a clear plan for how the organisation could maximise its value. The QUEST study (2000) found that many museum or gallery websites began as the project of a single division or even that of an individual and as a result of it Web activities supported the aims of specific departments rather than the organisation as a

whole. In many museums, several years after the establishment of their main website, Web development was still a departmental issue. Postings by museum staff on the MCN-L mailing list (international discussion group on museums and IT: <http://www.mcn.edu/>) in March 2006 indicated that the primary responsibility for museum web activities was located within a variety of departments (IT, curatorial, marketing, education division), though it was more likely to be located within Communications or Marketing departments (Bearman, D. and Trant, J., 2005).

Bearman, D. and Trant, J. (2005) also found that museums which first launched their website between 2000 and 2004 had a much greater than average chance of having the responsibility for Web development located in the Directors Office. They suggested that this reflected the larger perceived risk following the dot.com bust and also the rhetoric of the web as a strategic venture. However, it is also possible that those museums that launched their website quite late were small in size, with limited budgets and a flat organisational structure. In those museums, like in the case of the Geffrye museum, senior managers are more involved in the day to day operations, instead of just concentrating on strategic issues, due to lack of staff resources. Thus, even if Web development is not of strategic importance for those managers, there are still more chances of them being involved in it. Another issue that points to the same direction is that many small museums need to outsource the support for their website, as well as the development of online educational resources. As those museums have limited in-house IT expertise and experience of Web projects, managers tend to assume the responsibility for the planning and the development of those resources in order to minimise the risks.

## *7.2 Income generation (B2C aspect of e-business)*

Many museums have an e-store just for the sake of having it, without realising its real potential (Zulkarnanen, 2002) and to a large degree this seemed to be the case in Science Museum. The museum had several e-stores, which were not developed as part of a coherent museum plan to take advantage of the potential for income generation



from the Web. The development of those sites was initiated either by the Web Management team or staff from the Trading Company and was approved by senior managers without much thinking. The initiatives were seen as an opportunity to improve the museum's financial situation and they were the result of pressure from members of the public to offer this type of online service. The absence of a long term plan behind the development of those e-stores resulted in lack of integration among those initiatives and inefficient use of the museum resources. Funding was directed to some initiatives without having a clear idea of what would make the service successful, the amount invested was in some cases (publications' e-store) inadequate and no effort was made to examine if the museum could integrate the front-end or the back-end support of those e-stores in order to make more efficient use of resources.

Furthermore, several opportunities to create a commercial proposal to accompany large scale online educational products/services were not taken up by the Science Museum. Project managers from traditional museum departments, were not interested in incorporating any commercial aspects in the planning of online educational initiatives. On the other hand, the Trading Company had no interest in some ideas that were referred to them, probably due to the limited profitability of existing income generating initiatives, as well as the fact that some of those ideas were passed to them at a stage, when the benefit would not have necessarily justified the investment required to support the initiative (e.g. after those resources had been launched). As there was no Web strategy or any other mechanism to bring together educational and commercial objectives during the development of Web projects, as well as encourage cooperation between staff from traditional and commercial museum departments, several opportunities to generate revenue through the use of Web technologies were missed.

Although the lack of strategic direction resulted in inefficient use of organisational resources and missed opportunities to generate income, there could have been a chance for the Science Museum e-stores to be successful if other aspects of the service had been of high standards. There are several factors, which can affect the success of an online store, like the level of customer awareness about the site, the product availability

and prices, website issues like security of transactions and usability, a good after sales service and a website design that encourages repeat visits (Farthing & Stocking, 2005). A detailed examination of all those aspects of the Science Museum e-stores was beyond the scope of this study. However, it is reasonable to assume that as there was no suitable monitoring of the performance of the e-stores by museum managers, there were limited chances of improving any aspects of the service. Thus, existing problems with the e-stores remained unresolved.

Despite the limited success of the Science Museum e-stores, e-stores can be successful museum ventures, two of the best examples being the Boston Museum of Fine Arts and the Tate (QUEST, 2000). However, this is not a “one size fits all” situation and the success of any e-store initiatives, among others, depends on how well they fit within the general museum strategy. Investing large amounts on developing e-stores does not seem to guarantee the success. Instead, it’s only when these initiatives are part of an integrated approach to Web investments and different aspects of the service are evaluated that museums can ensure that the right amount of spending is directed to enhancing the areas of the service that need it most. Although online transactions offer potential efficiencies for not-for-profit organisations, those efficiencies are limited if e-commerce is carried out as an add-on to normal retail channels or on too small a scale (QUEST, 2000).

Furthermore, the development of an e-store can be an expensive proposition for small museums. Other than the initial development costs, there are long term costs involved like renting space on a secure server to support online transactions, keeping the site updated, providing back-end administrative support (e.g. packaging and distribution). Although, there are several “shop-in-a-box” solutions available that claim to provide e-commerce functionality, in reality these need tweaking and changing to fit the look, feel and purpose of the museum’s online presence. Implementing a successful e-store solution requires a range of skills, both technical and commercial within the museum. The Geffrye museum was poorly prepared for online retail sales due to limited staff resources and lack of experience in any retail activities not connected to a physical



outlet. Thus, the development of an e-store for the Geffrye museum would have been a very risky investment and for that reason managers decided not to invest until there is a change of the situation within the museum.

The absence of subscription models for online access to digital content in both museums was probably due to the fact that in order to justify any monthly or annual payments the museums would have to offer new or additional material of high quality and depth. The development cost of this type of material can be high (QUEST, 2000) and securing funding for projects of that size is not easy, especially for small museums like Geffrye. Furthermore, in the cases where digital content of high quality was developed and could have been offered to the public through a subscription business model (e.g. Ingenious website in the Science Museum) there were internal disagreements about what portion of that material should be available for free and what should be charged through subscription, as well as who should be responsible for setting up the service. Those disagreements, which were due to the reluctance among staff from the traditional museum departments to engage in commercial activities, were not unique in the Science Museum. QUEST (2000) claimed that all cultural heritage organisations exploring subscription to online content, as a source of potential revenue, were wrestling with the same questions.

The evidence from both museums regarding the take up and the success of online sponsorship and online fundraising pointed to a slightly different direction. In the case of online fundraising, because fundraising is considered one of the core activities of museums, the expectation was that both museums would be quite active in this area. Furthermore, because online facilities for processing virtual transactions like donations or memberships do not require a large investment, smaller museums like the Geffrye could engage in online fundraising. A facade approach, where the individual orders over the Web but the back-end is all traditional retailing (i.e. the order is then printed and processed manually) could be sufficient (QUEST, 2000). However, none of the museums had an online donation/membership facility. The absence of an online donation/membership tool for individuals in both museums seemed to be due to the

nature of the fundraising activities within the two museums. The main focus of the sponsorship program of both museums was on securing donations from governmental bodies, foundations or corporations, whereas there was limited interest in securing donations from individuals. Considering that museums and art organisations in the US have been quite successful in generating income from individuals' donations (Toepler, 2006b; Waters, 2007) and initial investment for an online tool of that sort is quite small, this would have been an activity with a great potential value for both museums.

Overall, the two museums had a varied amount of success in terms of their revenue generating web activities. On the one hand, the Science Museum invested a considerable amount experimenting with this kind of activities without obtaining much value, mainly because those initiatives were not dealt with in a strategic way. The potential value of different types of income generating Web activities was not examined carefully before making any decisions and there was no suitable evaluation of the performance of those services that could have improved future decision making. On the other hand, the Geffrye Museum, mainly for strategic reasons, did not invest in income generating Web activities. The museum's limited resources did not allow any space for experimentation in that area and managers chose to use their resources to fund other web activities that they considered more central to the museum's mission.

The view that income generating Web activities were not central to the museums mission was not held only by managers in the Geffrye museum; it was widespread within both institutions and affected the planning and development of Web activities in both museums. This is not the first study to provide evidence of negative staff attitudes to commercial activities within not-for-profit organisations. A survey among cultural heritage organisations (QUEST, 2000) found that in many institutions there was a conflict of values, between making content freely available on the Web to increase access or provide educational services, and exploiting that content commercially to earn revenues, whether direct from users, or indirectly through advertising and sponsorship. In the UK museum sector, the work of directors has been described as "a constant tug-of-war between artistic mission and commercial consideration." (The Economist, 2001)



and in the US the perceived commercialisation of museums and other cultural heritage institutions hasn't been greeted with unanimous approval by their staff (Bishoff & Allen, 2004; Toepler, 2006a). Research on market orientation in cultural not-for-profit organisations indicates that there is often suspicion about business practices being introduced because of fear that they will divert the organisation from attention to its traditional mission and values (Bennet Thatcher, Brower, & Mason, 2006; Gainer & Padanyi, 2002).

Many employees of not-for-profit institutions retain attitudes that characterise the values associated with a market focus as "evil" (Andreasen & Kotler, 2003) and there are areas of the social sector, where there is a general resistance to any ideas from the commercial sector (Andreasen, Goodstein, & Wilson, 2005). Weisbrod (1998) provides one of the most concise frameworks of the commercialisation issue within not-for-profit institutions. Weisbrod claims that not-for-profit organisations produce both public and private goods and managers have clear preferences that shape the product mix. The public good output, such as collection, conservation, scholarly research and education in the museum case, is the most preferred, but it requires potentially limited public subsidies and sponsorship. To supplement support through private sponsorship and funding from the government, not-for-profits also produce private goods. Private goods are preferred if they are closely related to the mission, such as admission charges for special exhibitions. Other private goods that are indirectly related to the mission, such as auxiliary activities (e.g. an e-store), are non-preferred and will only be produced at a minimum, unless income through donations and public subsidies is insufficient to finance the desired level of public good output.

Once non-profits' managers engage in private good production, there is the fear that financial considerations will override mission considerations. Although competition can sharpen the organisational senses, it can also keep not-for-profit institutions on a "treadmill", where they spend more time searching for the next income generating innovation than improving what they already know works in enhancing their impact (Light, 2002). Not only there is a fear among not-for-profit organisations of losing their

traditional orientation but also the fear of losing the public trust on which they ultimately depend (Salamon, 2002). In 2006, a controversial private business deal with a cable channel and a review of the compensation packages of senior management staff of Smithsonian Business Ventures brought the Smithsonian Institution under the direct scrutiny of the US Congress (Toepler, 2006b).

It may be that those fears persist in some not-for-profit organisations because ideas brought from private-sector management theory have often been portrayed as potential substitutes for traditional not-for-profit practices, rather than complementary to existing practices. Employees of not-for-profit institutions earn lower salaries on average and are typically more concerned about their organisation's mission. They often choose careers in the not-for-profit sector, because they do not like the ruthless competition of the corporate environments. The not-for-profit culture is one that strongly values its mission over strict attention to efficiency and effectiveness - concepts more often associated with the business world. Unless managers can show that the new values do not threaten important core orientations, the negative staff attitudes will persist.

For managers of not-for-profit institutions, a possible way of changing the negative staff attitudes and developing more performance-enhancing cultures is the provision of actual experience with market research, client surveys, and interdepartmental information sharing to their employees (Gainer & Padanyi, 2006). Science Museum managers could have encouraged staff to support income generating Web activities had they circulated evidence that the museum public was interested in the museum's e-stores or that specific audiences were willing to pay for access to online digital content. Museum staff also need to be convinced that income generating Web activities are related to the main function of the organisation and they are not necessarily risky. Strategic plans are needed to demonstrate how online ventures and the income they generate are related, and possibly essential, to the future of the museum (Zulkarnanen, 2002). Finally, contingency planning is necessary to guard against short-term losses and the possible decline of the business conditions in the long term (Toepler, 2006a), otherwise the lack



of success of the museum's commercial activities will discourage staff from supporting them or any future investments in similar activities.

### *7.3 E-procurement (B2B aspect of e-business)*

The two case sites were aware of the opportunities available in this area and they were prepared to test the new technologies (e.g. e-auction participation in the case of the Science Museum). However, their actual involvement in any B2B e-commerce activities was very limited. Their interest in e-procurement was to a large degree the result of the pressure from the DCMS for efficiency savings. However, none of the museums was convinced about investing in e-procurement the necessary resources to make it a reality. Evidence from both museums showed that managers were reluctant to move to this direction because of two reasons: a) an uncertainty regarding potential benefits and b) limited availability of resources.

The uncertainty about potential benefits in the case of the Geffrye Museum could be due to the lack of specialist procurement staff (e.g. staff holding a qualification from the Chartered Institute of Purchasing and Supply or the Government Procurement Service or with experience in procurement) that could have endorsed the benefits of potential investments in e-procurement. Another factor that could have encouraged the uncertainty about the potential benefits is the lack of suitable indicators measuring procurement performance in both museums. The information that both museums collected was based on their finance systems, so they knew who had been paid, how much, and under which expenditure. However, they did not collect any other information that could help them evaluate the efficiency of the service (e.g. the average cost to process a purchase order through to payment). Suitable procurement performance indicators could have provided both museums with an estimation of the potential savings from implementing e-procurement and could have persuaded them to proceed with e-procurement implementation.

It is also possible though that the two museums were not convinced about implementing e-procurement because the estimated benefits did not justify the cost involved. Dai & Kauffman (2002) found that one of the difficulties facing e-procurement implementation in small organisations was the small transaction volumes associated with these organisations' scale of business. In organisations like the Geffrye museum potential benefits from e-procurement might not justify the costs involved, due to the small volume of transactions that can be completed online. Furthermore, museums because of the nature of their activities are far more likely to procure services than goods. In a study about procurement practices among DCMS funded institutions that included some of the largest museums in UK, "professional services" was identified as the second largest category of procurement spends (National Audit Office, 2005). Because transactions for services are less likely to be conducted electronically (QUEST, 2000), organisations that spend a large percentage of their budget on the procurement of services, have less to benefit from e-procurement.

Even in the case of the Science Museum, with procurement expenses reaching 3 million pounds (2004 figure); the amount of transactions that could have been completed online depended on the availability of online suppliers. Some suppliers might be discouraged to participate in an e-marketplace, if they perceive it to be "buyer-led" (Baxter, 2007), which could be the case with the Zanzibar portal that was supported by the government. Furthermore, even in e-procurement options, where there are no subscription costs involved for suppliers (like in the case of the Zanzibar portal), companies will not invest time and effort into loading their content on to the system, unless they know there will be sufficient demand by buyers. Furthermore, for a large organisation like the Science Museum in order to maximise the volume of transactions completed through an e-procurement system and obtain full savings, they would also have to review their procurement processes and remove any manual processes. The review would involve an extra cost added to the required investment in infrastructure and the subscription costs involved in the implementation of an e-procurement system.



Yen & Ng (2002) found that organisations considered the costs and development time required to set up online procurement systems, enabling these systems, and meeting workforce requirements of such systems prohibitive and discouraging. The restructuring of business processes that may be involved in the implementation of those systems can also act as a deterrent for many organisations. Day, Fein, & Ruppertsberger (2003) noted users' reluctance to be subjected to significant changes in business processes as a major barrier to the implementation of e-procurement systems. Staff might resist to learning how to use e-procurement systems, especially when other older and competing means of purchasing are still being supported by an organisation, such as the use of procurement cards and expense submissions.

The above-mentioned reasons and the fact that not-for-profit organisations are usually reluctant to invest in high risk activities provide a reasonable explanation about the strategic decision that was made by the two museums not to implement e-procurement systems. The two case sites were not unique among non-commercial organisations in terms of their attitude towards e-procurement. Prier & McCue (2007) showed that the perceived high cost of implementing e-procurement procedures was the number one obstacle to adopting e-procurement among US public sector organisations. Local councils in England did not seem to be certain about the costs of e-procurement either. Bradley (2006) found that local councils in England had underestimated the costs of e-procurement implementation and miscalculated the potential savings.

For some organisations there is the potential for huge savings with the implementation of e-procurement systems (Thomson, 2007). The British Library reported benefits like reducing tender cycle times and administrative costs from the use of an electronic tender system (Vail, 2005) and the Imperial War Museum found that the use of suppliers' web-based ordering systems by their facilities management team resulted in improved record keeping, reduced administrative costs and price savings (National Audit Office, 2005). However, just like other types of information systems, investing in those systems does not guarantee the success. E-procurement should be approached strategically; potential

benefits should be weighted against direct and indirect costs and decisions should be made to proceed in the direction of implementation only if there is a good business case.

#### *7.4 Operational efficiency and internal communication*

One of the main priorities for both museums, mainly due to government pressure, was to improve operational efficiency. However, the use of Web technologies with the aim of improving operational efficiency and collaboration did not appear to be a strategic priority in the two museums. The implementation of Web technologies within the two museums initiated a review of existing processes and technical infrastructure, led to improvements in research, reduced the cost of some internal operations, and was used to communicate and disseminate information internally with different degrees of success. However, the benefits obtained were the result of initiatives from individuals at different organisational levels and not the result of an organised effort supported by a museum-wide strategic plan.

One of the causes for the lack of planning could be that senior managers in both museums were not aware that Web technologies could improve operational efficiency. Although there is enough evidence to support that Web technologies have a positive impact on operational efficiency and collaboration (Bloch, Pigneur, & Segev, 1996; Feeny, 2001; Fitzgerald et al., 2005; Sanders, 2007; Zhuang & Lederer, 2003) a large portion of the relevant literature is based on evidence from commercial organisations, examining the impact of those technologies on the corporate value chain. Existing literature on the potential benefits of Web technologies for not-for-profit organisations covers mainly the impact of those technologies on areas like access to information, marketing and income generation. The few studies that examine the impact of Web technologies on operational efficiency suggest that this has been the least well supported strategic objective by the Web activities of not-for-profit institutions (Cukier & Middleton, 2003; Hall Aitken, 2001; Saxton & Game, 2000). The lack of examples of best practice and success stories in this area combined with the risk adverse attitudes that characterise not-for-profit management could explain, at least partially, the lack of



interest by senior managers in using Web technologies to improve operational efficiency within the two museums.

Another possible cause could be that although operational efficiency appeared as a strategic priority in documents in both museums, it was not considered by senior management as important as other objectives that were directly related to the museum's mission (e.g. learning and education). Previous research has suggested that the organisational culture within some not-for-profit institutions can be reluctant in adopting "business like" practices and issues like organisational efficiency are not seen as vital as the support of the organisation's mission (Frumkin & Andre-Clark, 2000; Liao, Sargeant, & Foreman, 2001). Sometimes, due to external pressures, an organisation might advocate one culture but in reality it might practise another (Mulhare, 1999). Deeply-held beliefs and unspoken assumptions develop over time to become the foundation of an organisation's culture. They are visible in the practices and structures that determine the way that work gets done on a day-to-day-basis. As a result, an organisation's culture can have a significant impact on its ability to execute a chosen strategy.

The Intranet project in the Science Museum was the only Web project aiming to improve internal collaboration that was part of an integrated strategic plan (though it was owned by the IT team and was treated as an investment in the museum's IT infrastructure). This was mainly the result of increasing internal (trade unions) and external (DCMS) pressures to improve communication within NMSI, which arose after the end of the restructuring. The use of Intranet solutions, as a means of information dissemination is not uncommon among cultural heritage institutions (QUEST, 2000) and other not-for-profit organisations (Quinn, L., 2007). For an organisation like NMSI, which had several sites distributed geographically and a few of their main operations located only on one site (i.e. IT support, HR, Finance were located within Science Museum) an Intranet seemed to be one of the most obvious ways of improving internal communication. Despite the support by the Head of IT, the project did not meet the museum's expectations, because it was not accompanied by the required investments in

other areas that would have allowed the technology to become a useful communication tool.

Museum management did not realise that other than hiring an Intranet manager to take care of the technical side they also had to invest in changing the attitudes of museum staff and persuade them to add information to the Intranet in addition to viewing it. This is not a challenge faced only by managers of not-for-profit organisations. Only 44% of 2,000 business users surveyed in 2005 by Forrester Research said they could easily find what they were looking for on their Intranet (Blackman, 2007). And in a survey of 1,000 middle managers of large companies in the US and UK, released by Accenture in 2007, 59% said that they miss information that might be valuable to their jobs on a daily basis because although it is located somewhere in the company, it is difficult to find it (Blackman, 2007). The situation is more complicated within not-for-profit organisations, as staff are usually hard-pressed and want “just in time” solutions and not another set of tasks. Any technology will generally need to be seen as making life easier in order to be taken on enthusiastically by staff. Nurturing the potential of an Intranet can be a challenging process for a not-for-profit organisation. The American Lung Association ([www.lungusa.org](http://www.lungusa.org)) reported that after a major redesign of their Intranet and although there had been consistent growth in usage, it took staff four years to reach the point, where it was simply an expected part of their job to consult and contribute to information on their Intranet (Quinn, L., 2007).

Sometimes the cost of transition to new structural forms in order to make the most out of collaborative Web technologies may be perceived by managers as being prohibitive (Power & Singh, 2007). However, as this appears to be the only way for an organisation to maximise the value derived from those technologies, managers need to make plans and commit the resources required for a successful transition. Such a transition could manifest itself at a systems level and be characterised by the need to examine systems for managing data, the nature of technical platforms, and legacy systems currently in place (Triantafillakis, Kanellis, & Martakos, 2005). At the organisational level, such a transition would require the development of new processes (Kohli & Devaraj, 2004;



Moitra & Ganesh, 2005; Segev, Patankar, & Zhao, 2003), or even the involvement of new structures, roles and competencies for the management of such processes (Powell & DentMicallef, 1997; Power, 2004). The changes at system level were not a concern for any of the two museums. The reason for this was that those changes are easy to achieve, as soon as the necessary financial and staff resources become available. It was the changes at the organisational level that were the challenge for both museums.

In the Science Museum there was a need to embed the use of available Web technologies within the processes of different departments and to change the negative staff attitudes regarding information/knowledge sharing. However, none of the senior managers in the Science Museum assumed the responsibility for carrying out those changes. There were no attempts to evaluate the internal impact of Web applications, like the two large scale websites (Ingenious and Making the Modern World), to change departmental workloads or support staff where necessary with the required resources and enable them to respond to the increased demands of the public. Furthermore, managers did not realise that they had to persuade staff that Web technologies would save them time and money or to introduce in-house training for non-specialist staff to help develop pro-active departmental involvement in developing the museum's website. As a result of this, staff from specific departments had no interest in making use of the available web technologies.

Managers made no effort to find out the source of the negative information sharing attitudes and deal with it, so as to increase the use of the Intranet. Organisational cultures that emphasise individual power lead to information hoarding behaviours, whereas open and supportive value orientations are predisposed toward constructive knowledge behaviours, such as staff sharing data with others (Alavi, Kayworth, & Leidner, 2006). Employees that perceive the information as a way of securing their position within the organisation will be reluctant to share it (Barlow & Li, 2005) and the availability of technology that facilitates information sharing will not make a difference. On the contrary, a propensity to share and perceived organisational ownership of information can lead to greater use of collaborative media (Jarvenpaa & Staples, 2001).

The senior managers in the Science Museum should have made an effort to address negative organisational values concurrently with the implementation of Web related projects.

There is little research that directly addresses the issue of managerial intervention to promote positive values among staff regarding IT use (Leidner & Kayworth, 2006). However, Grover et al. (1998) suggested that a strategic planning culture at the top of the organisation facilitates recognition of the importance of information systems investments among staff. In the case of the Geffrye museum, the Assistant Director had the main responsibility for strategic decision making for the Web. Her involvement in the development of Web projects and her extensive knowledge of the museum operations allowed her to evaluate the impact of Web technologies to the activities of different museum departments. Consequently, she was able to make changes in processes and working practices that allowed the museum to maximise the value obtained from its Web activities.

Furthermore, the work of the Assistant director was facilitated by the flat organisational structure and the lack of bureaucracy in the Geffrye Museum. There are different opinions regarding the role that the organisation's size plays in the process of information technologies' diffusion. On one hand, larger organisations have a higher propensity to adopt Web technologies due to their ability to absorb risks related to technological development and preferential access to capital markets (Ramsay & McCole, 2005) or funding in the case of not-for-profit institutions. Small not-for-profit organisations that can not afford an IT department tend to be in the most difficulty with new technology, as the external services they hire to run their systems are often variable, and costs often spiral out of control (Cunningham, 2001). On the other hand, large organisations tend to be less agile and flexible than small ones. The actual use of e-business technologies involves changes in processes and structures, which might be hindered by the structural inertia of large firms (Zhu & Kraemer, 2005). Small organisations require less communication and less coordination. This makes it easier to



achieve good synergy between different units, which is considered a key IT-related organisational capability (Aral & Weill, 2007).

### *7.5 The need for strategic alignment and engagement of senior management in the planning and development of Web activities*

In the discussion of the research findings that has been conducted in the previous sections, two themes appeared to be the most influential regarding their impact on the value obtained from the Web activities of the two museums. The first one is the strategic alignment of Web activities and the second is the engagement of senior management in the planning and development of Web activities. Strategic alignment refers to the degree to which the priorities, goals and objectives of Web systems' development within the museums are aligned with the priorities, goals and objectives of the institutions' strategies. It involves issues like the existence or the lack of a Web development strategy, the vision for the role of Web technologies within the two organisations, major decisions regarding Web technologies within the two organisations and even the relationship between museum management and the Web Management team.

Henderson & Venkatraman (1993) describe the interrelationship between business strategies and IT strategies in their Strategic Alignment Model (SAM). They state that alignment is the degree of fit and integration among business strategy, IT strategy, business infrastructure, and IT infrastructure. Strategic integration is the link between business strategy and IT strategy, reflecting a set of external factors with the aim of gaining competitive advantage, and operational integration is the link between organisational infrastructure and processes, and IT infrastructure and process. Good alignment means that the organisation is applying appropriate IT in given situations in a timely way, and that these actions stay congruent with the organisation's strategy, goals, and needs (Luftman & Brier, 1999). Ideally, alignment should be present at all levels of an organisation, including the organisational level, system level (Campbell, Kay, & Avison, 2005), and the individual/cognitive level (Tan & Gallupe, 2006).

The evidence from the two case sites shows that the strategic alignment of Web activities can increase the value derived from those activities in several ways. It results in a more focused, strategic spending on Web technologies, it encourages sustainability planning and the use of complementary investments to support Web technologies, and it facilitates the development of positive staff attitudes to Web activities by establishing a link between those activities and the museum's objectives. In particular, the clear link between the strategic priorities of the Geffrye Museum and the Web planning process in the museum resulted in the museum's limited resources being directed to the development of online educational resources like the Kids zone, instead of an e-store. Those online learning resources had a positive impact on the museum's educational mission, which was the museum's first priority; whereas the development of an e-store would have demanded considerable resources without guaranteeing adequate revenues (sections 7.1 and 7.2).

On the contrary, the lack of strategic alignment affected Web projects' planning within the Science Museum in a negative way. The allocation of resources for the development of online educational services was not guided by a museum wide Web strategy, but was influenced by internal politics and the availability of funding. The result was that Web projects with cross departmental benefits (e.g. the re-design of the main website) or projects with long term benefits or innovative web applications that did not accompany museum galleries or temporary exhibitions could not be implemented despite their potential value for the museum (section 7.1). Furthermore, funding was directed to income generating Web activities without a clear idea of their potential value for the museum. In some cases the level of investment was insufficient to support a good service, because the initiatives were treated as experiments instead of concrete steps towards the achievement of an overall strategy (section 7.2). Whereas some web activities received inadequate funding, there were other aspects of the museum operation like operational efficiency and internal communication that were not even considered by museum managers, as potential areas for investments in Web technologies (section 7.4).



Previous research has found that greater business - IT strategic alignment, which is an outcome of knowledge integration between business and IT, improves IT project planning by facilitating more rational IT investments (Ein-Dor & Segev, 1978), and the ability to estimate the resources required for various IT projects (Walsh & Kanter, 1988). The business - IT knowledge integration implicit in greater strategic alignment can also facilitate the identification of the gap between current and future states of the organisation, and the identification and prioritisation of IT projects that help reduce this gap (Luftman & Brier, 1999). An organisation may possess unique IT resources, but such resources will not lead to high performance, unless they are used towards the achievement of the organisation's strategic priorities. Alignment can lead to more a more focused and strategic use of IT resources which, in turn, can lead to better performance (Chan, Sabherwal, & Thatcher, 2006). Greater alignment between an organisation's strategy and IS strategy implies that the information systems are targeted on areas that are critical to successful organisational performance.

The lack of strategic alignment of Web activities in the Science Museum did not affect only the process of prioritisation but also other aspects of the planning process. Due to the absence of long term Web objectives, there was no sustainability planning for online resources, which would have increased the value from those resources in the long term (section 7.1). Project managers not only disregarded the need for sustainability planning, but also did not consider the need for complementary investments to support investments in Web technologies. The result was that the lack of compatibility between existing systems, processes and recently implemented Web technologies restricted the value obtained from those technologies (sections 7.1 and 7.4). Finally, as Web development in the museum was approached on a project by project basis and not as a set of steps towards the achievement of an overall strategy, there was no integration among different components of the museum's e-stores that could have resulted in a more efficient use of resources (section 7.2). Kohli & Devaraj (2004) suggest that investing in complementary assets is the second step in the IT alignment process. An organisation can expect meaningful payoff only when its IT investments are

accompanied by changes in processes and staff development. Similarly, Dierickx & Cool (1989) stress the importance of the interconnectedness of a resource with other strategic complementary assets and emphasise the strategic alignment of an organisation's existing resources over time.

Previous research demonstrated that the above mentioned problems in planning Web activities within the Science Museum, which were caused by a lack of strategic alignment, are not uncommon with regards to the IT function within public sector or not-for-profit organisations. A report by the National Audit Office about IT-enabled projects in the public sector found a tendency among managers to skip over the "business case" and dive straight into a detailed specification of what technology was required, without setting clear objectives for those projects (Jones & Williams, 2005). However, if the aim of a project and its value for the organisation overall is unclear, the technologies will be poorly designed and implemented. Moreover, there will not be enough consideration of the strategic change management and people issues that are vital to the successful implementation of any IT project. Bennet Thatcher, Brower, & Mason (2006) suggested that the reason behind mismatched and decoupled IT systems often found in not-for-profit institutions was that IT is relatively loosely coupled to the organisation's decision making and other goal-related activities.

The degree of strategic alignment of Web activities in the two museums had an impact not only on the process of planning of those activities, but also on the way museum staff perceived those activities after their launch. A clearly established link between the objectives of online educational resources and the museum strategy in both case sites meant that managers were able to direct a lot of funding to this category of Web projects without bringing up controversy among their staff (section 7.1). On the contrary, Science Museum staff from traditional departments were reluctant to participate in the development of income generating Web activities because managers failed to establish a clear link between the objectives of those activities and the museum's strategy (section 7.2). Previous studies suggested that when the consequences of individual IT projects are clearly linked with an organisation's planning, IT



investments have a chance of becoming catalysts of organisational change instead of discrete expenses (Strassman, 1997); whereas when it is unclear what a technology is for, people will see the technology as an extra burden (Jones & Williams, 2005).

Although the majority of the studies, which suggest a positive relationship between strategic IT alignment and organisational performance, have examined IT investments in general (Chan & Reich, 2007), there are a few studies that have discussed the issue in relation to investments in e-business. Kearns (2005) found that organisations that failed to align their e-business strategies with their organisational strategies were not as profitable as those with high e-business strategic alignment. Rival & Kalika (2005) discovered a positive relationship between Web strategy alignment and Web performance. They also found that the organisational dimension of strategic alignment, which involved the creation of new organisational processes for the Web activity and the level of integration of those technologies within the different departments, had the highest influence on Web performance.

Previous studies in the commercial (Luftman & Brier, 1999) and the not-for-profit sector (Hartung, Reich, & Benbasat, 2000) have suggested that the actions of senior managers are very significant in achieving strategic IT alignment. Studies in small organisations have demonstrated that senior management involvement in IT planning may be more important than formal planning procedures in achieving alignment. In a study of small manufacturers, Cragg, King, & Hussin (2002) found that many of the manufacturers had achieved a high degree of alignment between their business strategy and IT. However, only a quarter had formalised their IT strategy (26%), so most of the IT planning was carried out informally. The researchers suggested as an explanation to this result the fact that small firms could be well aligned even in the absence of formal IT planning procedures, because the level of communication is high and individuals (including senior managers) play multiple roles. Pyburn (1983) also discovered that in environments with informal personal relationships between the IS manager and senior management, the formal IS planning does not appear to be a critical determinant of IS

effectiveness. Thus, in small organisations, it is possible to achieve strategic IT alignment through the involvement of senior managers in the process of IT planning.

The Geffrye museum did not have a strategic IT plan or a Web strategy. However, the involvement of senior management in the planning and development of Web activities resulted in the alignment of those activities with the museum's strategy and consequently improved the value obtained from them. The Assistant Director brought a broad strategic and operational perspective in the planning and development of Web activities, which resulted in a more efficient use of the museum's resources. Her vision that represented to a large extent the museum's vision provided the basis for integrating the museum's efforts in this area. Without her leadership that went beyond reliance on the Web administrator, the impact of Web activities would have been silo-based and museum staff would not have managed to embed the use of Web technologies in their daily activities.

An enterprise-wide perspective is required to ensure that organisational change initiatives that support Web-related investments are managed as part of an overall program of enhancing the performance of an organisation. The magnitude of organisational transformation requires commitment and support at the top (Chatterjee & Grewal, 2002; Hoque, Sambamurthy, Zmud, Trainer, & Wilson, 2006). A board member or senior director with belief in the Web can be the catalyst for changing internal dynamics within a museum and is in a position to push for the necessary funding. A senior manager can ensure that the Web is on the strategic agenda of a not-for-profit organisation and can help resolve any disagreements or disputes that might arise as a result of that (Saxton & Game, 2000). The Metropolitan Museum of Art - widely accepted as one of the most advanced online museums - has a "Museum Internet Task Force" which is chaired by the museum's senior vice president for external affairs and includes among its members both the director and the president of the museum (QUEST, 2000).



Previous studies have demonstrated that top management championship is important in encouraging the assimilation of IT (Lewis, Agarwal, & Sambamurthy, 2003; Purvis, Sambamurthy, & Zmud, 2001). In organisations where senior managers believe that Web technologies offer a strategic opportunity, their beliefs serve as powerful signals to individual managers, groups, and departments about the importance placed on Web assimilation. Further, through their beliefs and participation, senior management can legitimise the willingness of middle managers to spend their time and energy in making sense of the Web technology, exploring ways in which the technology's functionality could be leveraged into the departmental processes and activities, and justifying the viability of specific Web projects. Both the beliefs and the participation of senior management in the planning and development of web activities can lead to a gradual change in the organisational culture that facilitates the use of Web technologies by staff.

### *Conclusion*

The number and the scale of Web activities in the two museums was the result of the amount of resources available within each organisation and their previous experience with Web activities. The Science Museum due to their IT infrastructure, their strong brand and the expertise available managed to produce a great number of online educational resources and to experiment with income generating Web activities like e-stores, whereas the Geffrye museum did not engage in the development of large scale online educational resources or an e-store. Web technologies available in the two museums were used by staff to improve their departmental operations and internal communication despite the fact that there were no plans to use those technologies in this way and although none of the museums implemented e-procurement, staff benefited from the automation of different parts of the procurement process and the use of purchasing cards for online purchases of museum supplies.

However, the extent to which the Web technologies implemented within the two museums contributed to the museums' performance was not contingent on the amount of resources invested in those technologies but on the museums' organisational

practices. The strategic alignment of Web activities and the engagement of senior management in the planning and development of those activities appeared to have the most significant impact on the creation of value from Web technologies. In the Science Museum the weak alignment of Web activities with the museum's strategy affected many aspects of the process of planning. It resulted in lack of changes in systems, processes and staff attitudes required to support the use of Web technologies, as planning was restricted to the level of individual projects; it caused problems in the process of prioritisation, as there was no rationale behind the museum's spending on different Web projects; and it limited the value from Web activities in the long term, as there was no sustainability planning.

The greater strategic alignment of Web activities in the Geffrye museum, which was achieved through the engagement of senior management in the planning and development of Web technologies, resulted in better use of those technologies throughout the museum. Although the lack of a Web strategy, addressing the main museum objectives, meant that some areas of the museum operation (e.g. operational efficiency) did not receive adequate support, in terms of investments in Web technologies; the senior managers' involvement in the planning of Web activities resulted in more efficient use of the museum's resources. The broad strategic and operational perspective that top managers brought in the process of prioritising Web projects resulted in more rational investments and better estimations of the resources required for the various Web projects. Furthermore, their involvement in the development of Web projects provided them with the opportunity to create the right conditions (e.g. by changing staff workloads and departmental processes) that enabled staff to embed the use of Web technologies in their daily activities.



## CHAPTER EIGHT: CONCLUSIONS

### *Introduction*

This concluding chapter presents an overview of the core implications that have been developed in this thesis. It draws together significant aspects of the research design, case study and analysis. The first part of this chapter provides a summary of core contributions to theory, literature and practice. The second part is a discussion of the limitations of the research design and the implications these held for the treatment of the case study and the thesis outcomes. Finally, in the last part of the chapter some selected areas for future research are examined.

### *8.1 Core implications for theory and practice*

#### *8.1.1 Significance of the findings*

One of the main contributions of the thesis is that it draws attention to two theoretical concepts that could have a dramatic effect on the value obtained from Web technologies within not-for-profit organisations and which have received little attention by IS researchers in the past. The two core concepts that emerged from the data analysis, strategic alignment and senior managers' involvement in the process of planning and development of Web technologies have not been adequately discussed within the context of not-for-profit organisations and in relation to the particular type of technology. Only a few empirical studies have examined those concepts in relation to the value derived from Web investments (see sections 2.3.4 and 7.5), and even fewer studies (if any) have examined the impact of strategic IT alignment in not-for-profit institutions. These two theoretical concepts provide not only an explanation for the way Web technologies affected different aspects of the operation of the two case study museums but also directions for future research, which can examine their relevance and the extend of their impact to a variety of not-for-profit organisations.

Both IS researchers and practitioners are familiar with the concept of strategic IT alignment. The concept appeared in the IT value literature in the 90's, as one of the organisational factors that could have an impact on the value obtained from IT investments (see section 2.3.2 of the thesis). Researchers examined IT alignment, as well as a number of other contextual factors in an attempt to explain why companies that invested the same amount in IT and had the same objectives experienced different performance effects. Those studies discovered a connection between a number of organisational factors (e.g. re-engineering, open communications, CEO commitment, strategic IT alignment), IT investments and organisational performance. However, in most cases, the results of those studies were based on the analysis of secondary data or questionnaires and they fell short of explaining how the relationship between those factors affected organisational performance. Another set of studies on strategic IT alignment examined its effect on issues of project management (Walsh & Kanter, 1988) and general IT planning (Tan & Gallupe, 2006), without tracing the impact of those effects on the organisational performance. This thesis due to its research focus on the process of value creation and the methodological approach followed provides an in-depth understanding of the way strategic alignment affected the planning, development and implementation of Web activities in the two museums, and the consequent impact of those effects on the museums' performance.

The results of the thesis not only draw attention to the concept of strategic alignment within a new context, but also explain some contradicting results from previous studies or some unfounded assumptions regarding the use of Web technologies within non-profits. Although some reports published by consulting companies or government agencies (Bishoff & Allen, 2004; Hall Aitken, 2001; QUEST, 2000) have discussed the benefits from implementing web technologies within not-for-profit institutions and museums in particular, those reports have not been able to explain the varying degrees of success that the organisations had in using those technologies. The evidence they presented is based on surveys and interviews with representatives from different organisations and although they provide a useful overview of non-profits' use of Web technologies, they do not provide any insights into the conditions or the requirements



for successful use of those technologies. In their attempt to provide explanations on this significant issue, several of those authors made assumptions based on limited evidence.

One of those assumptions refers to the way organisational size affects the use of Web technologies within not-for-profit institutions. QUEST (2000) suggested that in large organisations with sophisticated online services there is more evidence of strategic thinking formalised into strategy documents than in smaller organisations and that would result in better use of Web technologies. Bishoff & Allen (2004) studied museums and libraries involved in large scale digitisation projects and assumed that if those organisations that were the leaders in digitisation engaged in limited sustainability planning, then organisations representing the norm would have been in a worse position in terms of sustainability planning (though smaller organisations were not studied). Another report concluded: “we found that many smaller organisations are making very good use of ICT and many larger organisations are not. We have not found research that confirms or denies this finding - although many accounts and opinions assume the opposite.” (Hall Aitken, 2001).

This study showed that the organisational size affected the number and scale of Web activities in the two museums, but it was not the main factor that affected the value obtained from those activities. The results of this study indicate that the lack of strategic Web documents within an organisation does not necessarily result in inadequate Web planning procedures, because in the case of a small organisation the involvement of senior managers in the planning process might compensate for the lack of formal plans. Also, the availability of Web resources and expertise does not necessarily result in better Web planning within large not-for-profit organisations, as even in the cases where those organisations are aware of the need for changes, the complex organisational structure and internal politics might slow down the process of change. Although the results of this study cannot be generalised, the insights offered on the relationship between organisational size and the value derived from Web technologies in the two case sites can account for the contradiction in the results of previous studies. The

relevant evidence will also encourage future researchers to reconsider assumptions of this type when researching the use of IT within not-for-profit organisations.

Finally, the case study findings provide a detailed description of the way Web technologies improved different aspects of the operation of the two museums and shed light to an area that has not received much attention in the past. Previous studies on the benefits of Web technologies for not-for-profit institutions have discussed mainly the impact of those technologies on areas like marketing and communication, online services for the public and income generation. Although there have been several studies examining the benefits of Web technologies in the area of operational efficiency and collaboration within commercial organisations (see section 7.4), there have not been many studies examining the situation within not-for-profit institutions. The results of this study not only indicate some of the opportunities that Web technologies present in this area for museums, but also suggest the significance of organisational change as a contingency affecting the process of obtaining value from those investments.

#### 8.1.2 Contribution to IS literature

This study extends the IS literature in several aspects. The IT value literature has been dominated by “black box”, input-output approaches and a similar trend can be observed in recent studies examining the value of Web-based systems. Although there are no doubts about the contribution of those studies, the specific approach cannot help us understand how and why specific IT benefits are achieved by organisations. IT contributions are made at different organisational levels, including the individual or the group level. Several of those contributions are not financial but are in the form of improvements in processes or changes in the organisational culture. Some IT benefits, although significant might not have an impact on the organisation’s overall financial performance, as they could be passed to customers. Furthermore, the benefits obtained from IT can vary quite dramatically according to the internal processes and activities, which determine how those technologies are used within an organisation.



This study, by adopting an interpretive case study design and a combination of process and organisation-level, financial and non financial measures for examining the concept of value, provides a rich insight into the process through which value is created from Web technologies within a non-profit environment. The in-depth examination of the process of value creation within the two museums resulted in a comprehensive understanding of the way in which Web technologies affected the operation of the two museums, how they contributed towards the achievement of the museums' mission, as well as how different organisational factors, including the social dynamics, affected the degree of success the museums had in obtaining value from those technologies. The interpretive approach that was followed allowed the researcher to examine how staff and managers of the two museums gave meanings to the organisations' Web technologies and how they acted on it in response to those meanings. The resulting evidence on the way staff values affected the use of Web technologies (e.g. commercial use of Web technologies) offers an explanation for the paradox sometimes seen in not-for-profit organisations, where an organisation's strategy points to a specific direction but organisational reality tells a different story.

Around the time that this research started, a need for future IT value studies to move their focus away from isolated investments in technologies to the interrelated nature of IT and organisation had also been identified by several researchers (see section 2.3.3). Despite suggestions by IS researchers for a new focus, the majority of studies on the value of Web technologies have considered those technologies as sheer technical systems with organisational consequences. However, in reality there is no linear path between the design of a technology, its use and its impacts. By using a socio-technical theoretical framework (consisting of the mangle of practice and the limits to value model), this study gave due recognition to both the technical and social element of Web based systems within the two museums. The research focused on Web technologies as ongoing artefacts-in-construction through the situated practice of knowledgeable agents and treated value as an evolving process affected by both elements of those technologies.

The interaction between the social and the technical element of Web technologies accounted for a number of observations in this study; some Web technologies were used in ways that had not been originally designed for and value was obtained in ways that were not predicted (e.g. operational efficiency impacts in the Science Museum); whereas other technologies, despite attracting a lot of investment, had limited value due to the way they were perceived by staff (e.g. commercial use of Web technologies in the Science Museum). The ways in which Web technologies were employed within the two museums were shaped by the historically embedded values that were the very essence of the organisations. At the same time, the technologies themselves set opportunities that challenged these values. The results of this study draw attention to the significance of the interaction between the social and the technical elements of Web technologies and its impact on the process of value creation, which should be considered by IS researchers in the future.

Finally, this thesis extends the IT value literature by providing examples of the employment of Web technologies within not-for-profit organisations and an understanding of the process of obtaining value from those technologies within the specific context. A large amount of research into the value of IT has involved data on large commercial organisations (see section 2.3.3). The results of these studies, although useful, can not be taken to represent the entire universe of organisations. Many voluntary organisations are ill-informed about the impact technologies could have on their work and as there is lack of best practices concerning the employment of IT within not-for-profit institutions (Dameri, 2005), managers have a great difficulty in identifying the most appropriate IT solutions for specific organisational needs. In these circumstances, research that offers insights to senior managers and their governing boards is crucial, firstly, in raising awareness that Web technologies are (potentially) powerful strategic enablers; and, secondly, in highlighting the conditions under which the technologies can be effectively employed.



### 8.1.3 Implications for museum managers

The results of the thesis showed that greater strategic alignment of a museum's Web activities could increase the value derived from those activities. Greater strategic alignment could result in a more focused spending on Web technologies, it could encourage sustainability planning and complementary changes in processes and systems, and it could facilitate the development of positive staff attitudes to Web activities by establishing a link between those activities and the museum's objectives. Although the results of the thesis can not be generalised and the extent of their applicability within the museum sector is something that will be decided by researchers in the future, the study can help museum managers understand how strategic alignment can affect several aspects of the planning and development of Web technologies, as well as the degree to which staff accept and employ the use of these technologies. The strength of the results lies on the rich description of the employment of Web technologies within the two museums, which could persuade other museum managers to approach investments in Web technologies in a more strategic way.

Museum managers may decide to treat Web activities as an integral route to the delivery of the museum's objectives across the breadth of the organisation, instead of treating them as departmental activities. They may realise that a clear and agreed plan is needed to reduce the capacity for disagreement, as different parts of the organisation will incorporate Web technologies into their planning, and to avoid inefficient use of the museum's resources. They may decide to review their strategies (e.g. marketing, sponsorship and development strategies) and set out where the Web fits into those objectives in order to maximise the benefits. The thesis does not have a set of recommendations to be followed by all UK museums in their handling of Web technologies; rather it draws the attention of museum managers to the potential effects of strategic alignment and senior managers' involvement in the planning and development of Web technologies. Large museums may decide that they need formal plans to guide Web development and suitable structures in order to improve the

strategic alignment of Web activities, whereas small museums may achieve alignment by assigning the responsibility for the planning of Web activities to senior management.

## *8.2 Limitations of the thesis*

Choices that were made during the course of designing this research brought with them limitations, as well as opportunities. In the previous section, where the contribution of this thesis was discussed, it was suggested that one of the main strengths of the study lies in the methodological approach that was used. To a large degree, the methodological approach is also responsible for the main weaknesses of the study, as at different stages of the research process it affected the choices made by the researcher.

As this was an interpretive case study the main focus during the data collection was on evaluating and interpreting the perceptions of staff in the two case sites. The focus on this type of data meant that other “hard” measures like financial figures received less attention overall (except when other evidence indicated the need to collect this information). This was not a problem in the case of identifying the benefits from Web technologies in areas like operational efficiency or contribution to the museums’ educational mission. In those cases, perceptual measures are probably the only type of measures that can be used within the museum context. However, in the case of measuring the value from income generating web activities like e-stores, some could argue that financial measures are important.

It could be argued that the negative staff attitudes towards the commercial use of Web technologies within the Science Museum could have resulted in bias in the evaluation of the success of the e-stores. However, although detailed financial data, on the cost of supporting the e-stores and the income they generated, were not available, staff that provided information on the Science Museum e-stores came from different departments and had different interests. As managers from the NMSI Trading, who had every reason to present those initiatives in a positive way, were included in the sample; it is believed that bias was minimised. Another area affected by the lack of “hard” data was the



researcher's evaluation of the potential benefits that e-procurement presented for the two museums. None of the two museums engaged in full e-procurement, so there was no evidence on actual benefits. Data from interviews and internal reports suggested that both museums made a strategic decision not to engage in e-procurement due to the high costs involved and an uncertainty about potential benefits. However, the validity of those propositions was not checked against detailed procurement figures from the two museums. Thus, in the discussion of the relevant evidence, the researcher presented a variety of factors that could have affected the museums' decision not to engage in e-procurement, which were supported by existing literature.

Another limitation of the thesis is that some technical aspects of Web technologies and their impact on the process of value creation were not addressed in sufficient analytical depth. The evaluation of the museums' websites confirmed the evidence collected through the interviews and the review of museum documents (e.g. internal evaluation reports) regarding the state of the two websites. However, there was no user testing conducted as part of this research, which is considered by many the best way of evaluating the quality of a website. Furthermore, in the case of e-stores there are a number of technical issues like the degree of customer awareness about the site, product availability and prices, security of transactions and after sales service that could have an impact on the success of the e-stores, which were not examined in detail. Although the in-depth examination of those issues could have provided some interesting insights, it was considered that in order to be able to conduct a valid evaluation of those technical aspects of the websites, it would have required a lot of resources. Consequently, it would have diverted the efforts of the researcher from the examination of the interaction between the technical and the social components of Web systems and its impact on the process of value creation to very technical aspects of Web systems. Instead, it was decided that those issues would not receive a detailed treatment in the case study but their potential impact would be briefly mentioned in the discussion of the evidence.

Although the limitations of this study are acknowledged, they do not detract from the significance of the findings, rather they provide a platform for future research, some examples of which are provided in the next section.

### *8.3 Directions for future studies*

In this section, ideas for research which have suggested themselves over the course of this study are described. It has not been possible to include all the issues that presented themselves. However, a selection of inter-related areas for future research is included.

Future studies could extend the focus of this research to include other types of non-profits both in terms of their activities, and their governance. In this study, it was found that museum staff had negative attitudes towards the commercial use of Web technologies and that in turn affected the value the two museums obtained from their income generating Web activities. In the case of a medical charity, staff may have more positive attitudes towards income generation and that could include the use of Web technologies for this purpose. As a member of staff from the Geffrye museum pointed out:

*“...we worry about the image of the Geffrye, whereas if you are working for a medical charity or something else, it doesn't matter what you do, it is always excusable as long as you get money, because it's such a worthy cause.”*

The case study also found that the relationship of the two museums with the DCMS and their financial dependency on the government department affected their use of Web technologies. The objectives of both museums and the planning of their activities were influenced by the DCMS priorities. Consequently, this had an impact on the way the museums used their resources to fund their Web activities (i.e. emphasis on the educational and outreach aspects of their mission). Museums or other cultural heritage organisations that receive funding from a variety of resources or organisations that receive a large percentage of their funding from individual donations may show different patterns in the use of Web technologies.



Future quantitative studies, preferably with the use of a wide sample of not-for-profit organisations, could also examine the extent to which strategic alignment of Web activities improves the value that not-for-profit organisations can obtain from those activities. The results of this study would help “operationalise” the concept of alignment in ways that it would improve the validity of future studies. Previous studies investigating IT alignment have emphasised the importance of strategic IT plans, however, this study has showed that IT alignment in a small organisation could be achieved through less formal methods. Future quantitative studies could include a variety of measures to examine the concept of alignment (e.g. senior manager involvement in Web planning, relationship of senior manager and Web manager, existence of Web committees with members from IT and managers, staff awareness of Web objectives) and a combination of perceptual and financial measures to examine the success of the organisations’ Web activities. Those studies could produce a series of useful recommendations for not-for-profit managers and the government (e.g. encourage decision making for the allocation of funding to consider other variables rather than project level criteria), which could help not-for-profit institutions maximise the benefits from investments in Web activities.

During the course of the study, some questions were also generated in areas that were not directly related to the aim of this research, like the significance of managerial intervention in shaping IT attitudes within not-for-profit organisations, the use of IT evaluation methods within not-for-profit organisations and the effectiveness of e-procurement technologies available to UK not-for-profit organisations. Different methodological approaches would be useful in examining different aspects of those issues.

Several studies, including this thesis, have found that organisational values affect the way staff use different technologies and consequently they have an impact on the value an organisation can obtain from those technologies. Studies in not-for-profit organisations have also suggested that the non-profit culture is one that strongly values its mission over strict attention to efficiency and effectiveness. Those studies have also

suggested that unless not-for-profit managers can show that any new practices or technologies do not threaten important core orientations, negative attitudes among staff will persist. This study showed that the involvement of senior managers in the planning and development of Web technologies within the Geffrye Museum helped staff assimilate those technologies. Previous studies have suggested that a strategic planning culture at the top of the organisation facilitates recognition of the importance of information systems investments among staff (Grover, Teng, Segars, & Fiedler, 1998). However, there is little research that directly addresses the issue of managerial intervention to promote positive IT values among staff (Leidner & Kayworth, 2006). There is a need for more research to find out, how not-for-profit managers could deal with negative staff attitudes towards new technologies and/or the organisational change that accompanies the implementation of new technologies.

Both the results from this study, as well as previous studies on evaluating museum websites have suggested that the lack of availability of basic IT resources in not-for-profit organisations makes it difficult to conduct website evaluation or in the cases where resources allow testing to be conducted, the testing centres on issues like interface and technical platform usability. The results of this study have also indicated that the two case sites did not conduct Web project reviews, unless this was required by the project sponsors. This thesis supports the results of previous case studies that claimed that IT evaluation practices within not-for-profit organisations are patchy. Future studies could examine issues like how widespread is this phenomenon among not-for-profit organisations or what are the causes of this phenomenon (i.e. is it just a matter of resources or are issues like the organisational culture important?).

Finally, the researcher found that there was very limited information available on the use of e-procurement technologies by not-for-profit institutions or the public sector both in US and in UK. Existing studies have suggested that these organisations are reluctant to use e-procurement technologies for a variety of reasons. At the same time, in UK, the government has supported e-marketplace initiatives like the Zanzibar portal and has encouraged the participation of not-for-profit organisations and governmental



departments in those initiatives (Office of Government Commerce, 2005). Several local authorities have set ambitious targets regarding the use of e-procurement, and a few NHS trusts have already joined the Zanzibar portal. However, articles in the national press and IT magazines have expressed doubts regarding the potential value of those initiatives (Baxter, 2007; Bradley, 2006). Thus, any studies that investigate the use and the impact of e-procurement technologies on UK not-for-profit institutions would be valuable.

## APPENDIX A: Case Protocol

1. Overview of the case study project (objectives, issues, topics being investigated).

### **Objective of the research:**

To gain insight and develop a better appreciation of an organisational perspective of the notion of value from Web based systems within museums (to investigate when, where, how, and why value is created from investments on these systems) and to identify and understand the factors that affect the process of value creation.

### **Definitions:**

#### Web-based systems:

- the delivery of services or/and products through the Web with or without a cost
- the B2B and C2C aspects of e-business, as well as the use of Web technologies for internal purposes (e.g. Intranet)
- and the intra-organisational processes that support these functions

#### Non-profits/ museums:

The organisations studied will have the following general characteristics (provided by Salamon and Anheier, 1997):

- organised (i.e. institutionalised to some extent)
- private (i.e. institutionally separate from government)
- self-governing (i.e. equipped to control their own activities)
- non-profit-distributing (i.e. not returning profits generated to their owners or directors)
- voluntary (i.e. involving some degree of voluntary participation, either in the actual conduct of the agency's activities or in the management of its affairs).
- public benefit organisations.

#### Organisational Value:

- The outcome of financial and non-financial consequences of investing in these systems at different organisational levels. Organisational performance impacts of these systems at both the intermediate process level and the organisation wide level and comprising both efficiency impacts and effectiveness impacts (Melville, 2004)
- Investigate the concept of value from multiple perspectives: upper and middle management, user/customer side.

### **Where should I look for the value?**

#### At the organisational level:

- Balanced Scorecard areas (Hasan and Tibbits, 2000)
- Kushner and Poole (1996) define the performance of a non-profit along four lines: the adequacy of funding, the efficiency of operations, the attainment of the



organisational goals, and the satisfaction of its constituents – examine impact of Web based systems on these areas.

- Best Value indicators (efficiency, effectiveness, economy).

At the intermediate level (based on the Internet/e-commerce literature):

Innovation, new markets

- Product or business model innovation (Zwass, 2003)
- New services at low cost (Ghosh, 1998)
- Open new markets, new distribution channels (Fruhling and Digman, 2000)

Reduce costs, generate revenue

- Reduced costs in marketing, advertising (Kent, Taylor and White, 2003; Zhuang and Lederer, 2003). According to (MacKay, Parent and Gemino, 2004) operational efficiencies in terms of reducing the amount of calls received and in eliminating the need for production and distribution of marketing materials (e.g. pamphlets, brochures and newsletters).
- Reduced customer support costs (Zhuang and Lederer, 2003)
- Reduced information processing costs (Zhuang and Lederer, 2003)
- Reduced cost in business operations (Bloch et al. 1996; Saxton and Game, 2000)
- Generate revenue: tickets, products/gifts, online donations (Saxton and Game, 2000; MacKay, Parent and Gemino, 2004)

Improve internal and external communications

- As a marketing tool: attracting new clients as well as reaching and responding to existing clients more effectively (MacKay, Parent and Gemino, 2004).
- Enhancement of the organisation's brand image (Smith, 2000; Saxton and Game, 2000)
- Enhanced communication with program clients, the media and potential donors. Website provides timely, accurate and complete background information to media representatives. Website helps retaining membership. (MacKay, Parent and Gemino, 2004)
- Provide better information for management decision-making (Zhuang and Lederer, 2003)
- A vehicle for communicating and disseminating information and knowledge internally (Fitzgerald et. al. 2005).
- A website gives the organisation the opportunity to participate in discussions on public policy issues, especially when, for example, a financially "powerless" NGO wants to challenge the practices of a large corporation or government (Esrock and Leichty, 1998)

Internal processes and organisational culture

- The technology could initiate re-engineering (Feeny, 2001)
- Digitisation of interaction with customers may lead to a smaller sales force, less paperwork, and fewer data input errors, while shifting the responsibility of product

information search, order entry and tracking to customers (Weill and Vitale 2001) > quoted in ref. 642

- Leidner and Kayworth (2006) support that specific ICTs have an influence on certain types of organisational values (e.g. on page 370 of the article there are several examples of technologies like data warehousing and workflow management systems leading to flexibility, empowerment, customer orientation).

#### Value for customers

Improved customer experience (planning visits to museum, offer extra info on the museum artefacts, customer interaction with artefacts). (Ariely, 2000)

## 2. Field procedures/basic analytic guidelines (credentials and access to sites, sources of information, data collection issues)

- *Case site sampling*: (more info on sampling techniques in Miles and Huberman, page 28). Start with a case site that has minimum requirements the existence of a website supported by the organisation (ongoing support), a web manager, major web project during last years. Then use the data collected from first site to decide on other sites “theory based sample”. The difficulty is that you need to know a lot about an organisation before even entering the site.
- *Within case sampling for interviews*: Initially talk to a few knowledgeable people (use gatekeeper’s advice) from different sections within the organisation (i.e. marketing - communications, visitor evaluation, visitor learning, curators). Within case sampling has an iterative or “rolling” quality, working in progressive “waves” as the study progresses (Miles and Huberman, 1994).
- *For interviews*: Offer information about the project in advance or at the beginning of the interview. Cover people’s background and experience in the department, their views regarding issues of value from Web, questions tailored to each individual. Tape-record all interviews, if this is not possible: write notes from the interview as soon as it’s finished. Use transcript conventions memo in Atlas.ti for transcription of interviews.
- Arrange a few visits to see people within their work environment – observation.
- Create tool for evaluating the websites based on relevant references. Check all references with “usability evaluation” keyword in Reference Manager and the relevant section in the transfer document.
- All documents will be imported into Atlas.ti. For a general description of the analytic process using Atlas.ti see relevant memo in Atlas.ti. Also check “Notes on process of analysis” with info on Grounded theory.

## 3. Case study questions (specific questions that the investigator must keep in mind during data collection)

***Look out for factors that could affect the process of value creation:***



- IT has its largest effect 2 years following implementation (Harris and Katz, MIS Quarterly, 1991, Vol. 15, no 3)
- No of IT staff (Sircar et al. 2000)
- A reserve of relevant knowledge (Teece et al., 1997; Wheeler 2002) as quoted in Ref. 317. Previous firm experience with IT (greater organisational learning – more effective employment of IT resource) in Weill (1992). Cumulative organisational learning and experience has an impact on web assimilation according to Finchman, 2001 quoted in Ref. 688.
- Managerial commitment to adopting the new technologies (Ref. 317). Top management commitment (defined as the belief that the system will be successful) in Weill (1992). Top management championship (Ref. 688 and Ref. 719). CEO commitment to IT in (Powell and Dent-Micallef, 1997).
- Any complementary investments in infrastructure (Kohli and Devaraj 2004). Within the IT portfolio the IT infrastructure is a most significant contributor to long term business value (Hoogeveen and Oppelland, 2002).
- Alignment with business strategy (Mckay & Marshall 2004; Kohli and Devaraj 2004; Tallon et al. 2000; Powell and Dent-Micallef, 1997)
- Customer (internal – external) involvement in IS development (Kohli and Devaraj 2004). Also customer - process alignment (Ref. 642)
- Organisational change management initiatives running concurrently to systems implementation (Sherer, 2003)
- Investments in training, marketing and process redesign (Kohli and Devaraj 2004; Powell and Dent-Micallef, 1997)
- Effective management roles and processes (Sambamurthy and Zmud).
- Open organisation (trusting relationships, minimal bureaucracy), open communications (free oral and written communications within and across business units), consensus (minimal conflict in goal setting, decision-making, and action-taking), flexibility (encourage change and experimentation) in Powell and Dent-Micallef (1997). As well as work practices like TQM and employee involvement in (Kraemer and Ramirez, 2003).
- People oriented cultures tended to experience greater levels of implementation success than those with more production-oriented cultures. By Harper and Utley, 2001 quoted in Leidner and Kayworth, 2006.
- Systems integration and synergy between different units (Ref. 642). Use of coordination mechanisms in Ref. 688 (e.g. the use of a liaison department to coordinate web implementation activities across organisational sub-units has proven to be effective in Sony Inc.) – again this is about impact on web assimilation not on value.
- Limits to value:
  - Resource barriers (e.g. training and other efforts to increase organisational awareness of how to obtain value from IT are often hamstrung by insufficient resources), knowledge barriers (employees need to learn new skills and the organisation to develop new routines) and usage barriers (users have different levels of tolerance for innovation and organisational change and their personal characteristics may predispose them to be reluctant adopters or even non adopters) in Chircu and Kauffman (2000).

- External factor: the success of the Web initiatives of a firm on the readiness of its customers, suppliers, and business partners to simultaneously engage in electronic interactions and transactions in Zhu and Kraemer (2002).
- External factor: Mansfield (1968) and Mansfield et al. (1977) present empirical evidence to support the theory that intense competition stimulates the rapid spread of an innovation and that firms, when confronted with a high degree of market uncertainty, are more likely to pursue an aggressive technology policy. (Quoted in ref. 747 BUT it's not about value but about adoption)

***Possible questions to be answered at each site, issues to investigate:***

- No of IT/ Web staff.
- Level of IT sophistication (defined as the number and diversity of information technologies).
- How much the government agenda influences the Web projects implemented?
- Is the implementation of web projects usually combined with investments in infrastructure, in training or changes in processes?
- Does the limited availability or unavailability of specific IT infrastructure restrict the things they can do with the web?
- Are IT priorities set and decisions on web projects made in accordance to the museum/IT strategic plan or do things happen in a more intuitive way?
- Is senior management and board of directors aware of the potential of these technologies? Is Web mentioned in the strategic plans and in which way?
- Where do ideas for Web projects usually originate (IT, museum departments, or senior management)?
- Do they use feedback from users to plan/make decisions on future projects or during the development and initial stages of implementation of Web-based systems?
- Are there any formal IS/IT planning processes and mechanisms in place (i.e. cost benefit or other types of financial analysis)? If yes, what kind? - If not, how do they determine whether these systems have an effect on organisational performance?
- Are there clear structures by which decision-making accountabilities and responsibilities are identified (regarding Web projects)?
- To check system integration: Is it easy to share data between different information systems/databases or organisational functions?
- When asking about the employees' participation in any web projects don't stop there but ask about their experience to find out if there was any conflict between different members of the design team (participation doesn't always guarantee success as there is the potential of conflict – Hoogeveen and Oppelland, 02).
- How do employees they see the concept of value from Web-based systems within the museum context? What do they consider to be the most important benefits for the organisation?
- What are the employees' opinions on the factors that influence the process of value creation both within and outside the organisation?
- Do they think the organisation gets the best value from the Web systems currently in use? Where do they see the possibilities for improvement?



- Look at the IT competence table in ref. No 617 (Peppard et al 2000) to check if there are specific questions relevant for each interviewee.
- Ask the curators about preservation issues involved in digitising material for web projects to see views on Web "must weigh-up the risks of exposing original material to any digitisation process, especially where the items are unique, valuable or fragile"
- Do the museum publications have information about the website?

***Questions relevant to web evaluation:***

- Have you done any research to find out what your visitors think of the organisation, either by yourselves or using a market research company?
- Do you have a users/ advocates/visitor evaluation group?
- What kind of evaluation methods do you use (web questionnaire, log analysis etc)?

***Questions about the website:***

- Budgets
- What year did your museum first launch a Web site?
- What year did your first e-commerce sections go on-line?
- What e-commerce functions do you support?

**4. A guide for case study reports (outline, format for the narrative)**

The following could be the primary headings - the key focal points of the case study reports.

1. Introduction and general background of the organisation. The state of Web-based systems within the organisation (Info on projects, website, other details). Use tables from (Peppard et al. 2000) to give an idea of all the areas for which information needs to be provided.
2. Areas of value and organisational factors with an impact on the process of value creation under each area.



## APPENDIX B: List of documents in Atlas.ti

Primary Doc Manager [HU: PhD project]	
Documents Edit Miscellaneous Output View	
I. ▲	Name
P 1	SM Business Plan 04 05.doc
P 2	NMSI Business Plan 03 04.doc
P 3	NMSI IT Business Plan 04 05.doc
P 4	NMSI Trading company .doc
P 6	NMSI E-committe minutes jan 04.doc
P 7	NMSI E-committe minutes May 04.doc
P 8	SM Results of evaluation of the website 2002.doc
P12	NMSI Staff questions- answers.doc
P13	NMSI Trustees Report Summer 04.doc
P14	SM Staff Briefing 05.doc
P26	SM Historical Information on their Websites.doc
P27	NMSI info from press and Internet.doc
P28	Geffrye board meeting Mar. 03.doc
P29	Geffrye board meeting Oct. 03.doc
P30	Geffrye board meeting May 03.doc
P31	Geffrye corporate plan 02 03.doc
P32	Geffrye Funding agreement with DCMS 03-06.doc
P33	Geffrye board meeting May 04.doc
P34	Geffrye board meeting Oct. 04.doc
P35	Geffrye board meeting July 04.doc
P36	Geffrye corporate plan 04 05.doc
P37	Geffrye accounts 04.doc
P38	Geffrye annual report 04 05.doc
P39	Geffrye review of agreement with DCMS.doc
P40	Geffrye info from DCMS review document.doc
P41	Geffrye board meeting Mar. 05.doc
P42	Geffrye board meeting May 05.doc
P43	Geffrye Big Picture Interactive web info.doc
P44	Geffrye accounts 05.doc
P45	Geffrye corporate plan 03 04.doc
P46	Geffrye corporate plan 06-07.doc
P48	Geffrye board meeting July 05.doc
P49	Geffrye board meeting Oct 05.doc



## APPENDIX C: List of interviewees

<b>Science Museum</b>	<b>Geffrye Museum</b>
Web Manager	Web Administrator
Web Designer	Collections Manager
Head of Sponsorship and Development (NMSI)	Head of Education
Head of Marketing (NMSI)	Shop Manager
Head of IT (NMSI)	PR Officer
Planning and Development Unit: Project assistant (NMSI)	Head of Finance and Administration
Planning and Development Unit: Project manager (NMSI)	Assistant Director
Educational Resources Manager	
Collections E-content Coordinator	
Commercial Services: Senior sales executive (NMSI)	
Head of Visitor Research	
Dana Centre Programmes: E-content Coordinator	
Schools Outreach: Manager	
Curator - Medicine	
Curator - Engineering	

## APPENDIX D: Information for participants

### The value of Web-based systems for non profits: the case of UK museums

#### **Introduction**

Not-for-profit organisations are starting to recognise that they are subject to the new paradigms of the digital economy. A large number of museums use Web-based systems for community building, to improve services offered to their public (customisation, access to more information regardless of user location, new education programs) or to generate income. However, the Web is not a universal panacea. Between the hype and counter-hype on the Web benefits, it is clear there are limits. Some organisations are failing to make the most of the power of Web technologies. Although there are a number of recent studies that examine the issue of value from Web-based systems' investments for businesses, there is not much published on the issue of value from these systems within not-for-profit organisations. This study is a first attempt to cover this gap in the literature.

#### **What is the aim of this study and how will it be conducted?**

The main objectives of the research are: a) to develop a better appreciation of the notion of organisational value from Web-based systems within a museum/gallery environment (i.e. examine issues like when, where, how, and why value is created from those systems) and b) to identify and understand the factors (organisational or external) that affect the process of value creation.

In order to collect information on these areas a sample of a few case sites is necessary from the UK museums and galleries community. Research on each site will include a number of semi-structured interviews with staff as well as the collection and analysis of relevant internal documents. In order to put in context the information collected with the above-mentioned methods a usability evaluation of the participating museums' web sites will also take place.

#### **What will be the benefits for the participating museums/galleries?**

- Direct feedback provided on specific issues (e.g. a report on web usability issues).
- An in-depth understanding of the process of value creation from Web-based systems within the organization, opening the way for better use of these systems.
- Publicity if the museum decides to be identified in future publications.

#### **Note to Participants:**

- Any requests for anonymity at the level of individuals or organisations will be respected.
- Participants will be provided with enough information necessary in order to understand the nature of the research before agreeing to take part in it.
- In the light of experience of the investigation, the participants will have the right to withdraw retrospectively any consent given, and to require that their own data, including recordings, be destroyed.



## APPENDIX E: Set of questions for a web manager

1. Could you give me some information about your post and your responsibilities? (e.g. how much of your time is spent dealing with web issues, who do you report to)
2. Your website is hosted by a private company. Could you tell me more about how that affects issues related to website maintenance? How does it work? (e.g. do you have personal access to a content management system, do you communicate with the company on a regular basis, do you have an agreement that specifies what kind of support the company will offer to you)
3. Could you give me some information about budgets for the web (how much does it cost to the museum to support the site, or was it an one off thing)? Where does the funding come?
4. How many major redesigns has the Geffrye website been through since its initial launch (i.e. new home page design or substantial addition of content)?
5. In a Geffrye document dated 16/12/02 the online shop appears as a function to be completed during the first phase of the website project. Are there any plans to add an e-commerce function on the website? If yes, when is this expected? If no, why?
6. Did Geffrye have any experience in large IT projects (museum wide, similar size budget and staff hours) before starting work on the website?
7. Where do ideas for additions/changes to the website usually originate within Geffrye?
8. Is it easy to share information between different departments or information systems in Geffrye (e.g. if you decide to add information on the website on a specific item from your collection is it easy to get hold of the relevant information)?
9. Are the decisions related to the website made in accordance to the museum/IT strategic plan or do things actually happen in a more intuitive way?
10. Does the government agenda influence the way you use the website in Geffrye?
11. Do you do any website evaluation (web surveys, web logs)? If yes, do you use feedback from users to plan/make decisions on future web projects?
12. Does the availability or unavailability of specific IT infrastructure within Geffrye restrict the things you can do with the web?
13. Are the changes on the website usually combined with investments in IT infrastructure or change of museum processes (e.g. in order to meet increased demands by the public resulting from website publicity)?
14. How often do you create sections on the website that do not correspond to a physical space in the museum or an activity that takes place in the museum (e.g. kids zone)?
15. In your opinion what are the greatest benefits of the web for museums?
16. Do you think that your colleagues in different departments are aware about the opportunities presented by the web?
17. Do you think Geffrye currently gets the best value from its website?
18. Is there anything that museum management could do to improve the value gained from investments on web projects?
19. Is there anything that your colleagues in different departments within Geffrye could do to improve the value Geffrye can get from the web?
20. Besides the internal factors that can influence the value you get from the website, do you have any concerns about general technological issues, issues of standardisation that could affect how much you get from the web?

## APPENDIX F: List of codes in Atlas.ti (October 2006)

### Code-Filter: All

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HU: PhD project  
Date/Time: 15/10/06 14:28:23

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1. Central web direction involvement of senior management
2. Clear agreement set with web design company
3. Commercial use of the web they are reluctant to create online products
4. Commercial use of web not central to museum mission
5. Communication issues between different departments affect web
6. Complementary investments supporting web projects
7. Current web value: education
8. Current web value: efficiency of internal processes
9. Current web value: facilitate physical visits
10. Current web value: income generation
11. Current web value: innovative educational services
12. Current web value: marketing and communication
13. Current web value: widen access to collections
14. Dana Centre Website
15. E-commerce
16. E-procurement
17. External pressure for efficiency
18. External pressure for increasing earned income
19. Financial challenges for the museum
20. Flexibility, small size good in exploiting web opportunities
21. Government doesn't influence web policy directly
22. Government policies affecting web policies/use
23. Ineffective content management/documentation negative for web value - SM
24. Ingenious
25. Intranet
26. IT context
27. IT Mission, objectives, priorities
28. Lack of central web direction - web manager extra responsibilities
29. Lack of central web direction/planning
30. Lack of complementary investments to support web projects
31. Lack of internal web expertise a disadvantage in deal with external companies
32. Lack of specialised IT staff leads to outsourcing/ use of consultants
33. Limited resources' impact on web projects
34. Limited resources lead to postponing projects
35. Limited web resources used in innovative ways
36. Making the Modern World
37. Management don't consider online store viable business proposal
38. Management don't see web as central to the museum mission
39. Management interested using web for customer value
40. Management interested using web for income generation
41. Management interested using web for marketing
42. Management not aware of impact of CM practises on the web
43. Management recognise need to generate income
44. Management/trustees recognise importance of the web
45. Measuring value from the web
46. Minimum risk culture negative impact on web issues
47. Museum communication practices
48. Museum Size and Brand - impact on web issues
49. Museum strategic planning and performance management practices
50. Nature of funding affects scope of web projects and implementation



51. Organisational context
52. Organisational culture doesn't support profit making
53. Organisational goals and objectives
54. Origins of ideas for web projects
55. Politics affecting web projects implementation
56. Positive content management practices
57. Potential value: broaden visitor base, widen access
58. Potential value: generate income, savings
59. Potential value: improve efficiency of internal processes
60. Potential value: innovation, new services
61. Potential value: learning and education
62. Potential value: marketing and communication
63. Potential value: web as a platform to improve CM
64. Previous experience of web projects useful in planning for future
65. Prioritising of web projects based on availability of funding
66. Problems with outsourcing
67. Re-using existing content
68. Senior management influence organisational culture
69. Senior manager involved in day to day museum operations
70. Senior manager involved in marketing
71. Senior manager thinks web
72. SM Restructuring
73. Socio-political factors affecting web policies/use
74. Staff aware of potential of the web
75. Staff aware of web projects' impact to museum operation and need for reengineering
76. Staff believe physical visits better than web for public
77. Staff don't think web
78. Staff lack skills/experience to make the most out of the web
79. Staff positive about commercial use of the web
80. Staff recognise need for better marketing of the website
81. Staff recognise need for editorial control of website
82. Staff recognise need to research web users
83. Staff reluctant or negative on commercial use of web
84. Staff responsible for managing content on the website
85. Staff see greatest potential - encouraging visits to museum
86. Staff see greatest potential - facilitating physical visits
87. Staff see greatest potential - reinterpreting objects
88. Staff see greatest potential - widening access
89. Staff see greatest potential learning and education
90. Staff see greatest potential marketing and communication
91. Staff views on digitisation vs preservation
92. Staff views on their website
93. Technical factors/infrastructure/standards
94. Trends/changes in importance/use of the web or other web issues
95. Unclear or ineffective roles/structures affecting web
96. Use of existing expertise, IT equipment for new web projects
97. User expectations/feedback - impact on the web
98. Users view on website
99. Web activity follows strategic museum plans/vision
100. Web activity responds to activities in the physical museum
101. Web activity spontaneous and in response to opportunities for funding
102. Web manager responsible for getting content for the web
103. Web objectives: broaden visitor base
104. Web objectives: e-commerce
105. Web objectives: enhance learning, innovate
106. Web objectives: increase access
107. Web objectives: marketing
108. Web objectives: value for the public
109. Web pages are out of date

- 110. Web projects' development: poor planning**
- 111. Web projects' development: procedures/guidelines/standards**
- 112. Web projects' development: roles and responsibilities**
- 113. Web projects demand extra resources for maintenance**
- 114. Web projects: stand alone**
- 115. Web site visitors' profile**
- 116. Web team's desire to innovate**
- 117. Working practices negative impact for web**
- 118. Working practices positive impact on the web**



## APPENDIX G: Families (last stages of analysis)

### **Code Family: Areas of value from Web activities**

Created: 01/05/06 18:01:16 (Magda)

Codes (5): [Value: e-procurement] [Value: income generation] [Value: marketing and widening access] [Value: operational efficiency and networking] [Value: supporting existing services and providing new services]

Quotation(s): 107

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### **Code Family: Complementary investments and change of processes**

Created: 02/11/06 19:47:02 (Magda)

Codes (12): [Complementary: change of departmental procedures/workloads] [Complementary: encouraging positive IT attitudes among staff] [Complementary: improve content management/documentation] [Complementary: marketing] [Complementary: museum infrastructure] [Complementary: using core staff] [SM ineffective content management/documentation negative impact on web value] [SM lack of change in departmental processes/workloads negative impact on web] [SM management not aware of impact of CM practises on the web] [SM staff do not have skills for commercial use of the web or web marketing] [Staff info sharing and communication practices impact on web value] [Staff thinking web has impact on web value]

Quotation(s): 94

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### **Code Family: Geffrye limited resources impact on value**

Created: 15/10/06 15:38:17 (Magda)

Codes (4): [Geffrye challenges arising from outsourcing web functions] [Geffrye limited operational budgets and staff resources negative impact on web] [Geffrye staff lack IT or Web expertise negative impact on value] [Usability evaluation (extent and type) depends on museum resources]

Quotation(s): 65

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### **Code Family: Impact of external or technical factors on value**

Created: 12/05/06 12:07:50 (Magda)

Codes (5): [External factor: Increasing access to Internet increases demand for online access] [Staff views on their website] [Technical factors/infrastructure/standards impact on web] [Users' views on SM website] [Web activities affected by Government directions especially if lack of strategy]

Quotation(s): 80

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### **Code Family: IT context**

Created: 27/06/05 19:20:45 (Magda)

Codes (10): [IT context: budgets/team/procedures] [IT context: Dana Centre Website] [IT context: infrastructure] [IT context: Ingenious] [IT context: Making the Modern World] [IT context: mission, objectives] [IT context: web] [IT context: web-related trends within museum] [IT context: Web content management] [IT context: Web visitors' profile]

Quotation(s): 162

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### **Code Family: Management & staff attitudes towards income generation**

Created: 08/11/06 20:13:11 (Magda)

Codes (7): [Geffrye managers don't see profit making as central to museum's mission] [Geffrye mgnt don't consider e-store first priority/good business idea] [Management interested using web for income generation] [Management realise need to generate income] [Staff reluctant about commercial use of web] [Staff suggestions for value: income generation] [Web and trading staff interested using web for income generation]

Quotation(s): 60

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#### **Code Family: Organisational context**

Created: 22/04/07 12:45:31 (Magda)

Codes (12): [Organisational: activities] [Organisational: communication practices] [Organisational: financial] [Organisational: Geffrye operational efficiency] [Organisational: Government impact on objectives] [Organisational: history] [Organisational: mission, objectives] [Organisational: planning and performance measurement] [Organisational: SM restructuring] [Organisational: SM staff concerns & lack of confidence] [Organisational: structure, roles, relationships] [Organisational: training]

Quotation(s): 235

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#### **Code Family: Size and organisational structure impact on web**

Created: 27/06/05 19:18:54 (Magda)

Codes (2): [Geffrye flat structure positive impact on web value] [SM size and brand positive impact on web]

Quotation(s): 15

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#### **Code Family: Staff attitudes impact on web (except profit making attitudes)**

Created: 09/11/06 00:02:37 (Magda)

Codes (7): [Organisational: communication practices] [Organisational: Geffrye operational efficiency] [Organisational: SM staff concerns & lack of confidence] [Staff info sharing and communication practices impact on web value] [Staff see greatest web benefit in supporting museum services and widening access] [Staff thinking web has impact on web value] [Web teams enthusiasm for web activities]

Quotation(s): 77

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#### **Code Family: Web projects development and post implementation support (issues of sustainability and evaluation)**

Created: 12/05/06 11:59:30 (Magda)

Codes (8): [Geffrye senior management involved in web planning and implementation] [Measuring web value is patchy & results not always used] [Project based Web funding raises issue of sustainability - need for strategic direction] [SM lack of sustainability planning] [Usability evaluation (extent and type) depends on museum resources] [User feedback affects scope and design of web projects] [Web projects' development: procedures/standards used] [Web projects' development: roles and responsibilities]

Quotation(s): 159

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#### **Code Family: Web projects planning and prioritisation**

Created: 23/02/06 16:34:22 (Magda)

Codes (10): [Geffrye senior management involved in web planning and implementation]

[SM lack of central web direction - web manager extra responsibilities] [SM lack of central web



direction/planning negative impact on web value] [Web activities affected by Government directions especially if lack of strategy] [Web activity coordinated by PDU] [Web activity guided by museum plans/vision] [Web activity in SM guided by availability of funding] [Web activity responds to activities in the physical museum] [Web objectives in plans: learning/education] [Web objectives in plans: marketing and widening access]  
Quotation(s): 167

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