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# From global value chains to corporate production and innovation systems: exploring the rise of intellectual monopoly capitalism

Cecilia Rikap

City, University of London

## Abstract

This article argues that contemporary leading global corporations are intellectual monopolies who base their power on the systematic concentration (and predation) of knowledge that they turn into intangible assets. By monopolizing access to portions of society's knowledge, these companies' capacity to plan portions of capitalism exceeds their legally owned assets. The article defines each intellectual monopoly's sphere of planning as a corporate production and innovation system that may include several substructures, from global value chains to platforms. Inside corporate production and innovation systems, value and knowledge production are organized and controlled by the intellectual monopoly. Moreover, among intellectual monopolies, those centralizing big data and the machine learning algorithms required to process them will develop greater planning capacities and a further self-expansion of their intellectual monopoly. The emergence of intellectual monopolies has implications at every level within capitalism, including global capital accumulation, effects on labour and the peripheries. By briefly referring to these dimensions, the article finishes by presenting a depiction of the geographies of digital capitalism as an era dominated by intellectual monopolies.

## Keywords

Global Value Chains; Intellectual Monopoly; Corporate Planning; Corporate Innovation System; Digital capitalism; Platforms

## 1. Introduction

Production in capitalism was considered to be organized through two distinct forms of division of labour: the technical one, inside the factory -as in the example of Adam Smith's (1950) pin factory- where production is planned, and the social division of labour organized through anarchic market exchanges. Anarchic in the sense that there is no central planning or a conscient way to assign what each *producer* should do. In this article, I will argue that, at odds with this distinction, planning has trespassed the front door of the factory or, in other words, the technical division of labour has conquered space that was organized through capitalist social division of labour. Portions of capitalism (including both commodities and knowledge production, distribution and extraction) are being organized as in the example of the pin factory. As a result, the frontiers between planning and markets are fuzzier than ever.

The case of Apple, the corporation with the highest market capitalization during most of the last decade, is a case in point. Apple controls every bit of its supply chains, as stated by former employees and suppliers interviewed by Satariano and Burrows (2011, p. 50). Apple exercises extreme control over its subcontractors and suppliers, appropriating part of their value (Chan et al., 2013; Froud et al., 2012; Haslam et al., 2013; Kraemer et al., 2011; Linden et al., 2009; WIPO, 2017; Xing, 2019). Quite illustrative of its planning behaviour is how Apple changed the screen of the iPhone weeks before it

was launched. Foxconn, Apple's main contractor, was forced to overhaul the assembly line. As soon as Apple's managers arrived at its facility, Foxconn managers woke up workers in the middle of the night to fulfil Apple's requirements (Rikap, 2018). This case was no exception. According to Foxconn employees interviewed by Chan et al. (2013), Apple monitors onsite production processes and delivery times. Overall, Apple knows who can produce each step of its different value chains and has the exclusive knowledge to oversee and integrate all its dispersed and outsourced production processes.

Apple is only one among the many firms using exclusive access to knowledge to plan portions of capitalism. Moreover, as I explain in this article, Global Value Chains (GVC) (Gereffi, 2014; Gereffi et al., 1994, 2005; Ponte et al., 2019; Ponte & Sturgeon, 2014; Sturgeon, 2009) is only one among the many structures used by contemporary leading corporations to -by exercising their planning capacity- appropriate value and knowledge. These companies control and organize what can be defined as production and innovation (sub)systems.<sup>1</sup> Other structures include platforms (which more often than not represent the creation of a new market), franchising and local subcontracting networks (value chains inside a single country). What they all have in common is that they are structures organized and planned by a leading corporation and integrated by several other subordinate organizations whose production process is controlled by the leading corporation. The latter also captures the lion's share of the surplus-value that springs from these structures.

From this starting point, this article explains that corporate planning relies on knowledge monopolization. In a nutshell, more than ever knowledge (cum innovation) is power and contemporary capitalism is driven by those monopolizing it. At the corporate level, these are a handful of leading global corporations that base their power on the systematic concentration of intangible assets. By monopolizing access to portions of society's knowledge, these companies' capacity to plan portions of capitalism exceeds their legally owned assets. The article also briefly refers to the different effects of intellectual monopolies at the level of global capitalism, for labour and the peripheries. A more thorough conceptualization including several study cases and further evidence of this thesis can be found in Rikap (2021).

The rest of this article is organized as follows. Section 2 elaborates on the emergence of intellectual monopolies, including the specific case of those that are data-driven. Data is the *holy grail* of any plan. This is followed by a section where the thesis on these companies' extraordinary planning capacity is further explained. Section 4 introduces several dimensions of analysis regarding the implications of intellectual monopoly capitalism and section 5 concludes.

## **2. Who are these corporate planners?**

Let's start with some stylized facts. A recent joint OECD and European Union report shows that the top 2000 corporations in business expenditure on Research and Development (R&D) concentrated 60% of total IP5<sup>2</sup> patents between 2014 and 2016 (Dernis et al., 2019). Furthermore, while in 1975 only 17% of the assets of S&P 500 corporations were intangibles, that figure had risen to 90% by 2020.<sup>3</sup>

In the United States (US), intangible-intensive industries' rate of profit grew faster than their total assets (Orhangazi, 2018). Yet this is not exclusively a US phenomenon, as shown in an OECD report

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<sup>1</sup> We refer to them as systems. However, it should be noted that they are subsystems in relation to capitalism as a global system.

<sup>2</sup> Patents in the 5 largest patent offices: European Patent Office (EPO), Japan Patent Office (JPO), Korean Intellectual Property Office (KIPO), National Intellectual Property Administration of the People's Republic of China (CNIPA) and the United States Patent and Trademark Office (USPTO).

<sup>3</sup> <https://www.visualcapitalist.com/the-soaring-value-of-intangible-assets-in-the-sp-500/>

that analysed 26 countries (the US and a sample of European and Asian economies) between 2001 and 2014. The report found that mark-ups of firms at the top of the mark-up distribution have grown and mark-ups are higher in digital-intensive sectors (Calligaris et al., 2018).

In this context, Pagano (2014, p. 1410) coined the term *intellectual monopoly capitalism* and considered it global leading corporations' dominant form of organization, which "expanded to an unprecedented level the process of concentration of productive knowledge". While the author's empirical focus is the concentration of intellectual property rights (IPRs), since his seminal contribution other authors have further elaborated on this concept by including three mechanisms that expand a company's intellectual monopoly: knowledge appropriation (see Section 3), data centralization and the exclusive access to knowledge on how to reintegrate production processes spread in global value chains and other forms of outsourcing (Durand, 2020; Durand & Milberg, 2020; Rikap, 2018, 2021; Rikap & Lundvall, 2020). All these mechanisms expand the intellectual rents that intellectual monopolies garner from turning knowledge into assets.

### *2.1. How did intellectual monopolies originate in the first place?*

In a nutshell, intellectual monopolies spring from the continuous monopolization (cum assetization) of knowledge. This means that they rely on a permanent and expanding monopoly over portions of society's knowledge. These companies are not merely one-time innovators. Knowledge is a cumulative process; new knowledge is produced based on and mobilizing existing knowledge (Antonelli, 1999; Dosi, 1988; Johnson & Lundvall, 1994). Moreover, the organizations that succeed in innovation will be better positioned to absorb new knowledge, thus further innovate (Cohen & Levinthal, 1990). These conditions contribute to explaining the perpetuation of intellectual rents in a few hands. Once a firm continuously wins the innovation race, the resulting gap with the rest of its industry widens. It is the capacity to continuously renew its intellectual monopoly that constitutes a source of lasting power.

Although these characteristics of knowledge, as well as those of capitalist competition leading to productive forces advancement (Marx, 1894), are intrinsic features of capitalism, it was not until the late 70s that institutional, political and technological transformations fostered and accelerated the spread of intellectual monopolies that we see as an accomplished result in the 21<sup>st</sup> century.

Concerning technological changes, the first phase of the ICT revolution accelerated knowledge diffusion, thus favouring those organizations with greater absorptive capacities. Moreover, in the last decade, data and deep learning algorithms stand out within intangible assets. Their specificities have contributed to engendering a unique type of intellectual monopoly that is data-driven. Big data are processed with machine learning algorithms producing digital intelligence (UNCTAD, 2019). Within machine learning techniques, deep learning and neural network approaches enable algorithms to learn and improve themselves as they process more data. This is why Cockburn et al. (2018) consider this technology a new method of invention.

Among intellectual monopolies, those monopolizing access to big data and the algorithms to analyse them are, thus, monopolizing a method of invention. Therefore, they are potentially self-perpetuating and expanding their intellectual monopoly (Rikap & Lundvall, 2022). Data-driven intellectual monopolies base their innovations on processing big data with this artificial intelligence approach. Data harvesting, centralization and analysis thus foster a cumulative advantage in terms of the ability to innovate. Furthermore, data-driven intellectual monopolies have a relative advantage when it comes to planning because of their exclusive access to data from production, distribution (markets) and consumption. Tech giants are the paradigmatic example. They are on the way to monopolize this method of invention or, more precisely, the benefits accruing from it (Rikap, 2020; Rikap & Lundvall, 2020).

Regarding institutional and political changes, a set of policies and regulations introduced in the US and later extended to most of the world have been essential to the reshaping of capitalism into intellectual monopoly capitalism. The development of a more stringent and all-embracing IPRs regime stands out. It included from the Bayh-Dole Act, which authorized to patent public-funded research results and to transfer this knowledge to private firms by providing exclusive licenses or creating joint ventures, to other acts that further extended IPRs, such as more severe sanctions for infringements, and the expansion of the definition of what IPRs could protect to include living beings, software and architectural work (Mowery, 2005; Orsi & Coriat, 2006; Pestre, 2003).

Other quite known policies that have favoured the accumulation of knowledge and profits by large multinational corporations from core countries included the weakening of antitrust controls (Glick, 2019) and overlooking taxing loopholes between jurisdictions. This resulted, among others, in a regressive corporate tax structure where the top 10% of US-listed corporations (defined as those with the highest ratio of net profit to sales) pay a lower worldwide effective income tax rate than the rest of the US-listed corporations (Hager & Baines, 2020).

What is perhaps less known is the role of the US industrial policy, promoting US multinational corporations as a means to limit other countries' catching-up (from the USSR during the Cold War to Japan in the 70s and China nowadays) to sustain the US geopolitical hegemony (Weiss, 2014). Disguised by dominant pro-free-market ideology, the US technological supremacy lays on this industrial policy, including moon-shot projects funded by public agencies that enabled the creation of the internet and GPS, all of them crucial for stimulating innovation in the private sector (Block, 2008; Mazzucato, 2015; Wade, 2017).

Altogether, these changes explain why intellectual monopoly capitalism took so long in establishing itself as the dominant form of capital reproduction. A system based not only on (surplus) value creation but also appropriation based on unequal access to knowledge.

### **3. From GVC's to corporate production and innovation systems**

Intellectual monopolies' exclusive access to knowledge enables them to expand their planning sphere, subordinating those organizations that have lost their technical autonomy and rely on adapting and adopting the techniques developed and required by those intellectual monopolies. This form of subordination is, in fact, part of a larger process because intellectual monopolies control capitalism's means of production (including market) coordination.

Going back to GVCs seen as one of the many structures planned by contemporary leading corporations, we can define a corporate production system as a planned system of reproduction and exchange of commodities where the leading corporation -which is an intellectual monopoly- is the central planner. At the contractual level, planning can be understood as sign-up contracts where subordinate firms can only decide whether to accept or reject the agreement (Levín, 1997). Planning not only implies setting prices but also includes the definition of clauses of exclusivity, commercial credit conditions and quality standards (Rikap, 2021, Chapter 2). When information cannot be so easily codified, intellectual monopolies exercise direct coordination or control, as in the example of Apple provided in the introduction. Those that control platforms are also market creators. As such, they are rule-setters. They decide the norms and standards of what can and cannot be done and how it can be

done inside their controlled platforms (Dolata, 2020). Overall, intellectual monopolies set the rules that govern markets<sup>4</sup> and production.

Corporate production systems can include all or as many structures as leading corporations consider strategic. They may combine GVC with platforms (as Apple and Amazon), franchising with GVC and even local networks of suppliers, such as Mc Donald's and Inditex, and so on. Each intellectual monopoly strategically decides which steps of its production system (and also of its innovation system, as explained next) belong to its core business and should be kept in-house and what should be outsourced. This cannot be universally defined in advance. In abstract terms, the core entails all the activities kept in-house to preserve and expand a corporation's intellectual monopoly.

Some leading corporations include in their core business activities that require in-house large (tangible) capital expenditures. This is the case of Amazon, Microsoft, Google and Facebook in the form of data centres and undersea bandwidth, indispensable to store and process data, thus to assure their data-driven rents (Rikap & Lundvall, 2020). The distribution chain (storage included) is part of Amazon and Inditex<sup>5</sup> core as part of their innovations concerns logistics and storage (on Amazon see Rikap, 2020). Large pharmaceuticals even outsource most of the innovation steps since they can still garner the associated intellectual rents and outsourcing reduces innovations' economic risks (Rikap, 2019).

Summing up, industrial structures are more diverse and put into question the idea that research, development, design, technology and business intelligence are the strategic activities to be kept in-house by leading corporations (Serfati, 2008). Even steps from all the latter are outsourced, while some intellectual monopolies keep in-house steps of the production process that had been considered as perfect candidates for outsourcing.

Corporate innovation systems planned by intellectual monopolies evidence that the production unit has been split from the legal ownership of capital. Following Bettelheim (1975, p. 57), there is a fundamental difference between possession and property. Subordinate companies have "the ability to put the means of production into operation" (possession) but they partially lack "the power to dispose of the products obtained with the help of these means of production" (property).

Hence, the unit of capital accumulation is no longer defined by ownership because the intellectual monopoly plans its (sub)system of production. This includes governing/controlling several (global) innovation networks (Chaminade et al., 2016; Ernst, 2009). Considered together, an intellectual monopoly's global innovation networks have been defined as a corporate innovation system. These are (usually global) systems each organized and controlled by an intellectual monopoly, constituted also by subordinate organizations (such as innovating companies, universities and public research organizations) (Rikap & Lundvall, 2020).

Within a corporate innovation system, the intellectual monopoly defines the general R&D orientations and desired results without anticipating every step to be followed and leaving degrees of autonomy to subordinate actors. Intellectual monopolies also influence and to some extent set global dominant research agendas of those disciplines related to their R&D priorities, as was shown by Testoni et al.

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<sup>4</sup> At the market level, the capacity of leading corporations to determine transaction conditions even when they operate as buyers has led to conceptualizing contemporary capitalism as a form of (global) monopsony capitalism (Nathan, 2021). Our conceptualization provides an explanation for the emergence of leading corporations not only with higher market power (both as buyers and sellers) that is based on capital's technological differentiation (Levín, 1997).

<sup>5</sup> On Inditex, see for instance <https://www.ft.com/content/c2b8e86d-d580-47f6-8f2d-13357b528dde?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c>

(2021) for the case of big pharma companies and health and biomedical sciences dominant research agenda.

Subordinate companies participating in corporate innovation systems will typically be the most advanced in specific technologies, but they either produce only steps of larger innovation processes or cannot integrate their creative results into production processes, relying on the overarching planning capacity of intellectual monopolies to whom they subordinate. So, most of the associated intellectual rents that can be garnered from knowledge produced within corporate innovation systems are appropriated by the intellectual monopoly. Following Veblen's (1899) concept of predation, it may be said that the latter is a predator of knowledge since there is a direct manifestation of superior force exercised through the spoliation of collectively produced knowledge, which is turned into intangible assets by the intellectual monopoly (Rikap, 2020, 2021). Next, I provide evidence of this behaviour for the case of Amazon.

### *3.1. Amazon: a paradigmatic data-driven intellectual monopoly*

Using a corpus of Amazon's scientific publications between 2018 and 2019 extracted from the Web of Science, Figure 1 shows Amazon's network of most frequent co-authors. Co-authorships indicate R&D collaborations. By focusing on Amazon's top co-authors, we are looking at institutionalized links. Therefore, we are considering organizations that integrate Amazon's corporate innovation system. However, even if Amazon organizes this system with thousands of other organizations, they barely share the property of its patents, providing evidence of its predatory behaviour (Rikap, 2020). Amazon also outsources innovation modules for apps development (it declared to have more than 700,000 developers in its ecosystem) and harvests open-source software (Rikap & Lundvall, 2020).

#### **Figure 1. Amazon's network of most frequent co-authors<sup>6</sup>**

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<sup>6</sup> Methodological details on how these networks are built can be found in my previous research on Amazon as well as other intellectual monopolies (see for instance Rikap, 2019, 2020, 2021).





others of mobilizing that knowledge for production and other purposes, including further advancing knowledge. Predation takes place both when exchanging commodities (as in the case of transactions within a GVC or platform) and within an intellectual monopoly's corporate innovation system. In these cases, a direct manifestation of superiority takes place as the intellectual monopoly appropriates value and knowledge. As Durand (2020) concludes, capital is shifting away from production to focus on predation. At the same time, intellectual monopolies rely on the expanding scale of capital accumulation inside their production systems to assure greater value creation, thus perpetuating sources of predation.

At the global capitalism level, although we live during the second phase of the ICT revolution (Brixner et al., 2020), the effects of innovation on economic growth seem curtailed. The monopolization of knowledge by and beyond IPRs blocks potentially profitable opportunities, fuelling weak global capital accumulation (Durand & Gueuder, 2018). In other words, under intellectual monopoly capitalism, innovation-driven growth and accumulation are being highjacked.

Moreover, as intellectual monopolies' rentiership and predation redistribute surplus value amongst firms, the hierarchy of power trickles further down and impacts on workers. Since the 1980s in the US, the share of surplus value in total value-added increased (Rotta, 2018; Stockhammer, 2013). Within workers' share, there have also been further redistributions due to workers' segmentation within and between intellectual monopolies and the different subordinate firms (Rikap, 2021, Chapter 10). In this respect, the effects on workers from subordinate firms in GVC, several of them in peripheral countries, have been widely studied (see for instance Selwyn, 2019; J. Smith, 2016). Similar effects are seen in subordinate firms participating in platforms, franchising and corporate innovation systems organized by leading corporations (Rikap, 2021, Chapter 10).

Furthermore, given the internal polarization of capitalism, it is no surprise that intellectual monopolies are mostly concentrated in core countries. When we focus on the peripheries, on top of other pre-existent forms of dependency, two additional forms can be associated with intellectual monopoly capitalism: knowledge extractivism and data extractivism. The former is defined as knowledge (in particular science and technology) from the peripheries that are monetized in core countries, usually by intellectual monopolies. This form of knowledge appropriation particularly affects leading universities and public research organizations from so-called emerging or middle-income countries while the assetization of scientific knowledge also diminishes local communities' knowledge (Rikap, 2021, sec. 3).<sup>7</sup> Moreover, data extractivism generates a new layer in the international division of labour. Net raw data providers pay for digital intelligence while data-driven intellectual monopolies mostly from the US and China appropriate data and concentrate value from selling products relying on digital intelligence (Rikap, 2021; Rikap & Lundvall, 2020). This context has been conceptualized as data or digital colonialism (Couldry & Mejias, 2019; Kwet, 2019).

In this scenario, the geographies of digital capitalism are quite telling of how value, data, knowledge and nature flow. They also provide crucial insights underlying main geopolitical conundrums.

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<sup>7</sup> Frequently, intangibles (either knowledge or data) extractivism is a practice that goes unnoticed, as in the case of blind knowledge transfer. A way to measure the latter is by analysing an institution's scientific publications that are cited in international patents not owned by that institution (Ahmadpoor & Jones, 2017; Codner et al., 2012; Codner & Perrota, 2018; Hicks et al., 2001).

#### 4.1 *The geographies of digital capitalism*

Leading digital platforms, in particular those that can be considered data-driven intellectual monopolies, are concentrated in the US and China. Together, they accumulated 90% of the market capitalisation value of the 70 largest digital platforms of the world by 2019 (UNCTAD, 2019). More recently, UNCTAD (2021) showed that North America (mainly the US) leads by a far in total value by market capitalization (67%) of the top 100 global digital platforms. Meanwhile, Asia & Pacific (mainly China), with 45 platforms, lead in the top 100 platforms' ranking by number. The US hosts 40. Europe structurally lags far behind, as well as Latin America -with only Mercado Libre integrating the list- and Africa -represented by Naspers and Prosus.

These figures not only speak of the winners of digital capitalism but also contribute to explaining why the US (and its tech giants) is so concerned about China's catching-up. As the technological rise of China became apparent, the power of the US state has been mobilised. It spans from massive state support to build infrastructure and promote innovation to embargos of technologies assumed to be of crucial importance for China's further development in relation to artificial intelligence (Lundvall & Rikap, 2022).

A report commissioned to an ad-hoc commission, chaired by Eric Schmidt, Google's former chairman, and including the head of Google Cloud Artificial Intelligence division, Microsoft's Chief Scientific Officer and Amazon's CEO, is extremely vocal on China as an adversary (National Security Commission on Artificial Intelligence, 2021). The report continuously refers to China's artificial intelligence threat and the need to dedicate greater efforts to confront China's ambition to be the global leader in this technology by 2030. This commission illustrates the close cooperation between tech giants and the US state.<sup>8</sup>

Besides the US-China technological war, since knowledge and data are created around the world, the concentration of leading data-driven monopolies in these two countries also speaks of knowledge and data extractivism from the rest of the world. Furthermore, the development of these technologies strengthens nature extractivism mostly from the global south since the lithium and cobalt markets have been driven by battery demand, primarily from consumer electronics.

Another layer of this geographical snapshot concerns other industries' intellectual monopolies, including here European and Japanese corporations, such as some big pharma and Samsung, respectively. These intellectual monopolies are also becoming more data-driven. Novartis, which claims to have two million patient-years of data, considers data to be "the crucial asset which will be instrumental going forward as we apply artificial intelligence tools to sift through the data and find hitherto unknown correlations between drugs and diseases".<sup>9</sup> This same rationale likely motivates Pfizer's agreement with the state of Israel for the provision of its Covid-19 vaccine. The latter agreed to give former anonymized health data of all its citizens (Dyer, 2021). Moreover, among data-driven intellectual monopolies, there is also BlackRock, the world's major asset manager with its financial data platform Aladdin, pointing to the interplay between financialization and intellectual monopoly capitalism (Auvray et al., 2021).<sup>10</sup>

All in all, the geographies of digital capitalism suggest a concentration not only of value but also of nature, data and knowledge by intellectual monopolies from selected core countries. Although some

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<sup>8</sup> Tech giants not only influence the US overall AI policy. Surveillance enabled by AI is a specific field where US big tech companies' business and the US state requirements come together (see for instance Kwet, 2020).

<sup>9</sup> <https://www.novartis.com/stories/discovery/data42-program-shows-novartis-intent-go-big-data-and-digital>

<sup>10</sup> <https://www.ft.com/content/5ba6f40e-4e4d-11ea-95a0-43d18ec715f5>

of these phenomena are not new, their deepness together with the specific effects of intellectual monopoly capitalism call for action.

## 5. Final remarks

Capitalism has always been a turbulent social formation. It has hitherto guaranteed the reproduction of human life but by continually marginalizing a portion of humanity, risking the future of every living being and of our planet as a whole. It has done so with rhetoric of universalism while it systematically confronts humans. Intellectual monopoly capitalism is probably its harshest episode.

As I have argued in this article by elaborating on my previous research, intellectual monopolies exercise knowledge (including data) and value predation. These leading corporations plan corporate production systems integrated by different structures, including but not limited to GVC and platforms. Not only do they plan portions of commodities' reproduction (thus exchange) sphere, but they also plan and harvest from knowledge production processes. They organize global corporate innovation systems turning resulting knowledge into their own intangible assets. Among intellectual monopolies, those exclusively accessing big data and deep neural network algorithms have additional advantages concerning planning -thus value appropriation- and the perpetuation of their intellectual rents over time.

Furthermore, intellectual monopoly capitalism reinforces underdevelopment, extracting value from the peripheries (as in previous capitalist stages) while new and old forms of extractivism spread. Consequences are also especially pervasive for workers, in particular for those in routine jobs or working for subordinate companies that attempt to compensate for the value captured by intellectual monopolies by super-exploiting their workers. The secular stagnation that the Western world is witnessing also reflects the implications of intellectual monopoly capitalism, since the effects of innovation on economic growth are restricted. This disconnection springs from leading corporations' exclusive access to knowledge.

This context and the overall scenario that I briefly described prompt us to discuss how to address a changing world. It would require evolving concepts and theories. We need broad conceptualizations that allow us to provide big pictures while we go in-depth into specific dynamics. And of course, a related and unavoidable question is *what is to be done*. This question cannot be answered individually. Collective and democratic debates need to be organized engaging both individuals and organizations, from unions and social movements to states.

These debates should lead to a reappropriation of planning capacities and knowledge by society as a whole since, as I have argued in this article, planning is already happening at global scale. In a time when ecological disasters put into question the type of growth to be pursued by humanity, deeper inquiries can be raised on the possibilities of overcoming private business planning with public or commons planning. Plans require integrated sets of short, mid and long term interconnected goals and democratic institutions where in-depth (political) discussions lead to the definition of those goals. This is needed not only to tackle ecological disasters but more broadly to envision a new society where the reproduction of our species is not at the expense of nature, other species and a (growing) portion of humanity. In short, the plan needs to address every dimension of life on Earth in a democratic, coherent and interrelated way. Although we are very far from this scenario, as much as intellectual monopolies are appropriating knowledge, let's not allow them to appropriate or eliminate our capacity to image and create new (better) worlds.

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