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# Intellectual Property, Knowledge, Capital and Labour

## INTRODUCTION

Intellectual property (IP) is a term that denotes several distinct bodies of law related to the protection of private ownership of knowledge and information.<sup>1</sup> It includes the laws of protection of patents, copyrights, trademarks and trade secrets, database rights, protection for semiconductor topographies, plant breeders' rights, protection for indications of geographic origins and rights in performances. In this body of law, many important legal benefits accrue to the owners of intellectual property. The owners of intellectual property can deny others the use of knowledge and information for a given period provided by statutes. The owners can charge rent for use, receive compensation for loss and demand payment for transfer of knowledge.

IP laws have been strengthened over the period. Contemporary laws favour a stronger system of intellectual property that provides for a system of a wider set of constraints on use and a broader exclusion of access to others. It covers now all types of knowledge-working, scientific, technological, cultural and so on. Intellectual property monopolies are uniformly of longer durations. A stronger intellectual property system has been provided a global reach through the Trade Related Intellectual Property Rights (TRIPs) Agreement. The law of patents provides a uniform period of monopoly for twenty years. The law of copyrights gives a monopoly of fifty years or more.

A stronger IP system under enforcement through the TRIPs Agreement implies extending the term of protection, expanding the scope of protectable subject matter, increased penalties for violation, facilitating enforcement and expediting litigation. The purpose is to strengthen enforcement and adjudicatory mechanisms for combating IPR infringements through specialized commercial courts. Intellectual property rights are formidable legal barriers to competition.

Several justifications are provided for the need for intellectual property. Advocates argue that incentive is needed to encourage further effort; inventors deserve property in the fruits of their labour and intellectual property is important to ensure both natural right and efficiency. But for Marxists, there is nothing 'natural' about property. Property formation is an ideological and material process and there is always an attempt to obscure the political acts that produce property norms and property regimes. The power relations that organize property form(s) of public, private and

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<sup>1</sup> Ambiguity in the definitions of 'knowledge' and 'information' may cause misunderstanding if the meanings of these terms are not distinguished. The term 'knowledge' implies the satisfaction of three conditions: a belief, a truth and a justification condition. Information understood 'as data transmitted from a sender to a receiver' does not have to satisfy these three conditions. Thus, information refers to such objects as databases (lists and statistics) and downloadable files (e.g. songs in mp3 format). Information can be treated as a sub-category of knowledge. Both information and knowledge can be commodified. It can be added that objects such as 'datasets', have to be activated and used by those who are able, partly due to their knowledge, to interpret and process. When understood this way, knowledge refers to something people possess, i.e., a cognitive capacity, and information refers to something passive that needs to be interpreted by those who have a cognitive capacity. However, it would not be incorrect to suggest that information matters. Cognitive capacity involves access to information.

commons in knowledge production are hidden in the legal details, which capital accesses from the nation state(s) through the efforts of lawyers and lobbyists.

More recently the capitalist character of the contemporary narrative is under use for the justification of intellectual property. These claims include the benefits of introduction of markets into knowledge production; the requirement of private property in knowledge for efficient use of knowledge and information; ensuring more and better innovation through markets in knowledge and information; little stimulus would exist for innovation without intellectual property; innovators must be incentivized and rewarded to commercialize knowledge; innovators require private monopolies to obtain the return on investment; and that progress in science and technology depends on the existence of markets in knowledge supported by stronger IP.

Capital provides these justifications to accelerate the pace and intensity of capital accumulation through the creation of private ownership of knowledge and innovation. Capital is able to impose scarcity in relation to possible use of knowledge even when there is no actual scarcity of knowledge resources. In recent times, the globalized system of enforcement of laws of intellectual property is on the rise and is structured through the power of monopoly, finance and informational capital across the nations. Presently the benefit of strengthening of IPRs is mostly accruing to the fractions of monopoly, finance and informational capital originating from United States, Europe and Japan. (May and Sell 2006)

Thus, for Marxists there lies hidden the story of the commodification of knowledge and information in the intellectual property laws.<sup>2</sup> Historically, the production of knowledge has not taken place in the market, but rather in guilds, universities, religious bodies and state institutions. The production of knowledge was rewarded through patronage, prestige, prizes, or income tied to rank or status rather than to economic performance. In the Medieval world, knowledge was often interpreted as a gift from God, and for this reason ideas were seen as inappropriate objects of property. This changed through the rise of capitalism and possessive individualism. Patents and other forms of intellectual property rights are seen as legal devices in the service of the process of commodification of knowledge; in this case, royalties that can be defined as the market price for the right to use patented knowledge. Universities can sell and license their patents to corporations and establish external sources of revenue in the form of royalty payments.

Knowledge as commodity can exist and acquire different commodity forms; Jessop (2007: 122-125) has argued that knowledge can circulate in various ways. Knowledge can circulate as intellectual commons. In this case knowledge has a non-commodity status especially if it is produced and distributed through a non-market mechanism (e.g. patronage). Knowledge is a fictitious commodity when it is enclosed through non-market mechanisms and circulated as private property within the market. Knowledge becomes a quasi-commodity when knowledge production (intellectual labour) is formally subsumed under capitalist control and competition. Knowledge

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<sup>2</sup> In Marxian terms, knowledge becomes a commodity only under certain relations, i.e., what counts as a commodity is socially determined. Commodification of knowledge in itself is a complex process. The capitalist commodification process consists of the following elements: privatization (exclusive right to control an object), alienability (an object can be detached from its seller), individuation (separating an object from its context via legal/material boundaries), abstraction (assimilation of a specificity of an object to a broader type), valuation (monetization), displacement (concealing involved social relations). Under capitalism the labour process is subjected to competition that implies that there is pressure to reduce the time during which commodities are produced and how long it takes to realize the surplus value that commodities imply; commodities' market-mediated monetary value for the seller gains more importance in relation to commodities' use value than their material and/or symbolic usefulness to the purchaser. In a capitalist market economy, only those commodities are produced for markets that have exchange value.

becomes a real capitalist commodity when the real subsumption of intellectual labour takes place, i.e., when knowledge is subsumed under the capitalist labour process. Knowledge may also become a form of fictitious or fictive capital when revenue streams to knowledge producers (e.g. universities) are guaranteed by intellectual property rights.

Marx himself foresaw under capitalism the advancement of enclosure of knowledge accelerating through the processes of primitive accumulation of capital as well as the dynamic of capital accumulation. Knowledge can circulate in various ways within and between social systems. Ample evidence exists of how through the processes of primitive accumulation of capital and the dynamic of capital accumulation, commodification of knowledge proceeded first in a slow and gradual way, and then rapidly under 20<sup>th</sup>-century capitalism. Personal and technological forms of surveillance in the production process are necessary elements of the capitalist economy (Fuchs 2012: 14). Commodification of knowledge is a process that is contributing to the increased surveillance of academic labour since this process is able to enhance corporations' accumulation of capital in knowledge capitalism. Commodification of knowledge and the related integration between universities and market forces requires the direct as well as ideological control of employee behaviour within higher education institutions. Academic labour is increasingly getting subjected to the discipline and logic of accumulation in which monopoly, finance and informational capital are important actors.

Evidence also exists of how even under capitalism progress in science and technology could occur without the creation of private property in knowledge and information. There exist mechanisms of government patronage, prizes and procurement to continue with the progress in production of knowledge (Mazzucato, 2014). Societies need not depend upon the introduction of markets in knowledge production. The markets for knowledge have been organized and provided social legitimacy in the capitalist society through the narrative that 'knowledge produced for sale' is efficient. The truth is that the fiction of 'knowledge has to be produced as commodity' allows monopoly capital to gain a foothold in the knowledge production and distribution process.

This article discusses how intellectual property laws have been constructed to legally achieve private appropriation (misappropriation) of the collectively produced knowledge. The analysis brings out how the co-evolving processes have been advancing the real subsumption of mental and manual labour to capital in the field of knowledge production and creating the dynamics of generation and dissipation of rents. The article also brings out the self-defeating character of the commodification process even from capital's own perspective. Commodification and accumulation are co-evolving which poses contradictions for capital through the process of commodification of nature or other aspects of social existence which results in social inequality and polarization within and across nations. This also shows how the history of the shift from international to global governance of intellectual property protection in favour of stronger intellectual property is not without contestation. It suggests that the hope for the construction of a system of knowledge production without property is still alive.

#### INTELLECTUAL PROPERTY, LABOUR AND CAPITAL

To contemporary minds, the notion that an employer (often a corporation) owns or controls various types of intellectual property of its employees is a legal reality. Fisk (2009) demonstrates how this modern legal reality of employer ownership of intellectual property is a relatively recent development. The legal doctrine that came to privilege employer ownership of intellectual property remains contested. Fisk reasons that modern intellectual property has also been a creature of

employment law and practice. The term 'intellectual property' was first used in a published judicial opinion in 1845 in the United States. The process of this shift was slow and gradual and extended from the late 19<sup>th</sup> to late 20<sup>th</sup> century. Corporate ownership of workplace knowledge came into existence as employment shifted from being a relationship where legal obligations were determined primarily by status to being one where legal obligation(s) are determined by contract.

In an earlier article, Fisk (2003) shows that this development evolved in contradiction to earlier industrial practice.<sup>3</sup> She observes that courts routinely held that an inventor was presumed to own his invention, regardless of his status as an employee roughly between 1840 and 1880. Fisk's work on copyright law points out that the privileged employee authors created copyrighted works throughout much of the 19<sup>th</sup> century. Earlier contributions of Fisk (1998) develop a similar theme and look at the question of who owns patented invention created by an employee. Earlier the employers approached the problem of ownership of knowledge as the problem of property, normally concluding that inventive individuals owned the fruits of their labour.

In the US, during the 19<sup>th</sup> century, the legal device that accomplished the ends of the employers was the implied contract. Implied contracts permitted courts to reallocate economically valuable information in ways that seemed to them fair and efficient. By the early 20<sup>th</sup> century, the employers started patenting inventions by employees 'hired to invent' even without any formal assignment from the employee. They could enforce a 'shop right', a non-exclusive, non-transferable right to use invention by employees not hired to invent; demand invention assignments by independent contractors that effectively left them unable to work or consult elsewhere in their area of expertise; protect 'trade secrets' that earlier generations had not recognized, such as ideas, general knowledge unreduced to written formula, and negative knowledge (that is what does not work); and enforce all these rights through negative injunctions forbidding former employees from taking specific jobs.

Benjamin and Weinstein (2009) also describe developments of the post-Second World War period briefly. Into the 1990s there has greatly expanded the scope of justifications of IP by employers in order to restrict employee mobility or an employee's claim over inventions. For example, while courts retained the traditional formula under which 'reasonable' covenants by employees not to compete would be enforced, the category of reasonable covenants expanded. In particular, negotiated covenants for 'unreasonable' duration or geographic scope were increasingly rewritten by courts into reasonable form, and then enforced against the employee. A Uniform Trade Secrets Act came into existence in America. The other important act came to be introduced in 1980 in America in the form of Bayh-Dole Act that encouraged universities to claim as their own intellectual property the intellectual creations of university faculty (the Indian version of Bayh-Dole Act was sought to be introduced by the National Knowledge Commission<sup>4</sup>; fortunately, there was

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<sup>3</sup> Fisk (2009) tells us the details of how workplace knowledge changes from something so unknowable that the Du Ponts in 1808 had no legal basis to stop employees and their knowledge from walking out the door, to a taken-for-granted corporate asset, routinely protected by legally enforceable contracts by 1930. Part of the answer is the steady expansion of intellectual property itself, particularly in the coverage of copyright and trade secrets. The domain of workplace knowledge expanded. Fisk notes the contributing factors for this joint development: the ideology of free labour and its interaction with corporate power, changing understanding of the middle classes, the transcendence of contract discourse, and the development of a consumer society. Fisk places much emphasis on the growth of corporations and the rapid spread of office and factory work with an accompanying systematization of knowledge and bureaucratic employment practices. Together with the triumph of contract over status to define employer-employee relations, the new workplace supported the commodification of creative labour and the transformation of the creative entrepreneur of the 1830s into the corporate man in grey flannel suit of the 1930s.

<sup>4</sup> National Knowledge Commission was an Indian think-tank charged with considering possible policies that might sharpen India's comparative advantage in the knowledge-intensive service sectors. It was constituted on June 13,

enough resistance within the scientific community at that time, and the government failed then to impose it on the Indian university system).

A 1996 federal criminal statute, the Economic Espionage Act made most ordinary misappropriation of trade secrets into a criminal offence. The result of these and other developments is to make litigation a threat almost anytime an employee valued by the employer attempts to leave for a competitor. Piracy is a term that has long been linked to claims of unauthorized uses of intellectual property. Drahos and Braithwaite (2002) show the significance of the rhetoric of piracy in political discourse concerning the development of the Trade Related Intellectual Property Rights (TRIPs) Agreement. Prior to the emergence of the World Trade Organization (WTO) nations had no general duty to protect or enforce intellectual property rights within their borders.

#### GLOBALIZATION OF INTELLECTUAL PROPERTY

The increasingly global reach of intellectual property law and the neo-liberal assumptions embedded in it raise many important issues that need to be analysed. The first issue is the skewed distributive effects of the TRIPs Agreement on 'have' and 'have not' nations. The TRIPs Agreement permits intellectual property exporting nations to erode their rights extraterritorially. The Agreement erodes historic notions of territoriality and sovereignty, and disadvantages those developing nations which have very little proprietorship in knowledge resources and few resources to pay for essential intellectual property-protected goods.

The increasing global reach of intellectual property laws requires greater engagement with the challenge of formulation of strategies to protect a public domain that cannot be fully owned as intellectual property. The inequalities relating to the exploitation of intellectual property as a form of bio-colonialism or bio-piracy allow the developed nations to remove natural resources and discoveries out of developing nations as raw materials that can be manipulated and transformed into intellectual property with no recognition or economic benefit (see Keith Aoki 1998).

Drahos and Braithwaite (2002) point out how the redistribution of intellectual property rights involves a transfer of knowledge assets from the intellectual commons into private interests, like media conglomerates and integrated life sciences corporations, rather than individual scientists and authors. The effect of this is to raise levels of private monopolistic power to dangerous global heights, at a time when states, which have been weakened by the forces of globalization, have a lesser capacity to protect their citizens from the consequences of the exercise of such power.

#### CONSEQUENCES FOR FORMAL AND REAL SUBSUMPTION OF INTELLECTUAL LABOUR

These concerns are closely connected to the issue of the changing balance between protecting knowledge, innovation and creativity as private property versus disseminating it widely in for public use. The tension between these two can be captured in the concept of the 'public domain', or

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2005, by the Prime Minister of India, Dr Manmohan Singh. In particular, the Commission was to advise the Prime Minister's Office on policy related to education, research institutes and reforms needed to make India competitive in the knowledge economy. The Commission was to recommend reform of the education sector, research labs, and intellectual property legislation; as well as consider whether the Government could itself upgrade its use of the latest techniques to make its workings more transparent. The NKC website was launched in February 2006. As of July 2014, the National Knowledge Commission was defunct as the incoming Modi government, elected in the summer of 2014, discontinued it.

sometimes, the 'intellectual commons' or 'knowledge commons', which denotes areas of social life where public access is privileged over intellectual property rights. Because the expanded global reach of intellectual property protection threatens access to knowledge commons, free speech and democratic participation in the process of intellectual labour is being made to appear as capital's own process, and the capitalist is being designated as the 'legitimate' owner of knowledge and information. As the owner of means of production used within the production of knowledge and the purchaser of labour power, capital is effectively becoming the manager of the processes of knowledge production.

'Capital' for Marxists refers to a social relation, namely that of waged labour employed in the production of commodities to be sold for a profit. With the ever-increasing penetration of the capital relation into knowledge production, intellectual property is actually creating a social possibility space for capital's expansion. Intellectual property has a central role in the neo-liberal project. A capitalist economy must expand continually if it is not to collapse, a consequence of the dynamics of self-interested investment upon which it depends. The dynamics of a capitalist economy and the production of profit are now far more dependent upon the spread and intensity of capital in the field of production of knowledge.

Today, IP is an important instrument of primitive accumulation in the hands of capital as it has allowed formal and real subsumption of all types of knowledge production throughout the world. Capital is excluding and displacing its costs to spaces such as the universities of both North and South. In the field of knowledge production, the process of formal subsumption of intellectual labour to capital includes the establishment of the wage labour relation. Universities are a terrain of contested development. In the publicly funded higher education institutions, academics are beginning to oppose the introduction of principles of new public management-intellectual technology of primitive accumulation. Academics are opposing the introduction of stronger intellectual property rights.

In the field of knowledge production, historically speaking, status competition and prestige distribution set limits and determined the value and price of labour. At the moment the meeting point is occurring within the well-institutionalized habits and rules governing the pre-capitalist life of knowledge production. The process of formal and real subsumption of intellectual labour under capital is not yet complete. Capitalist domination of the sector of knowledge production requires the universities and publicly funded research institutions to introduce the latest versions of intellectual property. Recent developments suggest that status, competition and prestige do not pose intrinsic limits for capital. Success is possible because all or most scientific and technological research requires funding; it matters how it is funded and on what terms and conditions. The terms and conditions will have impact on the nature of the research itself (Szadkowski 2017).

#### STRATEGIES FOR THE CONTROL OF RESEARCH DONE BY INTELLECTUAL LABOUR

It is possible to distinguish the practice of funding into five or six strategies which enable those paying for research to use and control the work of intellectual labour in the relevant sites of knowledge production. These strategies include 1. propertization (to maximize their control over every aspect of research and their rights over its utilization), 2. purchase (research commissioned by government agencies or private sector under project contracts), 3. prescription (the concentration and steering of research through the designation of centres of excellence, which, once established may enjoy a significant measure of independence), 4. persuasion and sponsorship (the identification of challenges and the encouragement of scientists and technologists to put forward proposals for

research relating to the challenge), 5. pluralism (responsiveness to researcher demand) and 6. patronage (research was funded through patronage provided earlier by aristocrats, later by governments and now by new philanthropy represented in the funding of the Gates Foundation, the foundations of George Soros and the Clintons, the Reliance, the Tata, the Aziz Premji Foundations, etc.).

The story of patronage has come to a full circle. There is very little space for curiosity-oriented research in the philanthropy-based funding of higher education institutions. The research funding of new philanthropies is devoted to creating a human face for capital. Funders use the contract system to purchase the labour power of researchers or knowledge production bringing the idea of commodification into the process of research. This means knowledge is a commodity that can be bought and sold or otherwise disposed of as the purchaser wishes. For example, the University of California (UC) attracts funding for biotechnology research by boasting that “UC means business” (Bridges 2017).

However, it is also a fact that a system of hierarchy develops as soon as research is valued on the basis of its potential to create wealth. Funding is growing for research in the fields of biosciences, material sciences, information and communications technologies, and the funding for humanities and social sciences is suffering. All over the world there are consequences of the treatment of research as a commodity (as if it was equivalent to buying and using coal). Damage is visible in the field of research. Public engagement with science and technology, regulation of risk, research on the relation of capital with labour, education research, economy related institution-building and policymaking for science and technology have already experienced an immense damage.

#### INTELLECTUAL PROPERTY, NEO-LIBERALISM AND FINANCIALIZATION

In recent times, priority has been given by monopoly, finance and informational capital to the expansion of capitalist relations of production in those societies that are yet not fully integrated into the global capitalist market. It has also focused on those fields of knowledge and material production (such as biosciences and bio-economy and information sciences and information economy), that are yet to be successfully commodified and globalized. In the field of knowledge production, the process of primitive accumulation includes the private appropriation of resources previously held in common so that these can be exploited for profit, a process called ‘primitive accumulation’. Through the introduction of IP, capitalist relations of production have spread extensively to societies as yet not fully integrated into the global capitalist market, as per globalization. The intensity of the capital relation in societies whose economic relations were already dominated by capital could also expand and deepen through further subsuming social practices. These practices aim for the construction of a globalized, neo-liberal knowledge-based economy (KBE) based on intellectual property.

The growing breadth and depth of phenomena of formal, real and ideal subsumption of intellectual labour to capital is visible at the level of the impacts on investments in knowledge production in the KBE. With the maturity of existing technologically advanced industries, capital has been in search of new investment possibilities. As revealed by the contemporaneous progress of science and technology, new technologies afford manipulation of material reality in novel ways in order to create profitable commodities and thus open up an entirely new sphere of social reality into which capital can expand. The two novel technologies of greatest significance in the neo-liberal age have clearly been information and communication technologies (ICTs) and biotechnology. ICTs are obviously related to a knowledge economy, allowing for the significant growth of labour that is dependent on information manipulation and technical knowledge, as well as facilitating global

production networks and 'flexible' production processes. Biotech has yet to penetrate the economy to the same extent, but it is also implicated because it is exceptional in the level of scientific sophistication, and it presupposes as a factor directly involved in the innovation of new products.

There is the expansion of capital relations not only into production of knowledge for industry and agriculture but also into the 'culture industries', with oligopolies controlling all major cultural outputs. The intensification of capital in these societies thus had to extend into spheres of social life, held in common to date, even more removed from the daily material reproduction of society. Expansion into the relations of production of knowledge has obvious complementarities with other tendencies of the growth of the economy. The connection between neo-liberalism and the KBE, however, goes beyond this. Neo-liberalism as an ideology also has particular conceptual resonance with the drive to privatize and marketize the creation of scientific knowledge (Mirowski 2011). Neo-liberalism has been centrally concerned with the marketization of the production of knowledge on a global (or 'universal') scale. However, private property rights must first be instituted in that resource – that is, IPRs for markets of knowledge – in order to make the functioning of capitalist commodity markets possible.

#### CAPITAL, BIOTECHNOLOGIES AND INTELLECTUAL PROPERTY

Much evidence shows that biotechnologies emerged without patents in the 1980s in the USA. Progress occurred on the basis of funding received from the government and the scientists working on the generic knowledge of recombinant DNA techniques and hybridomas were not interested in patenting knowledge. More specifically the patent regimes for the life sciences can be traced to the ruling of the USA Supreme Court in the early eighties that established that DNA could be a 'technical subject'. The important consequence of this decision was that legally speaking certain types of DNA were designated as the 'composition of matter' and 'product of ingenuity' rather than a manifestation of nature. The practice of presenting an invention based on DNA that it is basically or sufficiently chemical to be considered as patentable was put in place. The fragmented notion of life at a molecular level as knowable in an informational paradigm that is accessible for exploitation and capitalization was institutionalised through intellectual property. A world-wide harmonization and strengthening of IPRs through the norms and standards created in the USA has been enforced now through the powerful machinery of the WTO (Preamble, Article 7). There is a compulsory extension of patentability to all micro-organisms and all 'non-biological and micro-biological processes' 'for the production of plants or animals' (Article 27(3)). The latter includes all genetically modified plants and animals.

Biotech is an exception in the direct involvement of basic science in commercial applications. For patenting to be possible in biotech, two particular changes in US law were necessary. Biological materials were not patentable, given restrictions on patenting scientific discovery rather than invention. Given the location of this biotechnological research in university departments, private appropriation of the results of publicly funded basic science research was a problem. It was with neo-liberalism in place that the US universities found themselves compelled to compete increasingly for external dollars that were tied to market-related research. Not themselves being businesses, the US universities developed interest in patent reforms as trade secrets were unavailable to them.

In 1980 the Bayh-Dole Act (allowing patenting) was passed in America on the basis of the primary argument that biotech applications under development in the US universities need to be commercialized. University patenting has grown since 1980, with particularly striking growth in the life sciences. Patents granted to universities more than doubled in 1979-84 and again in 1984-9 and

1989-97 and these have been disproportionately concentrated in biological classes represented in 49.5 per cent of all university patents in the early 2000s. At Columbia and Stanford universities, both major protagonists and beneficiaries of the changes, by 1995 biomedical patents accounted for more than 80 per cent of their substantial licensing revenues. In short, therefore, the privatization through strong patents of such biological research suddenly became an acceptable change, if not an urgent priority, at exactly the time of the neo-liberal counterrevolution (Tyfield 2010).

The structural demands of global capitalist political economy – with the US at its centre – needed neo-liberalism, financialization and the TRIPs Agreement for advancing the processes of subsumption of knowledge production fields to capital. Financialization after 1980 gave political power to finance capital and its favoured investments, the most important being biotech, to amend economic regulation to its advantage. Through the TRIPs agreement these trends converged in the ‘globalized construction of knowledge scarcity’. The TRIPs Agreement is one of the founding treaties of the WTO, following the post-war General Agreement on Tariffs and Trade (GATT). It establishes for the first time globally harmonized minimum standards for IPRs.

The TRIPs Agreement allows capital to impose patents on medicines necessary for treatment of diseases such as AIDS or tuberculosis affecting large sections of the developing world thus inflating the costs of these drugs beyond the financial means of most patients. By extending the IPR norms to the products of nature and biodiversity in which most developing countries are rich, ‘bio-prospecting’ (or ‘bio-piracy’, depending upon your perspective) have been encouraged. Bio-prospecting is a process facilitated by genetic engineering techniques, which allows even insignificant genetic modification of plants to be patented.

The economic case for TRIPs is strikingly absent. First, as regards its effects on economic growth, there is almost unanimity in the economic literature that the TRIPs Agreement shifts the balance of economic gains significantly in favour of developed economies, particularly the United States, and away from developing countries (at least in the ‘short term’), thus exacerbating global inequalities in economic development. Even within the developed economies, including the US, the case for TRIPs was both spectacularly weak and dependent upon forging from scratch a conceptual connection between IPRs, free global trade and progress in science and technology.

Analysis reveals the centrality of TRIPs to neo-liberalism and the structural enablement upon which the signing of TRIPs depended. Life sciences are crucial players in the development of neo-liberalism as a concrete political project. But it was with the collapse of the Soviet Union in the late 1980s, that American power grew yet further (its triumph greeted by now famously premature declarations of the ‘end of history’). And it was under these circumstances that India’s and other developing countries’ resistance to TRIPs was squashed in 1989.

In short, the TRIPs Agreement has almost nothing to do with innovation (which is itself usually uncritically valued positively) and its implementation simply cannot be understood if it is treated as such. In fact, strong patents undermine the development of innovation capacity in most developing countries and, indeed, even in the United States itself. Rather, the TRIPs Agreement is becoming a legislative measure to enforce the primitive accumulation of knowledge production on a global scale. This opens the economic case for TRIPs to the objection that IPRs are a relatively unimportant mechanism for the translation of scientific research into innovation in the vast majority of industries. But the scientific results presented an economic opportunity and were quickly latched upon as the obvious ‘next step’ by financiers. Patents, and patent reform, were seen to be crucial for this fledgling industry.

The recent history of the political efforts to create a globalized, neo-liberal knowledge-based economy does not conclude, unfortunately, with the signing of TRIPs in 1994. This has been

something of a surprise to many of the developing countries who finally submitted to signing TRIPs, for while they viewed it as the uppermost limit of their efforts to harmonize global IPRs, those behind the agreement saw it instead as merely the first step. The TRIPs Agreement sets minimum IP standards, leaving open to the discretion of national governments the actual form of many intellectual property laws, and includes a number of provisions that provide limited flexibility for developing countries. For instance, compulsory licensing of drugs for national health emergencies is permitted, which the governments in power in India have failed to use so far because of the fear of adverse impact on foreign direct investment (FDI) inflows into the country. Almost as soon as TRIPs was signed, moves also started for a new round of negotiations both to strengthen IPRs and to remove the flexibilities of the TRIPs agreement; so-called 'TRIPs-plus' provisions.

#### PROPERTIZATION OF INTANGIBLES, DATAFICATION AND INFORMATIONAL CAPITAL

Mariana Mazzucato (2014) brings out that the public agencies of the United States were responsible for making risky investments behind the Internet and in funding most of the crucial elements behind the 'stars' of the information revolution, companies such as Google and Apple. And how each of the technologies that make the iPhone so 'smart' can be traced back to State investments, from the Internet itself, to the touch-screen display, to the new voice-activated Siri personal assistant.<sup>5</sup> Her account of the investment in the Internet provides evidence for the complex set of actions that make such wide-ranging innovations happen.

She highlights the importance of mission-oriented funding and procurement; of the bringing together of multiple agencies; and of the creation of incentives for multiple sectors and multiple financing tools deployed to make it happen. Successful efforts do not stop at basic and applied research but carry out the work of achieving commercialization. Companies like Apple, Compaq, Intel and many others received early stage financing through government funding programmes like the Small Business Innovation Research. The infrastructure of the ICT revolution, laying the basis for the Internet, was lavishly funded by the State from its beginning stages until it was installed and fully functional and could be turned over for commercial use.

Mariana Mazzucato argues that no private investors or market forces could have done that job on their own and highlights the crucial role of the German, Danish and other governments to develop and diffuse clean energy technologies. Her key point is that in the case of most of the radical new technologies in different sectors – from the Internet, biotech, clean energy to pharmaceuticals – we can trace the funding of a courageous, risk-taking State.

In the case of informational capital, presently the appropriation strategies of platforms under development by Google, Amazon, Facebook and others are three namely the propertization of intangible resources, the concurrent dematerialization and datafication of the basic factors of industrial production and the embedding of patterns of exchange that are legally protected in the interest of expansion of informational capital. The role of law is foundational and needs to be explored in terms of the political economy of platform capitalism. Although intellectual property doctrines suggest that data and algorithms – the building blocks of the information economy –

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<sup>5</sup> Siri personal assistant for iOS may not have been the first personal assistant, but it sure paved the way for modern speech-based assistants. This intelligent mobile assistant aims to make easy tasks even simpler – all done through voice command. Siri is capable of sending messages, placing calls, checking the calendar, and a whole lot more. The Siri personal assistant has so many functions, and a lot of it tends to get overlooked by users. Despite the beauty in its simplicity, there's more to Siri than meets the eye.

cannot themselves be the subjects of property rights, but property formalism notwithstanding, data and algorithms are the subjects of active appropriation strategies.

An important by-product of the access for data arrangements is a de facto if not de jure change in the legal status of data as proprietary informational property. Platform providers have worked to define both collected data and algorithms as zones of exclusivity. Platforms use contracts to facilitate and protect their own legibility function, extract transparency from users but have been shielding basic operational knowledge from third party vendors, users and advertisers alike. The particular form of the access for data contract – a boilerplate terms-of-use agreement not open to negotiation. Boilerplate agreements are contractual in form but mandatory in operation. The terms-of-use agreements step in where the map of formal entitlements ends, providing a vehicle for leveraging trade secrecy entitlements into de facto property arrangements.

Facebook's dealings have shown that the enclosure carries over into platform enterprises' dealings with application developers. Application developers receive access to carefully curated datasets, data structures and programming interfaces. Google's vaunted commitments to open data and open code do not extend to algorithms or to the data it collects about its users. Google imposes other restrictive conditions on developers offering Android devices or Android-compatible applications. When access to a platform requires technical interoperability with apps for desktop and mobile operating systems, patents and copyrights can supply important points of leverage against unauthorized access by third-party vendors and future competitors.

Data extracted from individuals plays an important role as raw material in the political economy of informational capitalism. Platforms in particular have structured their broad presumptive consent and have configured the artefacts that make use enrolment seamless and near-automatic. Personal information harvested within networked information environments allow them to create the backdrop for new algorithmic techniques of knowledge production that operate as sites of legal privilege. The data are both raw and cultivated, both real and artificial. Platforms as information refineries refine and massage consumer personal data to produce virtual representations that work to make human behaviours and preferences calculable, predictable and profitable, and businesses of all sorts can use the information for surplus extraction.

Google's chief economist has explained that at any given time Google and competing search engines are running millions of experiments on their users, designed to determine how users respond to information so that search results get optimized. In 2014, a paper co-authored by a Facebook data scientist described a massive experiment in which Facebook varied items in users' news feeds and then used automated discourse analysis tools on those users' own subsequent posts to gauge the effects of the news feeds on their emotional states. Major copyright industries and software producing firms have also worked to alter the legal status of networked information services in ways that would require them to prevent flows of unauthorized content or face potentially ruinous liability (Cohen 2017).

#### DYNAMICS OF GENERATION AND DISSIPATION OF RENTS

Intellectual property creates boundaries of private ownership over knowledge and information that are in tension with principles of public access. The tension and boundaries of private ownership has played out in different ways over time. Today capital accumulation depends far more than ever before on the contribution of 'knowledge rents' derived from the ownership of intellectual property. The World Investment Report shows that international royalty and licensing fee receipts of MNCs rose from 29 billion dollars in 1990 to 328 billion dollars by 2016 which outpaced the growth in sales

and exports of MNCs' affiliates and their growth in incomes from FDI outflows (UNCTAD 2017). This also explains the role of 'intangible assets'. According to UNCTAD estimates, intangible assets (brand value and other intellectual property) estimates account for around one-third of the market capitalization of the world's top 100 MNCs on average. Intangible assets of technology MNCs account for around half of their market capitalization. They allow multinational corporations to reap super profits for extended periods of time.

In today's global economy, the world's top 10 corporations have a combined revenue of more than the 180 poorest countries combined. According to the McKinsey Global Institute, 10 percent of the world's publicly listed companies generate 80 percent of all profits. A high degree of capital concentration can be seen in virtually all strategic industries today. Six multinational corporations – BASF, Bayer, Dow, Du Pont, Monsanto and Syngenta – control 75 percent of the global agrochemical market; 63 percent of the global seed market, and more than 75 percent of all private sector research in seeds and agrochemicals. By controlling the key inputs and related technologies for their production, a handful of MNCs now control the global food system. Likewise, the health of the world's population is in the hands of 10 pharmaceutical companies. The biggest 10 MNCs in the Automotive sector control the production of motor vehicles and parts. The top 15 companies control nearly half of all global revenues in transportation, courier and postal services. In the fastest growing sector of the global information and communication technology-based production, just six or seven technology firms – Apple, Samsung, Hon Hai Precision, Amazon, HP, Microsoft and Google – control the business.

Monopoly capitalists do everything possible within and outside the law to keep their monopoly over intellectual property. Although statutorily the typical patent is valid for 20 years, in the pharmaceutical sector the time period of patent monopoly is on average over 27 years or more in the United States. In the smart-phone industry alone, a Stanford University study tells us that as much as 20 billion dollars was spent on patent litigation and patent purchases in 2010-11. Apple and Samsung spent more on IPR litigation and buying up patents in 2012 than either did on R&D for their commercial products. More money is spent on preventing the dissemination of new technology or their further development. Many of these patented technologies under commercialization are based on public research. Indeed, none of the intellectual property would even be possible without public spending on basic education; without knowledge and information freely shared by people with one another; and without the knowledge and culture handed down from generation to generation.

#### CONTRADICTIONS OF INTELLECTUAL PROPERTY

Intellectual property also poses contradictions for capital itself. While each capitalist wishes to pay nothing for their knowledge input they wish to charge for their intellectual output. This contradiction is reflected in the conflict engendered in the processes of intellectual property litigation. Microsoft's use of hacker communities to beta test its commercial software and contradiction with firms that sell value-added services for Linux, an open source software (OSS), are also examples of this contradiction.

An important consequence of the strengthening of intellectual property rights of capital is the problem of social inequality and polarization within and across nations. There is the problem of growing economic differentiation between knowledge workers, the creative workers, or information workers and other workers who are deskilled through smart machines and expert systems.

The degree of concentration of capital today is not readily revealed by examining the size of firms or even their inter-locking ownership. The global reach and economic power exercised by

today's monopoly capitalist firms is also understated by figures on FDI, export and market shares attributed to MNCs in relevant markets. This is because under neo-liberal globalization, MNCs control and coordinate not only their subsidiaries and affiliates abroad but also nominally independent partner firms scattered in locations throughout the world. While the term 'global value chains' tends to give an impression that value is created at each location as per the capabilities and contributions and that the distribution of value captured by the lead terms (the MNCs) is rightfully the highest, it needs to be pointed out that MNCs rely on their monopoly control over technology via control over intellectual property to add the greatest value.

All the issues raised pertain to the process of primitive accumulation and of the normal dynamic of capital accumulation set globally in motion by the imposition of the TRIPs Agreement on all the member countries of the World Trade Organization (WTO). There was much resistance to the acceptance of the TRIPs Agreement in India. The CPI (M) provided the leadership to the organization of this resistance in India. However, there are many new areas of resistance for Marxists to take forward in the near future.

#### RESISTANCE FOR COUNTER-HEGEMONIC INFLUENCE IN KNOWLEDGE PRODUCTION

Legal and surveillance studies scholars have pointed out that surrendering control of the information environment to opaque, immanent entities and processes amounts to surrendering control over self-development and self-government. The impact on markets is equally profound. The legal-institutional context of intellectual property formation has been able to alienate labour from their own product as a resource. The networks of secrecy and boilerplate tight agreements that constitute markets for information and knowledge are acts of enclosure. They represent strategies of (mis)appropriation of valuable resources from the intellectual commons. Appropriation strategies based on contractually mandated secrecy are acts that alter the legal status of collected information. This misappropriation or enclosure is a way of underscoring the power of capital in the field of knowledge production. Unemployment, reserve army of labour, surplus population, are the flip side of the misappropriation or enclosure of knowledge commons.

While academics do not usually sell journal articles, books, or book chapters in markets for money, they sell some forms of knowledge commodities such as consultancy and advice in (quasi) markets. Today the commodification of knowledge in the field of higher education presents the distinctive features of the second enclosure movement wherein all kinds of scientific activities and their results are interpreted and assessed more on the basis of economic criteria. It is clear that knowledge can get commodified, but that it should not be commodified is also very clear. Research should be conducted in a systematic and disciplined way with care and thoroughness and respect for legitimate principles, with an imperative to see and to speak truth. These principles and purposes become distorted if the seeing and speaking of truth becomes subordinate to other considerations. In the field of knowledge production, no place should exist for considerations like protecting the reputation of the political authority, promoting the vested interest of the capitalist and shielding wrongdoing from the criticism of the people. This drift, be it epistemic or political, needs correction.

Knowledge is a public good not only in terms of economic benefit but also in terms of the moral sense. Scientific knowledge is not only a public good which has characteristics of a non-rivalrous and non-exclusionary nature, but it is also an inexhaustible resource. Scientific knowledge can be put to infinite uses. Generic knowledge, be it scientific or technological knowledge, is not an asset that has limited specific use but is an asset with the characteristics of fungibility. Generic artefacts of knowledge have the potential of multiple meanings. New meanings of generic knowledge are

possible. Science is the activity of manipulating nature with the use of conceptual machines, the study of technology and machinery can reveal facts of science just as the study of commodity reveals the nature of value and abstract labour.

Capital is trying to separate head and hand. Intellectual property widens the separation of head and hand. Technology reveals the active relation of man to nature, the direct process of the production of his life, and thereby also lays bare the process of the production of the social relations of his life, and of the mental conceptions that flow from those relations. The dynamics of rent generation in global value chains lays bare this separation. Today, trans-national capital originating from the United States, Europe and Japan controls intellectual property and uses it for surplus extraction from all over the world.

Science and technology give capital a power of expansion which is independent of the given magnitude of the capital actually functioning. There is a clear parallel between scientific abstractions, concepts and conceptual systems on the one side and value as the manifestation of abstract labour on the other. The intellectual property system is imposing on science the rule of capital. Science is the cognition of necessity. For Marxists, socialism is recognition of necessity. Knowledge is liberation.

Capital envisages for knowledge commons a role in the process of capital accumulation. Socialism envisages knowledge commons for transformation. Science is for transformation. Science is not for domination. Capital is trying to dominate humanity as well as nature. Monopoly over knowledge is a threat to democracy, public interest and progress – scientific, technological and economic. Even under capitalism, intellectual property monopolies are undermining social and scientific progress.

For Marxists, class struggle starts with the resistance against immediate threats arising out of the strengthening of the property form and the imposition of the value form of knowledge production for market-based exchange. Struggles being undertaken to save and protect the space for social, scientific and technological progress need to be given importance. Production of knowledge for use towards the advancement of public interest, social progress and democracy is the integral goal of socialism.

When science is in the process of being subsumed to capital the challenge of protection of public interest in science requires struggle against the regressive trend of strengthening of intellectual property. For the achievement of counter-hegemony for social transformation Marxists must actively contribute to the struggle for transformative science which promotes the value form in which reflexivity, broadening of space for socially responsible innovations, participation, self-organization and public scrutiny and change in class correlation to alter the balance in favour of public interest, social progress and democracy are equally well counted.

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