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Knowledge Production and Intellectual Property: A Perspective on Scientific Publications in the Capitalist System

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Abstract: The digital revolution has reshaped the production, dissemination, and accessibility of scientific knowledge. However, capitalist logic persists, commodifying intellectual labour and concentrating market power within a few mega-publishers. This article critically examines scientific publishing through the lens of Marx's theory of value, focusing on intellectual property rent as a mechanism of capital accumulation. By highlighting the Brazilian higher education system – where public resources are redirected to private publishers via paywalls and Article Processing Charges (APCs) – the paper exposes the contradictions of contemporary academic publishing. It critiques the dual exploitation of researchers as producers and consumers of knowledge and argues for alternative, equitable models like Open Access. Situating the analysis within global and local contexts, the article advocates for the democratisation of scientific knowledge as a resistance to commodification and privatisation.

Keywords: Marxism, intellectual property rent, academic publishing, open access, commodification of knowledge

1. Introduction

The 2018 documentary xPaywall: The Business of Scholarship"[1] sparked discussion on the fees paid for access to publicly produced knowledge and the benefits of open access. Although the accessibility of scientific articles has long been debated[2], it gained momentum in the early 21st century due to expanded internet networks. With the possibility of virtually distributing scientific articles, the mode of knowledge circulation gradually changed, causing printed journals to reduce their print runs until the point where currently, even though they still exist, the majority offer the option of accessing their content digitally. This mode of virtually providing articles can be done at significantly lower costs compared to the process of printing journals.

This digital transformation of the scientific publishing industry has reshaped the accessibility and distribution of knowledge. Initially envisioned as part of a collaborative, academic infrastructure, these networks have increasingly been subsumed under corporate control, reflecting broader neoliberal values that prioritise profit over equitable

[1] https://paywallthemovie.com

[2] Launched in 1991, the arXiv repository is an example of how knowledge can be distributed freely. Its scope covers areas such as physics, mathematics, computer science, quantitative biology, financial mathematics, statistics, electrical engineering, systems science, and economics. Although it lacks peer review, the site has an "arXiv moderation process [that] strives to disseminate research rapidly while maintaining content and technical standards. Each article submitted by an author is subject to this process, which verifies whether submissions are relevant to the scientific community and adhere to arXiv policies" (Morano 2019). After more than thirty years online, the repository now hosts over 2 million scientific articles, all submitted and made available for free. To learn more about arXiv and the impact of preprint publications, see Larivière et al. 2014.

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access. Rather than democratising access, this transformation has entrenched the profit-driven logic of capital. As Rigi (2014) argues, the value of information approaches zero due to the negligible cost of digital reproduction. Nonetheless, the publishing industry defies this logic by charging exorbitant rents for access to scientific knowledge, maintaining artificial scarcity through paywalls and Article Processing Charges (APCs). Mega-publishers like Elsevier and Springer dominate the market, leveraging both traditional paywalls and Open Access models such as APCs to extract value. Those mega-publishers have taken the lead in the field, acquiring smaller publishers, leading to the accumulation of capital and the oligopoly of academic publications. “Publishers’ activities are often distributed among multiple companies under their control, and over the past 40 years, there have been many mergers and acquisitions involving entire companies or parts of them” (Larivière, Haustein and Mongeon 2015, 3).

This article interrogates the mechanisms through which the publishing industry commodifies intellectual labour, using Marx’s theory of value as a framework. Intellectual property rent emerges as a central concept to understand the privatisation of knowledge. Special attention is given to Brazil, where public universities like the University of São Paulo (USP) face significant financial pressures to sustain access to scientific publications. The aim is to expose the contradictions of the current publishing model and advocate for a more equitable system.

The paper is structured as follows: Section 2 examines the theoretical foundations of knowledge production through Marx’s lens, establishing the connection between intellectual labour and capitalist dynamics. Section 3 explores the concept of intellectual property rent and its implications for the commodification of knowledge. Section 4 focuses on the scientific publishing market, with a particular emphasis on the Brazilian context, while Section 5 discusses movements advocating for Open Access and challenges to the current system.

2. Mental Representations, Consciousness, and Knowledge Production

This section aims to establish the theoretical foundation for understanding how scientific publishing perpetuates the alienation of intellectual labour, drawing on both Marx’s early works, particularly *The German Ideology*, and his later writings in *Capital*. While some critiques argue against blending Marx’s early and later works due to their different emphases – such as the early focus on ideology and the material basis of consciousness versus the later focus on economic relations and labour theory – I believe that integrating these perspectives offers a more comprehensive framework. By combining these views, we can uncover the potentialities of a more nuanced understanding of how intellectual labour is alienated in contemporary capitalism. The early works highlight the role of consciousness and ideology in shaping labour relations, while the later writings deepen our understanding of the economic structures that sustain these relationships, making the integration of both perspectives crucial for a full analysis.

Knowledge production is inherently tied to material and social realities, reflecting the interplay between labour, consciousness, and the conditions under which humans interact with the world. Rigi (2014) identifies intellectual property as a mechanism of rent extraction, where monopolistic control transforms reproducible information into an artificial source of profit. This dynamic is evident in the scientific publishing industry, where public institutions pay publishers multiple times for the knowledge they generate.

Marx and Engels’ insights into the nature of consciousness reveal the inherently social origins of intellectual labour. Human beings generate knowledge not in isolation

but through collective engagement with their environment, mediated by language and practice.

To understand, humans must first engage with the object of knowledge[3]. This historical process of acquiring consciousness is driven by the intrinsic need of human beings to transform nature for the production of material conditions of existence and to interact with one another for their own reproduction. Thus, the acquisition of consciousness by human beings is not only a historical process but also a social one, ranging from the "purely animal consciousness of nature" (Marx and Engels 1998, 50) to sensitive consciousness (which occurs when there is still limited human-nature interaction[4]) and, ultimately, to rational consciousness (marked by the complete abstraction between material and spiritual labour).

Through such interactions, human beings develop mental representations of the objects they have interacted with and of themselves[5]. In this manner, consciousness is, from its inception, a "social product, and remains so as long as men exist at all" (Marx and Engels 1998, 50). However, it is only through the division between material and spiritual labour that:

> From this moment onwards consciousness *can* really flatter itself that it is something other than consciousness of existing practice, that it *really* represents something without representing something real; from now on consciousness is in a position to emancipate itself from the world and to proceed to the formation of "pure" theory, theology, philosophy, morality, etc. But even if this theory, theology, philosophy, morality, etc., come into contradiction with the existing relations, this can only occur because existing social relations have come into contradiction with existing productive forces (Marx and Engels 1998, 50-51).

Thus, for Marx and Engels, so-called "pure" knowledge can be developed from the moment consciousness moves beyond the exclusively mechanical nature of practice, when mental representations can surpass the bodily presentation found in human-nature and human-human relationships. However, since these mental representations stem from the material and social world in which we are situated, such representations can never completely detach from what is lived and experienced.

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[3] This contact can occur "through pure contemplation or through a process of labour (i.e., the transformation of that object)" (Moura 2020, 75).

[4] According to Marx and Engels, from the very beginning of human history, there is interaction between the individual and nature, but initially, this interaction aims at "the production of material life itself" (Marx and Engels 1998, 47) by satisfying the most basic needs such as food and drink. With the complexity of these needs increasing, leading to more interactions between humans and nature, as well as between humans themselves, the emergence of the family, which initially constitutes the sole social relation, later evolves as "increased needs create new social relations and the increased population new needs" (Marx and Engels 1998, 48).

[5] "The ideas which these individuals form are ideas either about their relation to nature or about their mutual relations or about their own nature. It is evident that in all these cases their ideas are the conscious expression — real or illusory — of their real relations and activities, of their production, of their intercourse, of their social and political conduct. The opposite assumption is only possible if in addition to the spirit of the real, materially evolved individuals a separate spirit is presupposed. If the conscious expression of the real relations of these individuals is illusory, if in their imagination they turn reality upside-down, then this in its turn is the result of their limited material mode of activity and their limited social relations arising from it." (Marx and Engels 1998, 41, second footnote).

This knowledge has no utility until it is applied or shared[6]. Although certain contemporary trends assert the immaterial nature of knowledge (Amorim 2009; Gorz 2005; Moulier-Boutang 2011), its transformative potential only exists within its materiality. Subjectivity and immateriality cannot be generated except through the objectivity and materiality of human relations (Pimentel and Silva 2019).

With human subjectivity being determined from the real and material, the knowledge it produces requires a return to materiality to contrast itself with the existing relations there. Marx and Engels point out that this return, this connection between these two domains, occurs through language, since the mind is "from the outset afflicted with the curse of being 'burdened' with matter, which here makes its appearance in the form of agitated layers of air, sounds, in short, of language" (Marx and Engels 1998, 49).

Having language as a necessary factor for the development of consciousness and knowledge is crucial for understanding how the subjective and the material can connect: language is a social product, developed from the real and practical need of humans to interact with one another. In addition to being social, language is also individual, and consciousness, also developed from the social, is structured within the individual through this language. Finally, through the separation between material and spiritual labour, consciousness emancipates itself from praxis, developing abstract knowledge that becomes useful only when it returns to material form, either through praxis or through sharing via language. "Just as head and hand belong together in the system of nature, so in the labour process mental and physical labour are united" (Marx 1992, 643).

Consciousness and knowledge are outcomes intrinsically linked to the social and economic structure in which we find ourselves, tied to the practice of our activities. Now, if we live in a society where humans are alienated from the products of their activities, where work does not aim at satisfying immediate needs but those of others, the developed consciousness will also exhibit these characteristics of reality inversion.

> Men are the producers of their conceptions, ideas, etc., that is, real, active men, as they are conditioned by a definite development of their productive forces and of the intercourse corresponding to these, up to its furthest forms. Consciousness [*das Bewusstsein*] can never be anything else than conscious being [*das bewusste Sein*], and the being of men is their actual life-process (Marx and Engels 1998, 42).

If, therefore, materiality presents itself in an inverted and fetishised manner in the process of human beings' real life, their consciousness will also represent this reality in an inverted and fetishised manner, thereby impacting the knowledge generated by human beings. In a capitalist system, the process of creating knowledge is also inverted. Intellectual labour becomes alienated, as its outputs – scientific articles, data, and findings – are commodified. Researchers, often funded by public institutions, produce knowledge that is privatised by publishers and sold back to the very institutions that enabled its creation. This dynamic reflects the broader alienation of labour described by Marx, where the separation of intellectual and material efforts mirrors the commodification of all forms of work.

[6] "The question whether objective truth can be attributed to human thinking is not a question of theory but is a *practical* question. Man must prove the truth, i.e., the reality and power, the this-worldliness of his thinking in practice. The dispute over the reality or non-reality of thinking which is isolated from practice is a purely *scholastic* question" (Marx and Engels 1998, 569).

The alienation of consciousness in a capitalist society mirrors the broader alienation experienced in intellectual labour. Scientific knowledge, a product of collective human engagement and consciousness, becomes detached from its creators when commodified through intellectual property regimes. Researchers, alienated from the outputs of their labour, experience a disconnection between the social origins of their work and its privatised outcomes. This alienation is exacerbated when institutions, often publicly funded, must repurchase access to knowledge they enabled. Marx's critique of the separation between mental and manual labour reveals the deep structural contradictions within this system, where the "pure" knowledge produced is no longer a public good but a commodity dictated by market forces.

In Brazil, this alienation is starkly evident. Researchers are mostly publicly funded and generate knowledge that is often privatised by major publishing corporations. Rigi (2014) underscores the global extraction of surplus value through information monopolies, a dynamic mirrored in Brazil's scientific publishing system. Public universities fund research, pay publishers to disseminate it, and then repurchase access, funnelling public resources into private hands. Brazilian universities, like the University of São Paulo (USP), allocate large portions of their budgets to purchasing journal subscriptions and paying APCs[7]. These funds, intended for public education and research, are redirected to private publishers who profit from the labour and knowledge produced within public institutions. This system exacerbates intellectual labour alienation in Brazil, reinforcing global commodification. Moreover, Brazilian researchers often face significant financial strain due to the increasing costs of APCs and journal subscriptions, which are essential for maintaining the global visibility and credibility of their research. The financial burden of these practices contributes further to the exploitation of intellectual labour, reinforcing the capitalist logic that governs the academic publishing system.

By situating the production of knowledge within the framework of Marx's theory of value, we can better understand its transformation into a commodity subject to market forces. Echoing Rigi's (2014) critique of information monopolies, this paper argues that Open Access models based on APCs fail to address the fundamental alienation of intellectual labour. Instead, they reconfigure barriers to access in ways that align with capitalist imperatives, further extracting rents from researchers and institutions. In this context, the commodification of scientific knowledge becomes a mechanism through which capital extracts value from intellectual labour while distancing creators from their own work.

3. Land Rent and Intellectual Property Rent

The commodification of knowledge through intellectual property rent parallels Marx's concept of land rent. Unlike commodities with measurable value based on socially necessary labour time, knowledge lacks intrinsic value. Instead, its price is dictated by monopolistic control and its perceived utility.

Intellectual property rent in publishing manifests through paywalls and artificial scarcity. Similar to Rigi's (2014) analysis of land rent, the rent extracted by publishers through intellectual property rights reflects the commodification of knowledge as a 'free gift' of human labour. This monopolisation is exemplified by Elsevier, which reports profit margins exceeding 40% by restricting access to publicly funded research (Larivière, Haustein and Mongeon 2015). Meanwhile, Open Access models like Gold Open Access shift costs from readers to authors or their institutions, who pay APCs to make

[7] Data will be shown in Section 4.

their work available. This dual model ensures that publishers extract value at both ends of the knowledge production cycle, either from the author or the reader.

Beyond the scientific publishing industry, the commodification of knowledge extends to digital goods like software, algorithms, and databases. Patents on algorithms, for instance, exemplify how corporations monopolise immaterial knowledge products, creating artificial scarcity through intellectual property rights. These digital goods, though non-rival in nature, are priced according to their perceived utility rather than the labour invested in their creation, reinforcing the disconnection between value and price in the knowledge economy. This dynamic mirrors the commodification of scientific articles and highlights the broader reach of intellectual property rent in contemporary capitalism.

In this context, APCs have deepened the commodification of academic labour, especially in publicly funded research systems like Brazil. Researchers, who often rely on institutional support to cover APCs, find themselves caught in a system where knowledge production and dissemination are increasingly monetised. Plan S, an Open Access initiative aimed at increasing the accessibility of publicly funded research, exemplifies the contradictions of this system. While promoting openness, it also reinforces the commodification of knowledge, as authors and institutions bear the financial burden of APCs. As Lund and Zukerfeld (2020) observe, this model expands capital's reach into academic labour, masked as democratisation.

Open Access models like APCs reflect the economic alienation of labour and a distortion of scientific consciousness. While framed as a democratisation of knowledge, these models detach researchers from their collective achievements. The rhetoric of "openness" obscures how consciousness is shaped by systemic market forces that commodify even the act of sharing. Researchers are compelled to participate in these systems, driven by institutional mandates to publish in high-impact journals, often at significant personal or institutional cost. This commodification of consciousness underscores the paradox of Open Access initiatives: rather than dismantling barriers to knowledge, they reconfigure those barriers to align with capitalist imperatives.

Liberal approaches to Open Science, while ostensibly democratising access, often fail to address the structural inequalities underpinning knowledge production. Frameworks such as FOSS (Free and Open-Source Software) promote openness yet remain co-opted by capitalist enterprises that exploit the rhetoric of freedom for profit. As Lund and Zukerfeld (2020) argue, these models can inadvertently extend capital's reach into previously uncommodified domains by transforming openness into a marketable asset. Similarly, Open Science initiatives risk perpetuating exploitation if they do not challenge the foundational dynamics of intellectual property rent and academic labour commodification.

3.1. Patents and the Expansion of Surplus Value Extraction

One way for an individual capitalist to increase their rate of surplus value is through enhancing the productive power of labour. Surplus value, in Marxist terms, refers to the value produced by labourers that exceeds the value of their labour-power (i.e., the wages they receive). This surplus is appropriated by the capitalist as profit. The rate of surplus value, therefore, measures the ratio of surplus labour (the time spent producing surplus value) to necessary labour (the time spent producing value equivalent to wages). Marx addresses this in chapters 15 and 16 of the first volume of *Capital*. When assessing the conditions for determining the relative magnitude of surplus value, Marx takes into account three factors: the duration of the working day, its intensity, and its productive power. If only the latter is altered, it "follows from this that an increase in the

productivity of labour causes a fall in the value of labour-power and a consequent rise in surplus-value" (Marx 1992, 657). In the context of knowledge production, these dynamics manifest differently, as the commodification of intellectual labour shifts the emphasis from material productivity to immaterial processes, such as the creation and control of information. Enhancements in digital infrastructures and technologies, for example, can increase the 'productivity' of knowledge workers by allowing publishers to extract surplus value more efficiently through cost reductions in distribution, editing, and access mechanisms like paywalls and APCs.

An individual capitalist can invest in new technology to, for example, double production output. Considering that the "real value of a commodity, however, is not its individual, but its social value; that is to say, its value is not measured by the labour-time that the article costs the producer in each individual case, but by the labour-time socially required for its production" (Marx 1992, 434), the commodity produced by this capitalist will have the same average social value as all other commodities produced by capitalists who do not possess this new technology.

The individual capitalists maintain technological advantages to extract greater surplus value and increase profit. To prevent these technological advancements from being used by all capitalists, intellectual property and patents come into play. This type of knowledge monopoly can be referred to as intellectual property rent, drawing an analogy to land rent.

3.2. Ground Rent and Intellectual Property Rent

Within Marx's theory of value, value is a distinct category from price. Although they are distinct, they are still interconnected. Grespan (2011) explains that while value is grounded in socially necessary labour time, market competition introduces deviations in price, emphasising how rent exemplifies the disconnection between value and price.

Therefore, while value has a clear definition within Marxian theory as the socially necessary labour time for the production of a commodity, price can fluctuate, being higher or lower than the value of the commodity in question. Among the commodity forms discussed by Marx in Book III of *The Capital*, land rent is the final step in this disparity between value and price.

Bare land refers to land without any improvements. When improvements are made, they are carried out by tenants and increase the rent that the landowner can charge for their land in the future. The only legal justification for the landowner to charge rent is that they have private ownership of that land, on which no work has been done and no value has been generated.

Defining a price for land is only possible due to the monopolisation of land by certain capitalists, who attribute this conceptualisation of a commodity to something natural, albeit a commodity that costs nothing to reproduce. Intellectual property rent also resonates with Marx's insights on ecology, particularly his understanding of nature as a "free gift" to capital. Just as landlords extract rent from landowners without contributing to the production process, intellectual property owners' profit by monopolising immaterial resources that arise from collective human labour and ingenuity. This analogy underscores how capital exploits both natural and intellectual resources, commodifying what should function as public goods. By framing intellectual property rent within Marxist ecological theory, we see it as part of a broader capitalist strategy to enclose and extract value from common resources.

To determine the price, the use value comes into play. If we look at the present day, why is a beachfront apartment more expensive than one three blocks away? And even within the same beachfront building, why does an apartment on the first-floor cost less

than one on the tenth? When we delve into the question of setting prices for products that lack value, subjectivity comes into play again because a commodity is an external object that satisfies some human need, whether that need arises “from the stomach, or the imagination” (Marx 1992, 125).

Similar to land, we can say that knowledge lacks value according to Marx’s formal definition because it does not embody average socially necessary labour time in a straightforward manner. Marx’s analysis of land as a ‘free gift of nature’ to capital, where its value is derived from its use rather than intrinsic properties, provides a useful analogy. Like land, scientific knowledge gains pricing power exclusively through its use value, which capital exploits by commodifying its access and distribution. We argue that scientific knowledge has no value for two main reasons: First, there is no average social time required for the production of an article, as each article reflects varying degrees of intellectual labour and collaboration, making standardisation impossible. Second, while competition exists within the scientific sphere, articles are not materially identical; each is unique, akin to craftsmanship. This uniqueness, however, does not exempt scientific knowledge from being subsumed under capital. For instance, publishers impose rents on access through mechanisms like paywalls and Article Processing Charges (APCs), effectively commodifying what is intrinsically a non-rivalrous good. These dynamics highlight the tension between knowledge’s immaterial nature and its commodification, which is explored further below.

Just as with bare land rent, private ownership is the sole legal foundation that allows certain companies to charge for access to a scientific article. Jeon (2015) argues that abolishing intellectual property rights would eliminate monopoly pricing, aligning the price of information commodities with their intrinsic labour value – effectively zero.

In the context of academic publishing, this monopoly on knowledge is further exacerbated by the increasing concentration of the publishing market in the hands of a few global players who control the distribution and access to scientific research. This concentration in the hands of a few multinational corporations operates similarly to land rent, where the ‘landowners’ – publishers – benefit from the scarcity they create through exclusive intellectual property rights. Patents and copyrights in publishing privatise knowledge, cementing publishers’ monopolistic control. As knowledge becomes more commodified, the flow of research becomes constrained, ensuring higher profits for these corporations while limiting access to the broader academic community.

4. The Scientific Publishing Market and the Importance of Open Access Journals

Just like landowners, owners of scientific knowledge also charge a certain price for access to their properties. At this point, these properties appear as commodities, and there are various jurisdictions to prevent and punish those who infringe upon these ownership rights. The concentration of the scientific publishing market in the hands of a few multi-national corporations has profound implications for academia. These entities leverage their oligopolistic control to maximise profits, often operating with profit margins exceeding 40% (Larivière, Haustein and Mongeon 2015). This is achieved through a combination of subscription fees, APCs, and the acquisition of smaller publishers to consolidate market share. Fuchs and Sandoval (2013) argue that for-profit publishers commodify academic knowledge through high subscription fees and exploit the unpaid labour of academics who review and edit manuscripts. These practices privatise knowledge produced with public funds, underscoring the urgent need for alternative models of open access.

However, unlike land, scientific knowledge is a non-rival and non-excludable good and should, therefore, adhere to its formal character as a public good. Yet, under the

logic of capital, scientific knowledge becomes a form of private property, mediated through legal, economic, and technological means. Marx's analysis of private property, particularly its mediation through the division of labour and commodity exchange, provides a critical lens to examine this transformation. For example, intellectual property laws and digital infrastructures enforce artificial scarcity, transforming a non-material, inherently shareable good into a commodified asset. Moreover, just as Marx connected land improvements to scientific enrichment and technological development, the commodification of scientific knowledge involves similar processes. Technologies like digital repositories and advanced publication platforms are used to extract rents, creating value not from production but from access and control. In this dynamic, scientists receive no direct compensation for their labour after publication. Instead, surplus value is captured by publishers, who exploit the unique position of scientific knowledge as a public good reconfigured into private property through mechanisms such as paywalls, APCs, and intellectual property rights. These dynamics highlight the tension between the forces of production, which make knowledge broadly accessible, and the relations of production, which constrain it within capitalist logics of commodification and rent extraction.

All intellectual properties of scientific knowledge and the income generated from it are unique and exclusive to publishers, nowadays mega corporations with exorbitant profit margins. In an article published in 2015 (Larivière, Haustein and Mongeon 2015), we can gain a real understanding of how publishers, particularly Elsevier, have been increasing their revenue year after year.

The figures related to Elsevier's revenue and profit margin clearly illustrate the massive profits generated by the monopolisation of knowledge. These profits are not the result of added value to the content created by researchers but rather from the control over access to that knowledge. This situation mirrors the logic of land rent, where value is extracted not through production but through ownership and control of access.

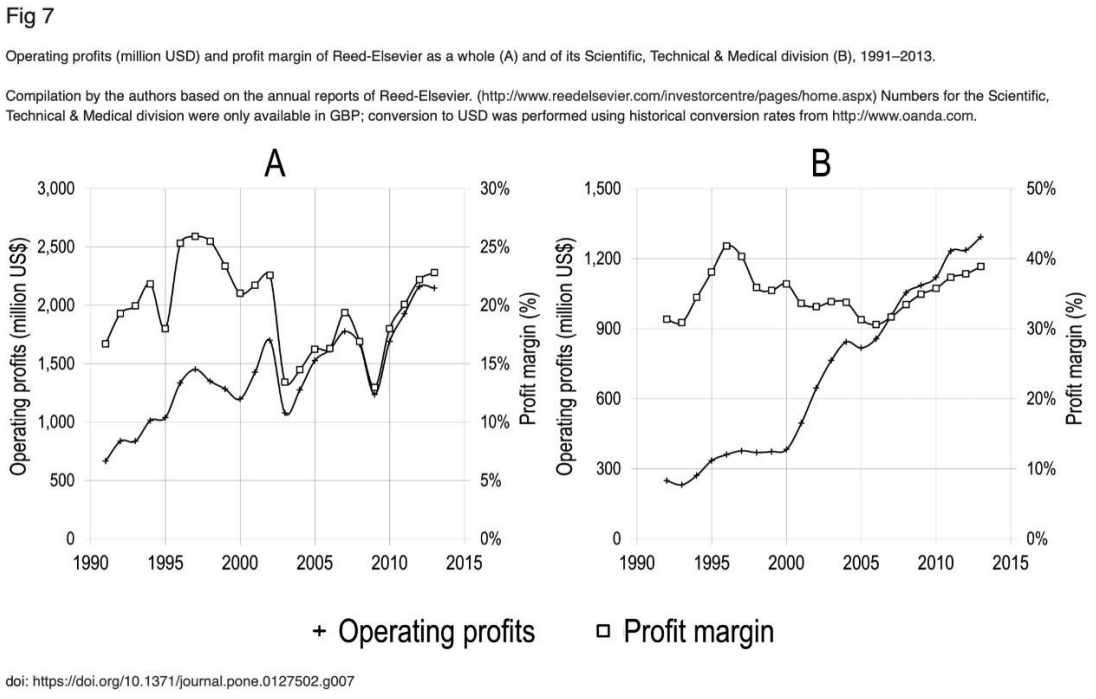

Figure 1: Elsevier's Revenue and Profit Margin between 1991-2013. Acknowledgement: Reproduced from Larivière, Haustein, and Mongeon (2015, 11) that uses a Creative Commons CC-BY licence that allows reproduction.

On the left side, we have the revenue and profit margin of the then Reed-Elsevier group. On the right side, the same categories are presented for the Science, Technology, and Medicine division. What is most striking is that, although the company's profit margin remains relatively consistent, it never falls below 15%. In the Science, Technology, and Medicine division, this margin exceeds 40% in the late 1990s.

When we read the 2023 annual report of RELX, the conglomerate to which Elsevier belongs, we see that the publishing division operated with 90% of the revenue coming from the sale of electronic articles, and more than 70% of this revenue derived from subscriptions, many of which are from educational and research institutions (RELX, 2023). The report further details that the total revenue for 2023 amounted to £3,062 million. This revenue is also geographically concentrated, with nearly half (47%) coming from North America, while Europe accounts for 22%, and the rest of the world contributes 31%. The predominance of electronic formats and subscription-based models underscores the structure of the academic publishing industry, in which institutions must allocate significant resources to maintain access to scientific literature.

Due to the fact that a scientific article cannot be fully replaced by another copy, educational institutions find themselves obligated to use their revenue to subscribe to journals, thereby enabling their researchers to access the necessary articles for their research development. In Brazil, these global dynamics intersect with local realities. Initiatives like SciELO, which promote Open Access, provide an important counterpoint to the dominance of international publishers. SciELO's model, supported by public funding, seeks to democratise access to knowledge by making articles freely available to readers. However, its reach is limited by the entrenched influence of major publishers, whose journals are often perceived as more prestigious due to their impact factors.

In Brazil, public universities like USP use public funds to both produce and access knowledge. In 2024, USP projected an expenditure of around 3.5 million Brazilian reais on subscriptions to scientific journals, which, according to the budget distribution proposal, accounted for 27% of the allocated budget for bibliographic materials. Additionally, another 1.5 million reais were designated as "Support for Scientific Publications (Resources for Publications)," almost 40% of the bibliographic budget directed to academic publishers. This situation exemplifies the 'triple-payment model' defined by the Deutsche Bank in a report from 2005 (Klein 2019), where public institutions fund research, pay for its publication, and then repurchase access.

Reclaiming consciousness from the commodification of knowledge production requires collective resistance to the structures that alienate researchers from their intellectual outputs. As Rigi (2014) concludes, the commodification of information is emblematic of capitalism's contradictions. Overcoming these requires reclaiming knowledge as a public good through collective resistance to intellectual property monopolies and the promotion of genuinely open science. Initiatives like Sci-Hub challenge not only the material barriers to access but also the ideological constructs that frame scientific knowledge as a commodity. By reconnecting the collective origins of intellectual labour with its outcomes, such movements embody a radical reassertion of the social character of science. This reclamation of consciousness transcends economic concerns, advocating for a scientific community grounded in collaboration and shared purpose. The struggle for Open Access, therefore, becomes not just a fight against paywalls but a broader effort to restore the alignment between intellectual labour, collective consciousness, and the public good.

The Brazilian academic system faces unique challenges in resisting the commodification of knowledge. National policies like CAPES' Qualis rankings, which prioritise publications in high-impact journals, force researchers to engage with international

mega-publishers to maintain academic prestige and secure funding. This reliance perpetuates dependence on monopolistic publishing practices, as smaller and local journals often lack the recognition necessary for career advancement. Furthermore, funding cuts to public universities exacerbate the strain on resources, making it even harder to adopt sustainable alternatives like Open Access repositories. These systemic issues highlight the intersection of global academic capitalism and Brazil's internal inequalities.

Public funds allocated to academic publishers channel part of the budget into the private sphere. The international scientific market refers to the network of relationships and exchanges between academics, universities, publishers, policymakers, and global actors advocating for open science. This market operates by commodifying knowledge production and dissemination through mechanisms such as subscription fees, APCs, and paywalls, which allow private publishers to profit from public research. Though publishers don't receive direct public funding, they profit from publicly funded researchers' labour. Public professionals conduct research using public funds, only to pay exorbitant APCs to make their work open access or to rely on institutional subscriptions funded by the same public budget. Moreover, these researchers often act as unpaid reviewers or editors, further contributing uncompensated labour to the publishing process.

This cycle redirects public funds into private hands, as universities must buy subscriptions for articles they produce. The relationships within this market are shaped by the power of transnational publishers, whose oligopolistic control over high-impact journals dictates the terms of knowledge dissemination. Meanwhile, policymakers pushing for open science often face resistance from entrenched publishing interests, which seek to maintain profit-driven practices. These dynamics reinforce existing inequalities in knowledge production, favouring well-funded institutions and researchers while limiting access for under-resourced actors in the Global South. Ultimately, the international scientific market commodifies knowledge, prioritising profit over equitable access and collaborative advancement.

4.1. The Struggle for Open Access to Knowledge

The logic of intellectual property in science is both unjust and contradictory, prompting resistance through initiatives like Sci-Hub, SciELO, and PLoS. Sci-Hub, founded by Alexandra Elbakyan, challenges the legitimacy of intellectual property laws by providing free access to scientific articles. Despite facing legal challenges and being blocked in several countries, Sci-Hub remains a symbol of the fight for democratised knowledge.

On the Sci-Hub website, a tool that enables free access to paid scientific articles, it is stated that:

> The basic unit of scientific knowledge is a publication in academic journal. But journals essentially are vehicles for communication: they exist to communicate, or to make common. Knowledge and communication are inseparable. Hence communism is the true essence of science, information and knowledge (Sci-Hub, 2011).

Although there have been government initiatives dating back to 2003[8] aimed at democratising access to scientific knowledge, such projects are still in their early stages when compared to the publishing market we analysed in the previous section. The intellectual property rights held by such publishers are supported by strong legal measures to ensure their enforcement. Legal actions against the founders of websites like Sci-Hub and Library Genesis are a reflection of this system of protecting private property, sometimes leading to tragic consequences, such as the suicide of Aaron Swartz in 2013[9].

In 2015, Elsevier filed a lawsuit in the New York court against Alexandra Elbakyan – the founder of Sci-Hub – and other websites hosting materials that infringe U.S. copyright laws. The lawsuit was concluded two years later, with the verdict stating that "Elsevier is awarded statutory damages against the Defendants for copyright infringement in the amount of $150,000 for each of the 100 infringed copyrights identified in Exhibit A to this Permanent Injunction, for a total of $15,000,000" (Elsevier Inc. v. Sci-Hub 2017, 3).

In Brazil, the struggle for Open Access is deeply tied to broader issues of inequality and resource allocation. Publicly funded research must prioritise accessibility to ensure that knowledge serves societal needs rather than corporate profits. Efforts like SciELO demonstrate the potential for alternative models but require sustained investment and policy support to scale their impact. The global push for Open Access, such as Plan S, offers a mixed picture. While increasing accessibility, these efforts often reinforce capitalist dynamics by shifting financial burdens to researchers and institutions. A truly transformative approach requires dismantling the structures that commodify knowledge and embracing models that prioritise collective ownership and public good.

> I would also like to mention that Elsevier is not a creator of these papers. All papers on their website are written by researchers, and researchers do not receive money from what Elsevier collects. [...] Authors of these papers do not receive money. Why would they send their work to Elsevier then? They feel pressured to do this, because Elsevier is an owner of so-called "high impact" journals. If a researcher wants to be recognized, make a career – he or she needs to have publications in such journals (Elbakyan 2015, 1-2).

[8] One European governmental measure is the so-called Plan S, which aims to stipulate that all publications resulting from "research funded by public or private grants provided by national, regional and international research councils and funding bodies, must be published in Open Access Journals, on Open Access Platforms, or made immediately available through Open Access Repositories without embargo" (Plan S, n.d.).

[9] Aaron Swartz was a programmer, activist, and hacker who advocated for the free and open distribution of scientific articles. In 2008, he released the Guerilla Open Access Manifesto on the internet, stating that "[t] here is no justice in following unjust laws. It's time to come into the light and, in the grand tradition of civil disobedience, declare our opposition to this private theft of public culture" (Swartz 2008, 2). In early 2011, he was arrested at the Massachusetts Institute of Technology (MIT) after connecting a computer set up to automatically download scientific articles indexed on the JSTOR platform using a user account issued by MIT. More than 1000 articles were downloaded before Swartz was arrested. The United States filed charges against him, and two years after the case was opened, Swartz committed suicide on January 11, 2013. Close friends of his believe that the legal persecution played a significant role in his decision to take his own life. One of these accounts can be read through the following link: https://lessig.tumblr.com/post/40347463044/prosecutor-as-bully. To read texts written by Swartz, cf. Swartz and Lessig 2016.

This quote directly addresses the fundamental contradiction at the heart of the academic publishing system. *Researchers, who are the true creators of knowledge, do not benefit financially from the system they help sustain.* Instead, they are *pressured into contributing to a monopolistic market* that values knowledge not for its social utility, but for its ability to generate profit for publishers. This is particularly evident in the power held by publishers like Elsevier, whose control over "high impact" journals forces researchers to submit to their platforms to gain career advancement, despite not receiving any compensation for their work. The *monopolistic control over scientific journals* and the exploitation of researchers for *prestige* further illustrate how *scientific knowledge is commodified* and how the *publishing system operates as an extension of capitalist exploitation*.

5. Final Remarks

The commodification of scientific knowledge through intellectual property rent is a contradiction in academia. By alienating researchers from their intellectual labour, the current publishing system subordinates knowledge to the logic of capital. This dynamic is particularly acute in Brazil, where public institutions bear the brunt of global publishing monopolies.

Using Marx's theory of value, this article has highlighted the mechanisms through which intellectual property rent operates, from traditional paywalls to Open Access APCs. It has also emphasised the importance of alternative models like SciELO and Sci-Hub in resisting this commodification.

The consequences of the current scientific publication system are manifold: beyond the previously discussed triple-payment scheme with public funds, researchers themselves find themselves hostage to this system. Even if they do not wish to perpetuate this process, the oligopoly of major publishers prevents them from doing so, as "the mantra 'publish or perish' has been replaced by the phrase 'be cited or perish'" (Hunt, Cleary and Walter 2010, 207).

In the same work, after analysing the citation count of the top 80 journals in psychiatry over eight years, Hunt, Cleary, and Walter (2010, 217) conclude: "It is less likely that articles appearing in lower-ranked psychiatry journals will obtain the same number of citations, but some articles will in fact do so, with the number varying widely between journals having similar impact factors".

If in the past, the measure of a researcher's performance was counting how many articles they published per year, now the primary goal is to achieve a higher H-index[10]. While it is not impossible for an article published in a smaller journal to receive many citations, the potential for this to happen is greater when publishing in a journal owned by a major publisher. Though smaller or predatory journals exist, they are less appealing now. The relevance of the H-index can be confirmed from the outset, as journals like Nature (Ball 2005) and Science (Data 2005) even published articles about it when the work developing it was still in preprint.

[10] The H-index is an academic evaluation metric suggested by physicist Jorge Hirsch in 2005. In the original article, Hirsch (2005, 1) points out that the index would allow for "comparing two individuals (of the same scientific age) with a similar number of total papers or of total citation count and very different h values, the one with the higher h is likely to be the more accomplished scientist". The foundation of the index is based on both the quantity of articles published by an author and the quantity of citations these articles receive. To correlate these two factors, the H-index represents a number N of articles that have received at least N citations. Thus, if an author has 5 published articles with citations in descending order of 20, 17, 6, 2, and 1, the author's H-index will be 3 (as they have 3 articles with at least 3 citations).

However, meaningful change requires systemic action. Public policies must prioritise open access to knowledge, ensuring that academic labour remains a shared resource, not a commodity controlled by corporations. This shift should start with greater investment in alternative models of knowledge dissemination, such as SciELO, the Directory of Open Access Journals (DOAJ), and other publicly funded, open-access initiatives. These platforms provide a valuable counterpoint to the oligopolistic control of major publishers, demonstrating that it is possible to create sustainable and accessible models for academic publishing that prioritise the common good over corporate profit. Fuchs and Sandoval (2013) argue for policies that prioritise Diamond Open Access, including public funding models and academic evaluation systems that reward contributions to non-profit journals. Such measures would dismantle the influence of for-profit publishers and reclaim academic knowledge as a public good.

In addition, national and international frameworks for open access should be strengthened. Public funding agencies, such as national research councils, must implement policies that mandate open access for all publicly funded research outputs, eliminating the barriers of APCs and subscription fees that currently prevent broad dissemination. Countries like Brazil and others in the Global South should advocate for international cooperation to support open knowledge infrastructures that allow for the sharing of research without the constraints imposed by commercial publishing monopolies. A global movement, where researchers, policymakers, and institutions collaborate, could lead to the establishment of knowledge commons that make scientific findings freely available to all.

Furthermore, universities and research institutions must lead the way in embracing open-access publishing models. This can include shifting their funding priorities away from paying subscription fees to commercial publishers and toward investing in open-access initiatives or creating their own institutional repositories. Academic labour should be recognised as a social and public good, and public institutions should not contribute to the privatisation of knowledge through the purchase of access to the very research they have funded.

To create a truly transformative publishing system, it is crucial that we move beyond the current framework that commodifies knowledge and instead embrace a model of collective ownership and collaboration. By democratising access to knowledge, we can ensure that research benefits society as a whole, empowering individuals and communities to contribute to and benefit from scientific advancements without being constrained by the logic of profit maximisation. This vision of a more equitable and accessible system can lead to a future where the fruits of intellectual labour serve the collective well-being rather than reinforcing the power of multinational corporations.

References

Amorim, Henrique. 2009. *Trabalho Imaterial: Marx e o Debate Contemporâneo*. São Paulo: Annablume.

Ball, Philip. 2005. Index Aims for Fair Ranking of Scientists. *Nature* 436, 900. https://doi.org/10.1038/436900a

Data Point. 2005. *Science* 309: 1181-1181. https://doi.org/10.1126/science.309.5738.1181c

Elbakyan, Alexandra. 2015. *LETTER Addressed to Judge Robert W. Sweet from Alexandra Elbakyan re: Clarification of Details.* (ajs) (Entered: 09/15/2015). Accessed 5 February 2025. https://www.courtlistener.com/docket/4355308/50/elsevier-inc-v-sci-hub/

Elsevier Inc. v. Sci-Hub. 2017. *ORDER AND JUDGMENT*. Accessed 5 February 2025. https://www.courtlistener.com/docket/4355308/87/elsevier-inc-v-sci-hub/

Fuchs, Christian and Marisol Sandoval. 2013. The Diamond Model of Open Access Publishing: Why Policy Makers, Scholars, Universities, Libraries, Labour Unions and the Publishing World Need to Take Non-Commercial, Non-Profit Open Access Serious. *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society* 11 (2): 428-43. https://doi.org/10.31269/triplec.v11i2.502

Gorz, André. 2005. *O Imaterial: Conhecimento, Valor e Capital*. São Paulo: Annablume.

Grespan, Jorge. 2011. As Formas da Mais-Valia: Concorrência e Distribuição no Livro III de O Capital. *Crítica Marxista* (33): 9-30. https://doi.org/10.53000/cma.v18i33.19312

Hirsch, Jorge Eduardo. 2005. An Index to Quantify an Individual's Scientific Research Output. *Proceedings of the National Academy of Sciences*, 102 (46): 16569-16572. https://doi.org/10.1073/pnas.0507655102

Hunt, Glenn E., Michelle Cleary and Garry Walter. 2010. Psychiatry and the Hirsch h-index: The Relationship Between Journal Impact Factors and Accrued Citations. *Harvard Review of Psychiatry*, 18 (4), 207-219. https://doi.org/10.3109/10673229.2010.493742

Jeon, Heesang. 2015. *Knowledge and Contemporary Capitalism in Light of Marx's Value Theory*. PhD diss. University of London. https://eprints.soas.ac.uk/26177/1/4485_Jeon.pdf

Klein, Samuel. 2019. Turning the Supertanker: Deutsche Bank on Elsevier's Excess. Accessed 5 February 2025. https://notes.knowledgefutures.org/pub/supertanker/release/4

Larivière, Vincent, Cassidy R. Sugimoto, Benoit Macaluso, Staša Milojević, Blaise Cronin and Mike Thelwall. 2014. ArXiv E-Prints and the Journal of Record: An Analysis of Roles and Relationships. *Journal of the Association for Information Science and Technology* 65 (6): 1157-69. https://doi.org/10.1002/asi.23044

Larivière, Vincent, Stefanie Haustein and Philippe Mongeon. 2015. The Oligopoly of Academic Publishers in the Digital Era. Edited by Wolfgang Glanzel. *PLOS ONE* 10 (6): e0127502. https://doi.org/10.1371/journal.pone.0127502

Morano, Janelle. 2019. *Our Moderation Process*. Accessed 5 February 2025. https://blog.arxiv.org/2019/08/29/our-moderation-process/

Marx, Karl and Friedrich Engels. 1998. *The German Ideology*. Prometheus Books.

Marx, Karl. 1992 *Capital Volume 1. A Critique of Political Economy*. Penguin Classics.

Moulier-Boutang, Yann. 2011. *Cognitive Capitalism*. Polity.

Moura, Pollyanna Paganoto. 2020. *O Regime Internacional de Propriedade Intelectual e Suas Implicações Para as Relações Econômicas Centro-Periferia.* PhD diss. Universidade Federal do Rio Grande do Sul. https://lume.ufrgs.br/handle/10183/216163

Pimentel e Silva, Christiane. 2019. O Método em Marx: a Determinação Ontológica da Realidade Social. *Serviço Social & Sociedade*, 34-51. https://doi.org/10.1590/0101-6628.164

Plan S. N.D. *Plan S Principles.* Accessed 5 February 2025. https://www.coalition-s.org/plan_s_principles/

RELX. 2023. *Annual Report and Financial Statements, 2023*. Accessed 5 February 2025. https://www.relx.com/~/media/Files/R/RELX-Group/documents/reports/annual-reports/relx-2023-annual-report.pdf

Rigi, Jakob. 2014. Foundations of a Marxist Theory of the Political Economy of Information: Trade Secrets and Intellectual Property, and the Production of Relative Surplus Value and the Extraction of Rent-Tribute. *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society* 12 (2). https://doi.org/10.31269/triplec.v12i2.487

Sci-Hub. 2011. *Alexandra*. Accessed 5 February 2025. https://sci-hub.se/alexandra

Swartz, Aaron. 2008. *Guerilla Open Access Manifesto.* Accessed 5 February 2025. https://ia800605.us.archive.org/15/items/GuerillaOpenAccessManifesto/Goamjuly2008.pdf

Swartz, Aaron and Lawrence Lessig. 2016. *The Boy who Could Change the World*. Verso.

USP. 2024. *Proposta de Distribuição Orçamentária 2024*. Accessed 5 February 2025. https://sites.usp.br/codage/wp-

content/uploads/sites/264/2022/12/2024_Proposta_de_Distribuicao_Orcamentaria_Aprovada.pdf

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