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Dependency in the Digital Age? The Experience of Mercado Libre in Latin America

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ABSTRACT

This article uses Mercado Libre, the leading digital platform company in Latin America, as an illustrative case to analyse the effect of regional platforms on development, by considering their interplay with both global leaders and local actors. Building on dependency theory, the article identifies the company's structural dependence on algorithms and computing power provided by the largest information technology (Big Tech) companies in the United States. Nonetheless, it also finds that Mercado Libre is at the frontier in applied data analysis solutions tailored for its businesses. Together with a privileged access to personalized and cross-fertilized market and financial datasets, the company's internal and purchassed technologies are the source of asymmetric relationships with its platforms' users. The article conceptualizes Mercado Libre's place in digital capitalism as extractivist with local actors and, just like local elites when dependency theory was first formulated, it is complicit with global powers. But, unlike those elite firms, it is not technologically laggard, and its value capture is underpinned by its technological advantage. Thus, this article conceptualizes (digital) dependency as multiple layers of economic power in which leading firms from the peripheries occupy intermediate and interconnecting positions. It shows that, while these regional leaders operate at the technological frontier, economic power relations based on technological asymmetries remain crucial for studying underdevelopment.

INTRODUCTION

Mercado Libre (meaning 'free market' in Spanish) is an Argentinean e-commerce and financial technology (or fintech) platform company. In June 2023, according to multinational financial broker Hantec, it was the fourth largest Latin American company in terms of market capitalization.[1]

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1. See Hantec Markets trading statistics: https://hmarkets.com/largest-latin-american-companies/#mercado-libre (accessed 23 October 2023).

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The company's 2021 Annual Report states that it is 'the largest online commerce ecosystem in Latin America based on unique visitors and page views' (Mercado Libre, 2021: 5). The fintech segment complements and reinforces the marketplace with e-payment and e-credit solutions. By 2021, fintech accounted for 34 per cent of the company's total revenues. Its businesses rely on harvesting and crunching the largest data sources in Latin America, which require the use of advanced digital technologies such as artificial intelligence algorithms and computing power.[2]

This article analyses the place of Mercado Libre in the global and regional hierarchies of digital capitalism and aims to identify whether the emergence of regional leading platform companies hinders or contributes to development. Towards this end, building on dependency theory,[3] we simultaneously consider the polarizing tendencies of global capitalism and identify the specific constraints faced by Latin America as a peripheral region (Kvangraven, 2021).

In terms of global structures, we examine the company's insertion in global digital capitalism. According to dependency theory, a crucial source of the perpetuation of underdevelopment is the unequal exchange between firms from core countries that are global technology producers and firms from the peripheries that are dependent technology users (Amin, 1974; Dos Santos, 1970; Kvangraven, 2021; Marini, 1973). Although Chinese Big Tech[4] companies (for example, Alibaba Group Holding Limited, Tencent and Baidu) exemplify autonomous technological catching-up that does not fit with that view, this catch-up took place under very specific conditions unique to China's more general catching-up and the role of its state (Lundvall and Rikap, 2022). Moreover, there is evidence of regional platforms from other parts of Asia and Africa that depend structurally on foreign technologies (e.g. Athique and Kumar, 2022; Kwet, 2019; Rajan, 2021). While these studies focus on the relations between regional platforms and global leaders, this article takes a more comprehensive view and analyses the interplay of a regional platform with both global leaders and local actors.

If Mercado Libre is found to be dependent on foreign technologies, it can be argued that the company operates as a channel for foreign capital accumulation. Following dependency theory, it would be complicit with foreign capital, reinforcing underdevelopment, just like local elites in the past. However, the complicit role of those local elites was precisely expressed in their lack of interest in developing indigenous innovative or frontier

2. For a comprehensive account of the complementarities between data, algorithms and computing power, see Crawford (2021).
3. In this article we use the terms dependency theory, dependency school or approach interchangeably. We take note of its internal discrepancy, which led even some of its initial contributors to speak of a school instead of theory, but the approach is mostly known as dependency theory, so we still use the reference in different parts of the text.
4. Big Tech refers to the largest information technology (IT) companies globally. In the US the five Big Tech companies are Alphabet (Google), Amazon, Apple, Meta and Microsoft.

industries. By contrast, Mercado Libre operates in an industry in which Latin America does not have comparative advantages and yet functions with state-of-the-art technologies. Even with its dependence on foreign digital technologies, the company must have developed capabilities to adapt and adopt them. Therefore, a competing hypothesis posits that, even if it is far from overtaking global leaders, by adapting those foreign technologies it could develop frontier advancements that in turn lead to industrial spillovers in Latin America. In such a case, the company would not be complicit with foreign capital but simply constrained by its dependence on foreign technology, just like other firms in the region, while driving some structural change.

This article uses traditional and alternative indicators to identify the technological capabilities of the e-commerce company and complements these with online in-depth semi-structured interviews conducted from mid-2022 to mid-2023. We interviewed three employees from Mercado Libre (two working as data analysts and one as an artificial intelligence or AI developer) and six experts — two from the public sector in Argentina and four from the private sector. The latter group included a former founder of an Argentinean digital company, a digital marketing specialist who had worked, among others, for Globant (a leading IT and software development company from Argentina, selling digital solutions both in Latin America and to developed countries), and a senior director at Globant. Given the sensitive information disclosed, the identities of these interviewees must remain anonymous, as agreed with them before the interviews. We also interviewed Ignacio Carballo, Head of Crypto and Alternative Finances in Americas Market Intelligence. We asked interviewees how data were obtained and processed, how algorithms were coded and upgraded and to what extent third-party technologies were used and could be replaced. We questioned experts and employees about the reasons for the success of Mercado Libre and what they considered to be threats to or challenges for the company. We also asked all the interviewees about Mercado Libre's relations with the third-party players of its platform.

The aim was to show that neither of the two competing hypotheses described above is completely accurate, even if there is some truth in both. Our hypothesis builds on, but also departs from, those two alternative hypotheses and argues that Mercado Libre is simultaneously operating in a complicit way with foreign capital, along the lines explained by dependency theory, but that unlike the elites of the 1960s and 1970s (detailed in the next section) the company is not a technology laggard. However, its technological advantage hinders development because Mercado Libre has monopolized, and keeps secret, its datasets and algorithms, instead of fostering spillovers.

Overall, our combined quantitative and qualitative analysis offers a comprehensive account of the company that contributes to understanding the complex processes of technological dependency in digital capitalism. Anticipating our results, we found that it has advanced capabilities to harvest and analyse big datasets and to develop artificial intelligence to that

end. Simultaneously, in accordance with the literature on regional platform leaders (e.g. Athique and Kumar, 2022; Jin, 2017), we found that these algorithms are unavoidably intertwined with digital services that Mercado Libre cannot supply in-house and that are provided by US Big Tech companies. Structurally, the company depends on digital technologies, such as algorithms and computing power, provided as black box cloud services by Amazon and Google.

Furthermore, Mercado Libre uses its in-house technologies, which are intertwined with US Big Tech digital services, to control and capture value from those operating in its marketplace and fintech businesses. The company cross-fertilizes big data from these two types of platforms. A specificity of digital capitalism outside core countries affords the possibility to operate marketplaces and fintech platforms as a single business, benefited by structurally underdeveloped financial markets in these economies (P.L. Dos Santos and Kvangraven, 2017; Frost et al., 2019; Morgan Stanley, 2022) as well as by the institutional promotion of financial inclusion (Bernards, 2019b).

While Mercado Libre (2017, 2018, 2019, 2020) claims to be democratizing commerce and money for individuals and companies, the asymmetric relation with those using its e-commerce and fintech (for payments and credit) platforms is based on its privileged access to market and financial datasets coupled with entangled internal and cloud-purchased algorithms for the management and crunching of those data. The intellectual rents paid by Mercado Libre to US Big Tech companies are ultimately extracted from consumers and firms operating on its platforms. And, as noted, by keeping all these digital technologies and data secret, regional spillovers are severely undermined.

Dependency theory's conceptualization of certain local actors hindering development by being complicit with foreign capital remains relevant for understanding underdevelopment today. However, the dynamics of a technological leader that captures rents from those below and that still depends on capital from the giants of the Global North speaks of complex forms of technological dependency. Hence we complement dependency theory with Dockès's (2000) conceptualization of power as exercised in a hierarchy of concatenated agents in which an agent agrees to being subordinated because this enables the subordination of those below, making it more beneficial than other alternatives. This suggests multiple layers of interconnected asymmetric relations, with leading firms from the peripheries occupying intermediate and connecting positions.

The remainder of this article is structured as follows. The next section summarizes the contributions of dependency theory and recent studies of regional platforms in the peripheries. Subsequent sections assess the relationship of Mercado Libre with global digital leaders and analyse how the company's in-house and rented digital technologies are fundamental for the establishment of hierarchical relations with those operating on its

platforms. The article integrates both results and elaborates on the suggestion of a complex hierarchy of power in digital capitalism inspired by and updating insights from dependency theory, combined with Dockès's (2000) concept of power, before concluding with some final remarks.

DIGITAL DEPENDENCY: CONCEPTUALIZING PLATFORM CAPITALISM IN THE PERIPHERIES

Power Relations: From Dependency Theory to Economic Power as a Hierarchical Network

Peripheral economies have been characterized by, among others, productive and technological lags in most sectors other than primary products (Cimoli, 2005; Cimoli et al., 2010; Marini, 1973; Prebisch, 1986). In such a context, during the 1960s and 1970s different authors became part of what was characterized as the dependency research programme (Kvangraven, 2021) or dependency school (Palma, 1978), and were deeply committed to understanding the political and economic causes of underdevelopment. Scholars in Latin America and Africa worked along similar lines to contextualize the experiences of their own countries. One of Africa's most prominent contributors, Samir Amin, organized the 1972 Dakar Conference, an example of co-production and socialization of ideas between dependency scholars and activists from both regions (Antunes de Oliveira and Kvangraven, 2023).

To some degree, this approach springs from a Marxist understanding of capitalism as comprising two asymmetric poles: development and underdevelopment (see, for example, Sunkel, 1971). While this distinction connects the dependency theory school with the theories of imperialism, a crucial difference is the former's focus on explaining underdevelopment by analysing the dialectical unity between internal and external factors and structures, not restricted to the unidirectional influence of the imperial powers (Palma, 1978). The dependency programme distances itself from the theories of imperialism because it assigns a more prominent role to traditional dominant classes from the peripheries and stresses their complicit role. Local elites are seen as associated with imperial power, thus, not fulfilling their role as a national bourgeoisie that thinks and behaves according to national interests (Bambirra, 1999; Bresser-Pereira, 2006; T. Dos Santos, 1970; Palma, 1978; Sunkel, 1971). To highlight this interplay, Palma (1978) suggests following an empirical strategy based in reconstructing the history of Latin America's underdevelopment. Quoting Cardoso and Faletto (1977), he considers the alliances and clashes between different sectors of local classes with foreign interests. In other words, he proposes a microanalysis of the dynamics of local actors — fractions of the capitalist class like elites or oligarchies — to understand the macroeconomics of underdevelopment in Latin America. Sunkel (1971) follows a similar strategy by examining

the alliance between multinational corporations and local manufacturing sectors in Brazil that, in his view, were reproducing the consumption and technological patterns of the core, leading to an industrial sector that was increasingly dependent and transnationalized. To cope with their technological dependency, Marini (1973) explains that local capitals super-exploited workers.

Several analyses exemplify what Bresser-Pereira (2006) characterizes as the perverse conditions imposed on development by multinational corporations and international financial capital that promote the concentration of rent in the peripheries in the middle-classes and upwards. For T. Dos Santos (1970), national bourgeoisies garnered more profits and established themselves as a superior elite by backing up foreign capital's higher extraction of profits from the most dynamic sectors in the region. This led Dos Santos to speak of a negotiated dependency that relied on an intraclass alliance between foreign and local capitals. Along similar lines, Bambirra (1999) conceives local bourgeoisies, where they existed, as a minority partner of imperial capital. For her, speaking of mutual dependency between countries requires equal access to fundamental technologies, something that was absent in poor countries.

Differences among these authors emerge when it comes to whether this complicit role of fractions of local capital could be overcome. The more critical views, such as those of Bambirra, Marini or T. Dos Santos, see elites' alignment to multinational capitals and, more broadly, to the interests of rich or developed countries, as irreversible. For others, like Bresser-Pereira and the ECLAC school of the 1970s (represented by Sunkel, among others), those elites could, in very concrete situations, revise their positioning, realigning with their workers and the public sector, thus contributing to a national development strategy. Our analysis builds on dependency theory tradition to explain underdevelopment by analysing the interplay between foreign and local capital with particular attention paid to the role of technological dependency.

As a complement to dependency theory, we also use Dockès's (2000) theory of economic power. While the former identifies unequal relations and the complicit role of local actors, it does not go as far as the latter in conceptualizing the unfolding of such economic power relations. Dockès (ibid.) explains that subordination is not only an effect of the capacity of those above to impose themselves but it is also an economic decision of those subjected to subordination. In his view, power is developed through a hierarchy of concatenated agents. An agent accepts being subordinated not only because it is dominated by a superior agent but also because, by integrating into the hierarchical order, it will be allowed to subordinate those below. For such asymmetric relations to prevail, Dockès explains that there needs to be a credible threat of what would happen if an agent tried to escape from subordination. The credible threat contributes to reinforcing the impression that integration within this hierarchical chain is the best

feasible option, even for those at the bottom. Dockès (2000) adds that these hierarchies of power are strengthened by the acknowledgement that others also obey or subordinate, creating a convention to obey.

We depart from dependency theory's conception of multinational corporations as the only ones sitting at the technological frontier. Technological dependency was generally seen by dependency theory scholars as a clear-cut distinction between the concentrated frontier technologies of core countries' multinational corporations and laggard local capitals. As synthesized by Amin (1974: 154), 'through technology, central capital is in a position to dominate the industries of the Third World and draw substantial profits from them without even having to finance their installation'.

The emergence of large regional platform companies in peripheral regions requires a more complex understanding of knowledge production and capture. As this article demonstrates in the case of Mercardo Libre, the production and use of technologies under digital capitalism in the peripheries differ from the purchase of technology embedded in machines that characterized the attempts by Latin American countries to industrialize by import substitution in the 1960s and 1970s. Local firms' heterogeneity in peripheral regions also calls for a re-examination of the interplay between different types of local and foreign capitals. Against this backdrop, the next section assesses the literature on regional platforms in the peripheries.

The Emergence of Regional Platform Leaders in the Peripheries

The emergence of digital platforms in peripheral regions, such as Jio Platforms, Rakuten and Naver in Asia, Jumia Technologies in Africa and Mercado Libre in Latin America, is an open field of research. Usually, existing studies focus on specific platform experiences or analyse the platform economy in a particular country. For example, Flipkart was an Indian e-commerce company that relied on Tencent and Microsoft technology for its expansion. In 2018, Walmart acquired a 77 per cent controlling stake of this Indian company in a bid against Amazon (Rajan, 2021). Also in India, Jio Platforms operates the country's largest mobile network operator and owns dozens of apps under the name Reliance Jio. This private tech giant is controlled by an Indian oligarch linked to traditional sectors. However, it is dependent on its main technology provider, Microsoft Azure, and, after allotting equity shares, includes Meta and Google among its shareholders (Athique and Kumar, 2022). Likewise, Nowak (2023) observes that Grab and Gojek, two ride-hailing companies that are the largest digital platforms in Indonesia, follow a data extraction logic and rely on venture capital investments from, among others, Google and Uber.

Yeşilbağ (2022) analyses the effects of platformization, focusing on three Turkish platforms: Getir, Hepsiburada and Trendyol. He finds that, regardless of impressive growth rates and monopolization of domestic

markets, these companies depend on the infrastructure of Big Tech companies; Trendyol was acquired by Alibaba Group Holding Limited (hereafter Alibaba). In common with our argument, the author concludes that platformization is a global but uneven phenomenon that takes a dependent form in countries like Turkey.

Similar trends have been observed in Africa. Kwet (2019) studies the adoption of digital technologies provided by Microsoft in South Africa, among others, and discusses digital colonialism, so called because the South African state uses Microsoft technologies without aiming to foster similar local developments. Langley and Leyshon (2022) show how Africa's fintech platforms are reproducing traditional banking biases, concentrating on the middle and upper classes in big cities. Badran (2021) analyses the case of Jumia Technologies in Egypt and shows how its expansion was underpinned by characteristic features of underdevelopment, such as poor infrastructure (including poor connectivity) and low financial inclusion, relying heavily on cash. As Daramola and Etim (2022) and Bonina et al. (2021) synthesize, Africa's domestic platforms are growing by finding partial solutions to those structural characteristics. Interestingly, while these deficiencies pave the way for platforms' emergence, they simultaneously limit their expansion.

Regional platforms in Latin America have received less attention. Among the exceptions, Reilly (2020) studies the market disruptions and policy reactions of fintech, lodging and transportation platforms in Chile, Colombia, Mexico and Peru. Ioannou and Wójcik (2022) examine the expansion of fintech in Argentina, Brazil and Mexico, finding that it reproduces key aspects of the traditional banking sector. As Langley and Leyshon (2022) found for Africa, fintech in Latin America is concentrated in big cities and makes only a marginal contribution to financial inclusion. In their comparison of the two regions, Heeks et al. (2021) analyse how ride-hailing platforms in Colombia and South Africa solve or reproduce institutional voids. They find that while platforms do create more efficient markets, they also reproduce inefficiencies and inequalities.

According to a report by the Inter-American Development Bank, in Latin America the 'most common strand [of technological based companies] is made up of consumer internet regional players that replicate and localize the model of successful US players that have yet to set a foot in the region. They focus on spaces where there is local friction (i.e. the need for distribution, contracts, payment solutions)' (Arrieta et al., 2017: 15). In the same vein, Andreoni and Roberts conclude that existing opportunities for regional digital platforms in the peripheries are mostly limited to tailored solutions that require location-specific investments, such as e-commerce and ride hailing, or that create what the authors define as 'mini-apps that run on super-apps' (Andreoni and Roberts, 2022: 1437).

More generally, the literature seems to agree that regional platforms play a fundamental role in a dynamic that propagates 'a new centre–periphery model of international relations in the data-driven digital economy', where

the US and China are the new centre and the rest of the world the periphery (UNCTAD, 2021: 84). Going one step further, Jin (2017) conceptualizes power relationships between US Big Tech and platforms from developing countries as platform imperialism.

Based on an overview of the literature, it is possible to identify two commonalities of digital capitalism in the peripheries. First, the structural characteristics of underdevelopment and the specific features of the countries where platforms emerge shape their business models. Second, in all the analysed cases, regional platforms in one way or another — from underlying technologies to funding or acquisitions — are dependent on US or Chinese Big Tech companies. By focusing on this dependence, the existing literature speaks of platform imperialism or digital colonialism.

Against this backdrop, this article's main contribution is to provide a comprehensive study of platform capitalism in a peripheral region that conceptually and empirically integrates the interplay of a regional platform with both global leaders and local actors. It is this integrated scope that has led us to build on dependency theory because, unlike studies of digital colonialism or those thinking in terms of platform imperialism, dependency theory not only recognizes core–periphery dependency but also the heterogeneity of actors in the periphery and how some of them — favouring foreign capital accumulation at the expense of others in the periphery — reinforce underdevelopment. Furthermore, by combining dependency theory with Dockès's (2000) concept of economic power, we can shed more light on the place occupied by leading platforms from the peripheries in relation both to global platform capitalism and to sustaining underdevelopment in their regions.

As we show in the rest of this article, dependence on core countries' technologies does not mean the same today as it did in the 1960s or 1970s. Using the case of Mercado Libre allows us to illustrate how an updated version of dependency theory's analysis of the role of complicit local actors, combined with Dockès's idea of economic power, provides a compelling conceptualization of regional leaders in the peripheries.

ASSESSING MERCADO LIBRE'S PLACE IN GLOBAL DIGITAL CAPITALISM

Established in 1999 as an auction website partly funded by eBay (which ended its commercial agreement in 2006), Argentina's Mercado Libre made the *Financial Times* 2023 list of the fastest-growing companies in the Americas between 2018 and 2021 (*Financial Times*, 2023). It is the biggest e-commerce platform in Latin America; by 2022, it had 148 million active users — all platforms considered — 15 million more than it had in 2020. In the same year, the company operated in 18 countries, but 95 per cent of its net revenues came from Brazil (54 per cent), Argentina (24 per cent) and Mexico (18 per cent). In Argentina, where it is the largest company by

market capitalization,[5] its e-commerce market share is around 50 per cent.[6] Table 1 compares the size of Mercado Libre with other regional platforms that combine e-commerce and fintech. Alibaba is one of China's Big Tech companies, Jumia Technologies operates in Africa and Shopee (operated by Sea Limited) is mostly concentrated in Southeast Asia, although it has recently expanded into Latin America. Among the four leading regional platforms, Mercado Libre ranks third in terms of revenues, assets, employees and gross merchandise value (GMV), a measure commonly used for proxying the size of an e-commerce ecosystem.

With the rapid growth of e-payments and credits, Mercado Libre's business is becoming more evenly split between e-commerce (US$ 5,808 million) and fintech (US$ 4,729 million). In 2013, following Amazon's strategy, the company established a logistics branch, Mercado Envíos, which grew to include its fulfillment centres (18 in the region) and, since 2020, an aircraft fleet in Brazil and Mexico. To operate these businesses, Mercado Libre relies on digital technologies. To assess the capacity of the company to develop these in-house, we analysed different indicators for proxying science and technology capabilities.

Traditional Indicators

A company's main source of science and technology typically comes from its research and development (R&D) investments (Joo et al., 2016; J. Lee and K. Lee, 2021; K. Lee, 2013, 2019). In terms of outputs, a popular quantitative method to assess catching-up at the firm level is to use patent data as proxies for innovation outputs.

Mercado Libre has been increasing its R&D spending in the last decade. From US$ 76.5 million in 2015, this had grown to US$ 459 million in 2021. However, the company has been growing faster than its R&D investments. In a sector characterized by a fast pace of innovation, and considering that the company is not the global leader, this is indicative of limited catching-up. Comparing these results with those of the Chinese company, Alibaba, for example, we found that Mercado Libre invests a higher share of R&D over revenues than Alibaba (see Figure 1) but its total R&D budget represents only 7 per cent of Alibaba's revenues in 2021.

Furthermore, judging by its publications in academic journals and its patents, Mercado Libre does not seem to be engaging in science-based research. Unlike US and Chinese Big Tech companies, which have thousands of publications and patents (Rikap and Lundvall, 2021), a search

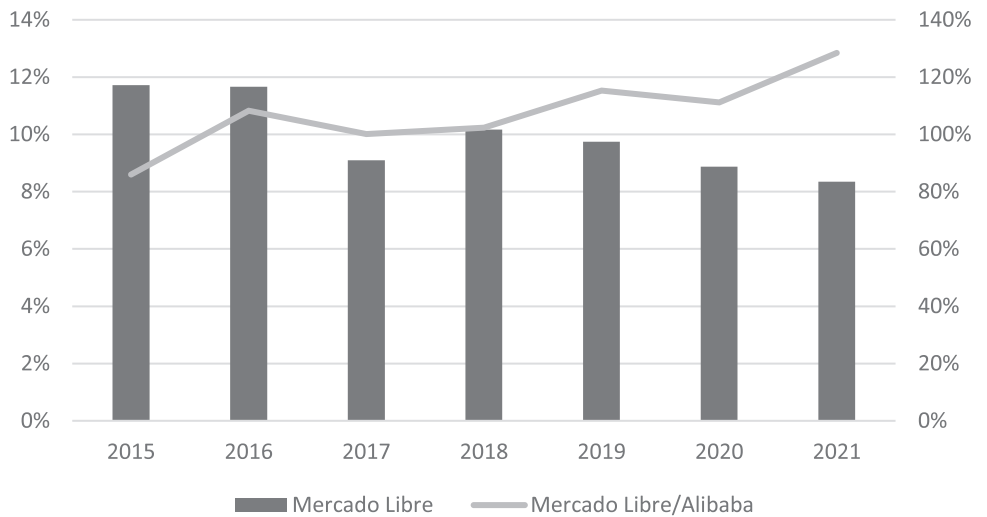
5. See: https://companiesmarketcap.com/argentina/largest-companies-in-argentina-by-market-cap/ (accessed 23 October 2023).
6. Including all the firms that sell online. The estimation is ours based on Argentina's e-commerce chamber (CACE) and Mercado Libre.

Table 1. Regional Big Players in E-commerce

	From	Total Revenue (US$ millions)	Total Assets (US$ millions)	Number of Employees	Gross Merchandise Value (US$ millions)
Alibaba	China	134,567	267,467	254,941	1,312,000
Jumia	Nigeria	222	330	4,318	1,048
Mercado Libre	Argentina	10,537	5,524	40,548	34,449
Sea Limited (Shopee)	Singapore	12,400	17,003	63,800	73,500

Source: Authors' own elaboration based on annual reports by Alibaba Group Holding Limited (2021), Jumia Technologies (2022), Mercado Libre (2022) and Sea Limited (2022).

Figure 1. R&D Expenses to Sales Ratio, 2015–21



Note: The ratio was first calculated for Mercado Libre (in percentages, left vertical axis) and then divided by Alibaba's ratio (in percentages, right axis). *Source*: Authors' analysis based on annual reports from Mercado Libre (2019, 2020, 2021) and Alibaba Group Holding Limited (2020, 2021) as well as Compustat data, see: www.lseg.com/en/data-analytics/financial-data/company-data/fundamentals-data/standardized-fundamentals/sp-compustat-database

on Web of Science finds only one publication by an author whose affiliation is with Mercado Libre. The company has never applied for a patent.

However, in the tech sector, patenting is not the main appropriation mechanism. Secrecy is a privileged strategy when it comes to both algorithms and big datasets (Benaich and Hogarth, 2020; Rikap and Lundvall, 2021), a point that interviewed employees confirmed in the case of Mercado Libre. Since the research and all the data remain secret and even unmeasured, some innovations remain 'invisible to existing innovation measurement tools' (Martin, 2013: 5–6). Building alternative indicators could thus provide a different scenario to the one described so far.

Alternative Indicators

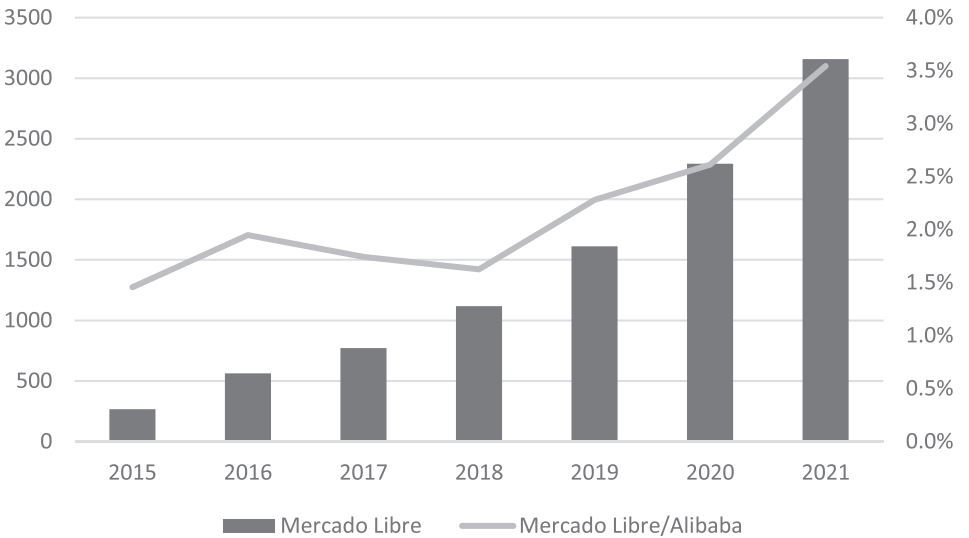
An alternative way to analyse the science and technology capabilities of Mercado Libre could be to expand the analysis from patents to the company's overall accumulation of intangible assets such as a patent or trademark (see Figure 2). Its intangibles grew from US$ 267 million in 2015 to US$ 3,158 million in 2021, which represents an annual growth rate of 53 per cent. This points to an impressive growth that leads us to think that previous indicators were indeed insufficient to account for the company's science and technology capabilities.

Furthermore, some types of innovation may not be included in the measurements of intangible assets since big data are often harvested for free from platforms, hence they could be undervalued within Mercado Libre's intangibles. Interviewed employees confirmed that secretly kept big data and internal data management and analysis were the main assets of the company. Given the lack of standardized indicators to measure data stocks at the firm level (UNCTAD, 2021), we proxy data generation using GMV. The rationale is that the more transactions in the market, the more data are generated. The GMV of Mercado Libre has been growing steadily at an annual rate of 18 per cent, receiving an additional boost during the COVID-19 pandemic (see Figure 3). However, by 2021 the company's GMV was just 0.0025 per cent of Alibaba's GMV. This implies huge differences between the companies.

Gathered big data needs to be processed with artificial intelligence in order to be monetized (Nuccio and Guerzoni, 2019; UNCTAD, 2019). Since these algorithms are usually kept secret, we proxied in-house algorithm development capacity with job openings in related sectors. A similar measure was used by Abis and Velkamp (2024) to proxy data stocks with job posts in data management and data analysis. Mercado Libre lists their job openings online.[7] We retrieved information for jobs linked to data,

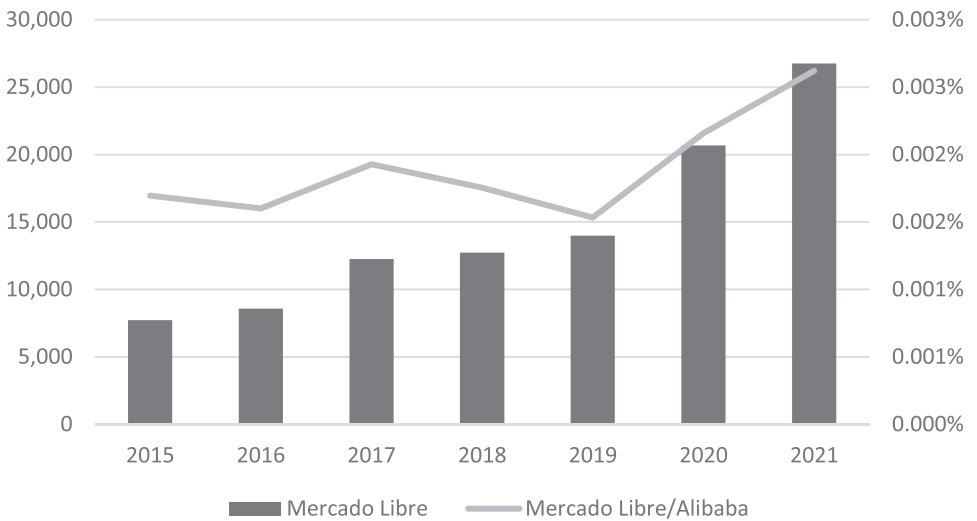
7. See https://jobs.mercadolibre.com/ and https://talent-holding.alibaba.com/en/home?lang=en

Figure 2. Intangible Assets, 2015–21



Note: Intangible assets were first calculated for Mercado Libre (in US$ millions, left vertical axis) and then their value was compared against Alibaba's intangible assets (in percentages, right axis). Peters and Taylor (2017) explain that intangibles are undervalued in balance sheets. To compensate for this, they add to declared intangibles what they defined as organizational and knowledge intangibles. Organizational intangibles are calculated as 30 per cent of Selling, General and Administrative Expense plus 80 per cent of that expense for the previous year. Knowledge intangibles are defined as the stock of R&D calculated as 80 per cent of the previous year's R&D investment plus that year's R&D investment. *Source*: Authors' analysis based on annual reports from Mercado Libre (2019, 2020, 2021) and Alibaba Group Holding Limited (2020, 2021) as well as Compustat data, see: www.lseg.com/en/data-analytics/financial-data/company-data/fundamentals-data/standardized-fundamentals/sp-compustat-database)

Figure 3. Gross Merchandise Volume, 2015–21



Note: Gross merchandise volume (GMV) was first calculated for Mercado Libre (in US$ millions, left vertical axis) and then its value was compared against GMV from Alibaba (in percentages, right axis). *Source*: Authors' analysis based on annual reports from Mercado Libre (2019, 2020, 2021) and Alibaba Group Holding Limited (2020, 2021) as well as Compustat data, see: www.lseg.com/en/data-analytics/financial-data/company-data/fundamentals-data/standardized-fundamentals/sp-compustat-database

algorithm development and information technology. By mid-2022, Mercado Libre had 173 job posts.

Finally, acquisition of start-ups is a common practice in this industry, among others, to access their technology (Bourreau and de Streel, 2020; Jia et al., 2018; Rikap and Lundvall, 2021). Mercado Libre acquired 11 firms and, by 2023, was investing in 24 companies in four Latin American countries through its Corporate Venture Capital Fund. At least four acquisitions were aimed at strengthening its market position since the acquired firms were direct e-commerce rivals: Deremate.com (in 2005), Classified Media Group (in 2008), Portal Inmobiliario (in 2014) and Metroscúbicos.com (in 2015). Even in the case of acquisitions driven by technological catch-up, the overall effect at the country level cannot be anticipated because acquisitions limit catching-up opportunities for other firms. In the markets of US Big Tech-acquired companies, venture capital investment is reduced after those acquisitions (Kamepalli et al., 2020). Furthermore, Affeldt and Kesler (2021) found that once a US Big Tech company acquires a company producing an application, competing applications tend to innovate less.

Mercado Libre's Relationship with Global Leaders

Considering the indicators collectively, the regional leadership position of Mercado Libre is undeniable. The company combines network effects triggered by a first-mover advantage in Latin America with a genuine development of digital technologies. It is increasingly accumulating (digital) intangible assets (for example, big data) and, as interviewees agreed, it is constantly expanding the regional technological frontier by continuously enhancing its data management and analysis capabilities, for instance, for fraud detection in e-payment and analysis of consumer patterns. In the words of a digital marketing specialist in the private sector: 'In data processing, in ways to work with the data, in its architecture they [Mercado Libre] are multiple steps ahead of where the local industry is. They leapfrogged and now have international capacities'.[8]

However, even though the company defines the regional digital technologies frontier, it remains far behind the world's technological frontier in terms of the most ubiquitous or comprehensive AI models and related digital infrastructure. According to several interviewees,[9] the company's data management and analysis capabilities are heavily dependent on technology developed by US Big Tech and accessed as cloud services. Currently Mercado Libre has no plans to develop its own cloud. Amazon, Microsoft

8. Online interview, digital marketing specialist, 21 January 2023.
9. Online interviews with Mercado Libre employees, 20 August 2022; 26 September 2022; 23 July 2023; a digital marketing specialist, 21 January 2023; and the founder of an Argentinean digital analytics company, 28 January 2023.

and Google, in that order, dominate the cloud computing market, together accounting for a 65 per cent share (Synergy Research Group, 2022). Moving from one provider to another is particularly costly; leaving a cloud is problematic because of what the tech sector describes as 'stickiness'. Stickiness refers to specific code that is written by Big Tech companies to make it harder to change technology provider. The cloud operates by locking in customers because users write code integrated into, or including pieces of, cloud services whose code is not disclosed.

In every piece of software developed by Mercado Libre, cloud services are embedded as black boxes. Leaving the cloud would require reconstructing the whole software architecture. In fact, beyond the specific case of how the cloud operates, disassembling a software architecture is much costlier than its original development, even when all the lines of code used are known. All things considered, while leaving the cloud might be a cheaper alternative in the long term, there is no certainty that the company would find the talent needed to build frontier digital infrastructure and all the code that it now rents from Big Tech. And, even if it could, it is unclear whether such an investment would pay off, given economic uncertainties.

So, the more the company grows, the more its technology and platforms become intertwined with Big Tech cloud services. This is simply because the growth of Mercado Libre means more data, thus a higher reliance on yet more cloud for storage, processing power and even more sophisticated algorithms for analysing the data. As several interviewees explained, this further reduces Mercado Libre's chances to develop its own internal cloud since it would be even more expensive and would require frontier knowledge that is kept secret by US Big Tech.[10]

Using cloud services through renting without accessing digital technology narrows avenues for overcoming technological dependence since learning by using is curtailed (Lundvall, 2016; Rikap and Lundvall, 2021). Along the lines of Bambirra (1999), we cannot speak here of a mutual dependency because there is no equal access to fundamental technologies. As digital experts confirmed, there is no technology produced by Mercado Libre that the US Big Tech companies do not master or have not developed themselves.[11]

In other words, we can say that technological dependency subordinates the company economically because the core of its business cannot operate without processing power and code that it cannot develop internally and that is only offered as a cloud service by a small group of the most powerful corporations in the world. According to Mercado Libre (2020: 15), its daily operations largely depend on its cloud providers. These are Amazon Web

10. Online interviews, data analyst at Mercado Libre, 20 August 2022; digital marketing specialist, 21 January 2023; and AI developer at Mercado Libre, 23 July 2023.
11. Online interviews, data analysts at Mercado Libre, 20 August 2022 and 26 September 2022; and AI developer at Mercado Libre, 23 July 2023.

Services (AWS) and more recently also Google. An AI developer for the company confirmed that Mercado Libre's consumption of cloud services had reached a point during the pandemic at which, given the extraordinary growth of its business and thus of data collection, cloud services became so expensive that managers started monitoring them closely, attempting (without much success) to reduce costs.[12]

This is more challenging given that the company stores its data and uses digital services offered by a direct rival who is also the global e-commerce and cloud services leader. One expert from the private sector described this as scandalous and claimed that 'even if there were … thousands of confidentiality contracts protecting Mercado Libre's data, they [the company] would never use AWS if they were in Mercado Libre's shoes'.[13]

Both experts and a Mercado Libre employee also pointed out that the scenario is even more complex given that the company's regional e-commerce lead could be compromised in the mid to long term by Amazon, which already operates in Brazil and Mexico.[14] Indeed, one employee disclosed that the company's market share fell from 28 to 22 per cent in Latin America between 2018 and 2022 due to the expansion of Amazon and Sea Limited's e-commerce brand, Shopee.[15] The same employee anticipated that the company would be transitioning to Google Cloud, which was not only cheaper but also represented lower risks since Google is not a direct competitor. Currently, Mercado Libre operates with both cloud providers, which an AI developer at the company saw as a means to cope with technological dependency by at least having a chance to bargain with both providers over prices, although it did require writing more code and spending on additional cloud services to interoperate.[16] Even if Mercado Libre completely transitions to Google Cloud, it will remain technologically dependent, paying intellectual infrastructure rents to a US Big Tech company.

All in all, given that Mercado Libre relies on monopolized technologies kept secret by those global leaders and that the latter neither depend on its technologies nor on Mercado Libre as a client, we interpret the company's economic relationship with them as asymmetric. To extract value by using its own intangible assets, Mercado Libre depends structurally on US Big Tech companies. Therefore, we can say that accepting this form of dependency is its best available alternative even though it implies unequal exchanges with other companies and may even threaten its business in the long run. However, this is only part of a more complex picture whereby, as

12. Online interview, AI developer at Mercado Libre, 23 July 2023.
13. Online interview, digital marketing specialist, 21 January 2023.
14. Online interviews, data analyst at Mercado Libre, 20 August 2022; digital marketing specialist, 21 January 2023; founder of a digital analytics company in Argentina, 28 January 2023.
15. Online interview, data analyst at Mercado Libre, 20 August 2022.
16. Online interview, AI developer at Mercado Libre, 23 July 2023.

we explain in the next section, Mercado Libre also mobilizes its intangible assets and those rented from Big Tech to capture value from platform users.

REGIONAL HIERARCHIES OF DIGITAL CAPITALISM IN LATIN AMERICA

Two decades ago, Hand and Sandywell (2002: 205) identified two opposing conceptions of the internet. While one referred to it as advancing authoritarian ways of living, the other, defined by the authors as the 'Cosmopolitan Model of Internet Democratization', had an intrinsically democratizing essence. Platform companies like Mercado Libre have embraced the latter conception. Adopting such a narrative works as a marketing and reputational strategy for consumers, clients and regulators. It is also a discourse that fosters or justifies the relentless efforts of the workforce to improve provided services.

Both Google and Microsoft have claimed in pieces published in *Harvard Business Review*, while promoting their cloud businesses, that democratizing data availability and access to insights from data analysis drives economic success (Hasbe, 2020; Iansiti and Nadella, 2022). Mercado Libre has made similar claims to be democratizing consumption and money:

> Our main focus is to serve people in Latin America by enabling wider access to retail, digital payments and e-commerce services, and by providing compelling technology-based solutions that democratize commerce and money, thus contributing to the development of a large and growing digital economy in a region with a population of over 646 million people and one of the fastest-growing e-commerce and internet penetration rates in the world. (Mercado Libre, 2019: 7)

Democratizing statements are usually combined with the use of technical rationality, assuming that technologies are neutral engines of efficiency gains, reinforcing the idea that platforms are good for society (Li and Qi, 2022) — a narrative that has been widely criticized, including research on algorithmic bias. Here, we question such democratizing claims by examining what we conceptualize as asymmetric relationships between Mercado Libre and the users of its platforms, both individuals and firms from Latin America, finding that big data crunched with the help of AI, is crucial for exercising such a powerful relationship.

Expanding the Market Frontiers and Creating (Unfulfilled) Wants

The expansion of consumption driven by Mercado Libre is impressive and has become even more relevant since the outbreak of the COVID-19 pandemic. From 2019 to 2022, Mercado Libre's GMV grew by an average of 35 per cent annually, a trend that is expected to continue because, at 12 per cent, the current e-commerce share in Latin American economies is lower than in core countries (23 per cent in the US) (Morgan Stanley, 2022).

The marketplace growth of Mercado Libre partly relies on its advantages for users. Buyers get access to a vast supply of products that can be easily compared while they enjoy several payment and delivery options. For sellers, especially small businesses, it expands their market without the need for a tech department or large investments, with many operating exclusively through Mercado Libre, as one private expert explained.[17] A public sector expert argued that another reason for the company's success was the favourable regulations during the pandemic: while bricks-and-mortar shops were closed during lockdowns, the online company was allowed to operate.[18]

Against this backdrop, Mercado Libre's claim to democratize consumption and the growth of its marketplace could represent a shift from non-electronic market exchanges or/and the expansion of market relations. Several digital platforms have commodified previously non-marketized spheres (Montalban et al., 2019). Examples range from platforms commodifying space, such as accommodation for tourists (for example, Airbnb) or seats in a car (for example, Blablacar), to replacing non-market-based entertainment such as the use of public spaces with electronic devices and online entertainment subscriptions.[19]

It can be argued that Mercado Libre promoted a change in consumption patterns as e-commerce grew in Latin America. It was not necessarily the case that its customers could not satisfy their needs before, but that at least some of those wants were fulfilled in a non- or less-commodified way or sold by other retailers. In the former cases, the so-called democratization of consumption creates market subjects in the sense of integrating individuals into more market relations (see Berndt, 2015, cited in Gabor and Brooks, 2017). For example, headphones were the most sold item on the company's website in Argentina in 2022. Music can be listened to without them, and thus be shared with family and friends, and people may even buy new headphones while already having well-functioning ones. Further, headphones have historically been sold in diverse stores, from electronics chains to general retailers.

Several experts confirmed that Mercado Libre continuously analyses consumption and search patterns as well as sellers and credit data to promote transactions.[20] The company has information on what each consumer wants (where, what and how each consumer searches in the platform) and what suppliers and third-party sellers can offer and at what prices. It supplements

17. Online interview, digital marketing specialist, 21 January 2023.
18. Online interview, Undersecretary of Actions for the Defense of Consumers, Argentine Government, 25 January 2023.
19. Other lesser-known examples are agritech platforms in Kenya. Mann and Iazzolino (2021) found that under a narrative of inclusion for development, these platforms were incorporating poor Kenyan farmers into markets for the benefit of the already established private (local and foreign) economic and political powers.
20. Online interviews, data analysts at Mercado Libre, 20 August and 26 September 2022; and AI developer at Mercado Libre, 23 July 2023.

these data with in-depth interviews and focus groups. Just like Amazon, it matches consumer habits with personal information (for example, past and present addresses, age, history of purchased goods). All this information is used to persuade customers to make purchases by nudging consumers, shaping and influencing their behaviours (Rikap, 2020; Schüll, 2016).

Yet, households from peripheral countries may frequently lack the means to fulfil their daily needs. Here, nudging may have a different effect than in the case of Amazon in developed countries.[21] Mercado Libre might be democratizing supply but not necessarily effective demand and thus consumption. Concerning the supply side, the fact that Mercado Libre became the first searching point for fulfilling multiple needs has led more and more sellers in Latin America to join this marketplace, accept its rules and incur even higher costs given the fees and requirements imposed by Mercado Libre. As one private sector expert explained: 'While Mercado Libre simplifies online selling, entering Mercado Libre's ecosystem implies accepting conditions on delivery time and costs and fees which are not cheap. Moreover, leaving the site is really complicated for small firms'.[22] Drawing on Dockès's (2000) conceptualization, we argue that network effects of successful marketplaces build a credible threat for third-party companies. The threat is that they will lose sales if they decide to leave the market where all the consumers go to buy. This threat, therefore, operates as a precondition for sellers' subordination. This form of domination has been widely documented for the case of Amazon (Coveri et al., 2022; Khan, 2017; Rikap, 2020; Srnicek, 2017).

Since 2019, Mercado Libre has offered its own products in its marketplace under three brands: Klatter (tools), Tedge (electronics) and Begonia (house accessories). As is also the case for Amazon (Lan et al., 2019; Zhu and Liu, 2018), Mercado Libre is indulging in unfair competition practices with companies that sell similar items in its marketplace without having access to the individualized market data that it harvests. Additionally, instead of sourcing its brands in the region, increasing production, employment and exports, the company mainly imports from Asia, thus further impacting on regional firms and employment (Catalano, 2019).

Overall, the claimed democratization of consumption entails unequal relations between Mercado Libre and its e-commerce marketplace users. This asymmetry is underpinned by its privileged access to data coupled with its internal and rented data analysis capabilities. As we explain in the next section, Mercado Libre's claim to democratize money operates in the same way.

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21. According to World Bank data, by 2019 28 per cent of those living in Latin America were below the US$ 6.85 (2017 PPP) poverty line, see: https://data.worldbank.org/indicator/SI.POV.UMIC (accessed 27 May 2024).
22. Online interview, digital marketing specialist, 21 January 2023.

Mercado Pago: A Means to 'Democratize Money'?

The other dimension of Mercado Libre's democratization claim refers to its fintech business and relies on the assumption that financial inclusion contributes to development. Indeed, it was recently shown that financial subordination remains a structural and crucial impediment to development that functions in variegated ways depending on the time and space (Alami et al., 2022).

The company's fintech business, which started as an e-payment platform and expanded to include credit and insurance, has been praised as a means to overcome structurally underdeveloped financial markets and promote financial inclusion (Boissay et al., 2021; Frost et al., 2019). In a recent publication, the Bank of International Settlements (BIS, 2022: 31) concluded that the Big Tech fintech business has 'bolstered financial inclusion by leveraging big data and machine learning to provide cheaper and more targeted products'. This narrative was also embraced by media articles (e.g. *El Cronista*, 2022; Garcés, 2022; Juárez, 2021), and by Mercado Libre itself. It was the core message of its vice president at a conference organized by Argentina's Central Bank in 2016.[23] In its 2020 Annual Report, the company stated: 'We envision Mercado Pago as a powerful disruptive provider of end-to-end financial technology solutions that will generate financial inclusion for segments of the population that have been historically underserved and operate in the informal economy today' (Mercado Libre, 2020: 5).

In both more supportive (Frost et al., 2019) and more critical studies on e-payment (Dos Santos and Kvangraven, 2017) there is agreement on fintech's economic efficiencies. These studies have highlighted that access to more and better information through e-payment and other digital technologies not only includes subjects that were previously 'outside' the financial circuits; they also decrease transaction, management and safeguarding costs in comparison with incumbent financial institutions. However, the same studies recognize that features of these technologies lead to less desirable consequences regarding the distribution of those gains, and critical approaches emphasize the effects in terms of the financialization of everyday life (Gabor and Brooks, 2017). Furthermore, other critical studies point out that fintech only perfects the mapping of creditworthy actors, without including the most vulnerable populations (Bernards, 2019a, 2019b).

Mercado Libre illustrates all these (to some extent contradictory) dynamics. Total payment volume, the amount of US dollars used in transactions with Mercado Pago, was about eight times higher in 2019 than it was in

23. See powerpoint presentation by Osvaldo Gimenez, Mercado Libre's VP and Mercado Pago's CEO at: www.bcra.gob.ar/Pdfs/Institucional/JMB2016_Gimenez.pdf

2014.[24] Between 2020 and 2022, the active Mercado Pago accounts grew 249 per cent in Argentina and 324 per cent in Mexico (Americas Market Intelligence, 2022).

What Mercado Libre defines as an online e-payment — the mandatory use of Mercado Pago for purchases on its marketplace — has triggered a positive loop with its e-commerce branch. Yet, e-payment is costly for sellers and Mercado Pago is more expensive than pre-existent electronic payment methods like debit and credit cards. Ignacio Carballo, Head of Crypto and Alternative Finances in Americas Market Intelligence,[25] explained that Mercado Libre uses the same payment infrastructure as Visa and Mastercard, thus once the company adds its fees, it becomes costlier. Its competitive edge comes from building a 'closed loop' with buyers' and sellers' deposits in Mercado Pago accounts thus reducing financial steps and costs, which also make funds available more quickly. Public sector experts agreed that Mercado Pago succeeded in Latin America because its middle class was already financially included and generally 'tech savvy' and because insecurity disincentivizes cash transactions.[26] In this respect, it does not seem to be including the unbanked, but offering better solutions to middle class buyers at the expense of sellers.

Nonetheless, by offering more payment options, some potential purchases that might not have been made due to lack of cash in the consumer's pocket can now be fulfilled. This positively impacts on sellers who, as more stores adopt Mercado Libre's e-payment solution, are increasingly compelled to join or stay in Mercado Pago. Moreover, the sunk capital expenditures (in hardware and software) and procedures required to switch payment systems reinforce power asymmetries in the e-payment sector (Dos Santos and Kvangraven, 2017). All this strengthens Mercado Libre's capacity to set the terms and rules of the e-payment business in Latin America, even beyond the scope of its platform. According to a private sector expert, the company is so confident of its leading position and existing network effects in e-payments that it even adopted Argentina's Central Bank regulation for QR code interoperability.[27] This was supposed to facilitate, to some extent, the emergence of alternative solutions to compete with Mercado Pago while consolidating e-payment dominance over cash and traditional credit and debit cards. So far, Mercado Pago remains the undisputed leader in the country.

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24. See: https://investor.mercadolibre.com/static-files/5cb0d6df-3fbc-4d87-9cef-f1fca7fea00c
25. Online interview, Ignacio Carballo, Head of Crypto and Alternative Finances in Americas Market Intelligence, 21 December 2022.
26. Online Interviews, Undersecretary of Actions for the Defence of Consumers, Government of Argentina, 25 January 2023; economic analyst, Secretary of Industry and Productive Development, Government of Argentina, 26 January 2023.
27. Online interview, digital marketing specialist, 21 January 2023.

Debt as a Power Relation Underpinned by the Centralization of Knowledge and Data

Mercado Crédito, the credit solution arm of Mercado Libre, initially offered small sums to be paid in six, nine or 12 instalments. By 2020, it had provided loans to 450,000 individuals in Argentina for amounts up to (but not surpassing) the equivalent of three times the user's annual transactions (Clarín, 2020).

As Dos Santos and Kvangraven (2017: 209–10) argue, '[a]n active payments platform that mediates exchanges and stores value for depositors will have the ability in competitive financial markets to make loans by issuing new deposits ex nihilo, backed by fractional holdings of generally recognized monetary assets'. However, recent regulatory changes in Latin America have banned fintech from that practice and only allow these companies to offer credit backed by their own funds. This favours Mercado Libre above small fintech companies because the size of its overall business provides it with larger cashflows.

The claim that it democratizes money is materialized here under the aim of 'making capital more accessible through different credit products, fostering entrepreneurship and social mobility' (Mercado Libre, 2019: 7). This could be seen as a claim to favour credit for productive purposes, given that peripheral countries have been and still are characterized by a banking system oriented to short-term financing instead of fostering long-term productive investments (Amin, 1974; Koddenbrock et al., 2022). However, the experience of Mercado Libre does not seem to offer any solution for overcoming the lack of productive credit. According to a data analyst at the company, the credit portfolio of Mercado Libre is biased toward personal use.[28] Almost 60 per cent of its loaned funds are personal credits to households, 35 per cent are commercial credits to sellers and less than 5 per cent are credits for production. Therefore, Mercado Libre's credit business does not substantially differ from microfinance and other forms of so-called financial inclusion that have promoted neither the transformation of productive structures, nor the reduction of productivity gaps (Dos Santos and Kvangraven, 2017).

If we consider, at the same time, the large expansion of products available for purchase on Mercado Libre's marketplace, its capacity to shape behaviours to create new wants and needs, and the structurally low income levels of a significant share of the Latin American population, incentivizing previously financially excluded consumers to get personal loans is a relatively straightforward business. As the company explained to its shareholders in its 2020 Annual Report, '[f]acilitating credit is a key service overlay that enables us to further strengthen the engagement and lock-in rate of our users, while also generating additional touchpoints and incentives to use Mercado Pago as an end-to-end financial solution' (Mercado Libre,

28. Online interview, data analyst at Mercado Libre, 20 August 2022.

2020: 6). However, even if those household or personal loans generate welfare by smoothing consumption, they will not contribute to generating the revenue flows necessary to overcome indebtedness (Dos Santos and Kvangraven, 2017). Dos Santos and Kvangraven (ibid.) also observe that it is unclear how fintech companies could overcome the knowledge problems associated with lending to those without formal credit scores such as small and micro firms. While microfinance institutions addressed this by drawing upon direct social relations, in the fintech sphere those relations are absent. In this respect, Mercado Libre's fintech business has a clear advantage. As explained by BIS, the company itself and one of our interviewees, Mercado Libre uses individualized data from its e-commerce marketplace to inform its fintech business. It conducts algorithmic assessment of risk and creditworthiness, using around 2,500 variables to proxy credit scores (Frost et al., 2019; Mercado Libre, 2020).[29] This results in evolving or dynamic credit rankings that are constantly fed with new data. Therefore, we cannot speak of the same degree of abstraction (simplification and reduction) as credit information systems that rely on purchased data. In its 2020 Annual Report, Mercado Libre explains the complementarities of its businesses and data:

> Initially, we began offering credit to our merchants given our distribution capabilities and in-depth understanding of their sales on the Mercado Libre Marketplace. This has also allowed us to develop our own proprietary credit risk models with unique data that differentiate our scoring from traditional financial institutions, as we are able to leverage machine learning and artificial intelligence algorithms that we historically used for fraud prevention. Additionally, because our merchants' business flows through Mercado Pago, we are able to collect principal and interest payments from their existing sales on Mercado Libre's Marketplaces, meaningfully reducing the risk of uncollectability on the loans we originate to our merchants. (Mercado Libre, 2020: 5)

Overall, the company expands credit by building more comprehensive and diverse credit profiles than fintech-only firms and commercial banks (Yosovitch, 2019). The extended capacity to profile individual buyers and sellers renders them legible or visible in the sense that they had previously remained invisible to established financial institutions (Aitken, 2017; Gabor and Brooks, 2017). As Mercado Libre turns harvested personalized data into knowledge about users (both individuals and firms) for its fintech services, it reduces 'the need for collateral to assure repayment' (Boissay et al., 2021: 859; see also Zetsche et al., 2018). Along the lines described by Bernards (2019a), the result is not financial inclusion for all but a more accurate identification of who can be a (perpetual) credit subject, providing a more profitable way to operate a financial business.

29. A data analyst at Mercado Libre confirmed that when Mercado Crédito enters a new market, it exports its risk model and its underlying data from other places until it gets data from the new market. These risk models are continuously recalibrated (online interview, 20 August 2022).

Mercado Libre thus operates as a data-driven intellectual monopoly (Pagano, 2014; Rikap, 2021) based on exclusive and detailed access to constant flows of data, coupled with internal and rented algorithms. This enables Mercado Libre to continue as lender, retaining the power of deciding who will be financed and disciplining, through constant monitoring and nudging, consumers and (online and offline) sellers. If a user cannot repay the loan, Mercado Libre also has more mechanisms than a traditional financial institution or fintech-only business to penalize and enforce payment. It can suspend the user's e-commerce account or, in the case of sellers, put their offers on hold or drop them to a lower position in search lists. The fear of these outcomes can work as a disciplining mechanism to enforce payment. Drawing on Dockès (2000), this is another example of a credible threat that incites subordination. For some credit recipients, their position may be even more precarious than owing to commercial banks, given that Mercado Libre gets much more data on their behaviour.

All in all, Mercado Libre excels in segmenting and perpetuating polarization in Latin America. Ultimately, firms like Mercado Libre have the power both to borrow and to lend. Mercado Libre uses its exclusively accessed knowledge to set the terms when it lends to consumers and sellers (and when it decides who to lend to) but also has the leverage to place debt wherever it wants (Sgambati, 2019). For leading corporations like Mercado Libre, debt is not a burden but, as Dos Santos and Kvangraven (2017) argue building on Amartya Sen, it expresses the borrower's freedom. Meanwhile, individuals and firms participating in its ecosystem risk becoming trapped. Their 'financial inclusion' is data based and incomplete, a subordinate financial inclusion to the extent that they are compelled to accept Mercado Libre's conditions. Visibility, financial inclusion and Mercado Libre's claim to democratize money do not alter the underlying structures that generate inequalities (Aitken, 2017; Bernards, 2019a, 2019b; Gabor and Brooks, 2017). In fact, they often reinforce them.

LAYERS OF (UNEQUAL) DIGITAL CAPITALISM

The two sections above show Mercado Libre either occupying a subordinate or subordinating position in Latin American and global digital capitalism. The company purchases cloud services because it does not have the capabilities to replace them. This dependence economically subordinates the company to Amazon and Google because the core of its businesses must operate with code that the company cannot develop internally and that is only offered as black box cloud services from global leaders that have no reciprocal dependency on Mercado Libre.

In this respect, and regardless of the size and diversity of its businesses, the Argentine company is no different from other fintech or e-commerce platform companies that depend on what Langley and Leyshon (2021)

define as highly centralized Big Tech infrastructures. This is also common to other major regional and global platform companies as we explained in an earlier section of the article. These companies all run their businesses in a layered network that depends on the digital infrastructures and AI solutions provided by a few US and Chinese Big Tech companies (Bratton, 2016; Jacobides et al., 2021). They are examples of what Srnicek (2017) describes as austere platforms.

The fact that all these platforms recognize their dependence on a few Big Tech companies contributes to cementing power relations. For platform companies that subordinate to Big Tech cloud providers, there is a convention to obey, along the lines explained by Dockès (2000), based on a discourse which sees Big Tech companies as the unequivocal AI forerunners, coupled with the conception of this technology and the cloud as the crucial means to run digital platforms. For such an asymmetric relationship to prevail, there needs to be a credible threat of what would happen if an actor challenges it (Dockès, 2000). In this case, the threat could be that if Mercado Libre does not buy the cloud services which allow it to analyse its data with the most advanced algorithms, it will not be as successful or profitable and could lose its business to another platform or even to the traditional retailers and banks that have also started to operate online.

Nonetheless, we also found that the regional technological leadership of Mercado Libre is undeniable. The company takes advantage of network effects triggered by a first-mover advantage in the region, which is further benefited by its acquisition strategy. This results in constant flows of diverse big data from its interlinked platforms, and a genuine internal development of advanced digital technologies that are integrated with the services purchased from AWS and Google Cloud. Data are not a by-product but a crucial product that connects the elements of Mercado Libre's ecosystem and that, coupled with the technologies to analyse them, sustain its position of power in relation to those operating on its platforms. Based on these technologies, the company sets the terms of its relationship with platform users, from fees to be paid to sell in its marketplace or use its e-payment platform, to who receives credit and under what conditions. Its credit information system springs from its marketplace and from its own fintech business.

Mercado Libre's place in digital capitalism can thus be conceived as a layer between global powers and local actors. The company could be labelled as semi-peripheral, but this ignores the fact that it produces frontier digital technology, even if only for specific uses associated with its businesses. Hence, we propose to rethink (digital) dependency not as an unequal relation between capital from the centre and the periphery, in which local elites are complicit by buying foreign technology without aiming to develop it. Instead, we suggest speaking of multiple layers of power, with leading firms from the peripheries occupying intermediate and connecting positions that require the production of frontier digital technologies that are dovetailed with foreign cloud services. Hence, in comparison to the dependency

school's conceptualization of the interplay between local and foreign capital for explaining underdevelopment, a crucial difference highlighted by our study of Mercado Libre is that the peripheries are also contributing to the production of frontier science and technology. However, even though the company systematically expands knowledge frontiers in specific domains or niche applications, it remains structurally dependent on technologies from US Big Tech companies.

We conceive these asymmetrical relations as a specific form of the power relation described by Dockès (2000), since power is developed through a hierarchy of concatenated agents. Mercado Libre subordinates to US Big Tech companies not only because the latter are superior agents — as the literature on digital platforms from the peripheries has already shown for other cases — but also because, by integrating within a hierarchical order, it will be allowed to subordinate those below (consumers and firms using its platforms or solutions). In this scenario, Mercado Libre's productive spillovers are limited. Its datasets are kept secret, and the company does not significantly encourage local players to develop new technologies. Moreover, compared to manufacturing, its platforms have fewer linkages and most of them are in complex sectors (for example, computers, servers and software) controlled by multinational corporations and unreachable for domestic suppliers. These extremely limited local linkages and spillovers can be seen as the flipside of the Latin American platforms' success. Since they do not have the constraints of using regional suppliers or infrastructure, they can escape from a structural limitation of the region. This structural feature is further deepened by the decision of Mercado Libre to use imported goods for its own brands, further reducing possible linkages.

Another adjustment to dependency theory that our study suggests is the chance to better understand the interplay among local firms in the peripheries. While Marini (1973) highlighted that local capitals further exploit workers in order to cope with their technological dependency, the case of Mercado Libre shows that local capitals can also capture value and subordinate other local capitals. The company not only super-exploits its workers but also, and to a large degree, captures value from the super-exploited workers formally hired by those other (subordinated) local capitals.

CONCLUDING REMARKS

This article has scrutinized the emergence of Mercado Libre, Latin America's platform behemoth, through the lens of technological dependency in the region and by analysing its place in the hierarchies of digital capitalism in Latin America and globally. Our results show that the Argentine company lacks the internal processing power and the most advanced general technologies based on AI to store, process and analyse its datasets, technologies that it purchases as Black Box cloud services from Big Tech companies

in the US. However, we also found that Mercado Libre develops frontier software and data analysis capabilities which are applied to specific uses and intertwined with those purchased cloud services. Its business is also underpinned by constant flows of cross-fertilized big data. Altogether, digital technologies underpin its business, enabling it to subordinate and profit from those operating on its platforms.

Furthermore, Mercado Libre's privileged knowledge of its platform users and its capacity to make sense of extracted data with AI turns debt into a perpetual power relation within its ecosystem, where credits fuel transactions but do not contribute to overcoming productive lags. This result echoes the conclusions of Donovan and Park (2022) for Safaricom in Kenya but, in the case of Mercado Libre, the effects can be said to be even greater since the latter operates in a market where consumption is satisfied with credit. Along the lines argued by Gabor and Brooks (2017), the company fosters sales in its marketplace and the financialization of business and everyday life in Latin America. However, echoing Bernards (2019a), it only does so for those identified as creditworthy subjects by a more accurate mechanism than that used by banks and fintech-only firms, while the most vulnerable remain excluded.

The main contribution of this article is the comprehensive analysis of Mercado Libre which has enabled us to update crucial aspects of dependency theory regarding the complicity of certain local actors with foreign capital, and the part this plays in hindering development. We argue that labels such as local elite, oligarchy or even local bourgeoisie, used by dependency scholars over half a century ago, are not suitable for contemporary digital capitalism. In that time, local firms that were related to foreign capital had individual owners. While one could still speak of an oligarchy associated with the exploitation of natural resources and the export of primary products, which relates to foreign capital along the lines described by dependency authors in the past, they are not the only powerful local actors in contemporary peripheries.

Capitalism has become more complex and some of the local companies that operate and favour foreign capital accumulation are not private companies (and thus owned by individuals) but they are listed companies, as is Mercado Libre. Unicorn companies[30] from Latin America, even when they are not listed firms, still frequently rely on foreign investors for venture capital; these investors then get direct access to unicorn companies' founders, steering priorities and business models. This is a practice used globally, with the prominent case of OpenAI and Microsoft being a recent example (Rikap, 2023). With this in mind, we build on the idea of an intermediate and complicit actor as proposed by dependency theory, but we do not see these intermediate players as an elite of individuals. The intermediate

30. The term 'unicorn companies' refers to private companies which have a market value of a billion US dollars.

actors are the regional leading platform corporations which are governed by a complex interplay between shareholders (investors), founders and executives that is beyond the scope of this article.

The case of Mercado Libre also illustrates that the reliance on US Big Tech technologies is different from the mostly linear technological dependence observed by dependency scholars. To some degree, and building on Dockès's (2000) conceptualization of economic power, we explained that it makes sense for Mercado Libre to accept its dependency, since it can still profit by extracting value from those further down the hierarchy, even if part of that rent is transferred to Big Tech. This complexity requires us to focus not only on market exchanges among local and foreign capital but also to enquire about the technological capabilities of Mercado Libre, the division of creative labour and the redistribution of science and technology and its associated rents between foreign and different types of local actors.

Although our article has delved into hierarchical relations, there are degrees of contestation or autonomy which remain to be investigated in the future. Along the lines of Malabou's (2022) understanding of power as a relationship that leaves room for (re)action or contestation as it is exercised on free subjects, there are multiple examples of contestation. Mercado Libre has diversified its cloud providers with the aim of reducing the associated lock-in effect. Mercado Libre also allows local actors a certain degree of autonomy. Latin American firms can still decide not to use its platforms, even if this could imply losing sales. Some sellers are finding ways to pay lower fees to Mercado Libre by asking buyers to pay by electronic bank transfer, which is free of charge, instead of paying with Mercado Pago. These relative degrees of autonomy make the identification of the global hierarchy of power relations less straightforward than it might have been when dependency theory was first introduced, and call for more research to map the interplay between actors from the same and different layers, also focusing on regional leaders like Mercado Libre. One senior director from Globant referred to the links between Mercado Libre and Globant as mutually reinforcing the leading position of these two companies.[31] Future research should examine technological collaboration among regional leaders.

More generally, in a context where global powers are even stronger and regional leading companies from the peripheries operate as transmission chains reinforcing inequalities, there is a need to keep on updating the contributions made by dependency theory. Such updating could bring light to the interplay between different types of firms within and beyond the peripheries and illuminate the specificities of these relationships and their impacts on uneven development. This would improve our understanding of the new forms of dependency with global leaders.

31. Online interview, senior director at Globant, 17 February 2023.

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