# **The Future of Platforms, Big Data and New Forms of Capital Accumulation**

## **Abstract**

**Purpose**

The paper argues that the classical Marxist theory of capitalist accumulation is inadequate to understand new forms of capitalism and their accumulation processes determined by ‘platforms’ and ‘big data’.Big data platforms are shaping the processes of production, labour, the price of products and market conditions. ‘Digital platforms’ and ‘big data’ have become an integral part of the processes of production, distribution and exchange relations. These twin pillars are central to the capitalist accumulation processes. The article argues that the classical Marxist theory of capitalist accumulation is inadequate to understand new forms of capitalism and their accumulation processes determined by ‘platforms’ and ‘big data’.

### **Design/methodology/approach**

As a conceptual paper, it follows critical methodological lineages and traditions based on nonlinear historical narratives around the conceptualisation, construction and transition of the ‘Marxist theory of capital accumulation’ in the age of platform economy. This paper follows discourse analysis (Fairclough, 2003) to locate the way in which an AI led platform economy to identify and conceptualise new forms of capitalist accumulation. It engages with Jørgensen and Phillips (2002)’s contextual and empirical discursive traditions to undertakes a qualitative comparative analysis (QCA) by exploring a broad range of complex factors with case studies and examples from leading firms within the platform economy. Finally, it adopts two steps of ‘Theory Synthesis and Theory Adaptation’ as outlined by Jaakkola (2020) to synthesise, adopt and expand the Marxist theory of capital accumulation under platform capitalism.

### **Findings**

This article identifies new trends and forms of data driven capitalist accumulation processes within platform capitalism. The findings suggest that an AI led platform economy creates new forms of capitalist accumulation. The article helps to develop theoretical understanding and conceptual frameworks to understand and explain these new forms of capital accumulation.

### **Originality/value**

This study builds upon the limited theorisation on the AI and new capitalist accumulation processes. This article identifies new trends and forms of data driven capitalist accumulation processes within platform capitalism. The article helps to understand digital and platform capitalisms in the lens of digital labour and expands the theory of capitalist accumulation and its new forms in the age of datafication. While critiquing the Marxist theory of capitalist accumulation, the article offers alternative approaches for the future.

**Keywords:** Big Data, accumulation, digital and platform capitalism

## **Introduction**

Contemporary global capitalism is changing rapidly with the growth of platform economies driven by data collection, control, concentration, storage, organisation, management and manipulation. The growth of ‘digital platforms’ and ‘big data’ have transformed the nature of individuals, societies, states, markets, corporations and economic systems around the world. It has transformed all economic activities and entered into every economic sector~~s~~. Digitalisation and datafication are core components of the world economy today. It is impossible to operate any industrial, entrepreneurial or service activities without ‘data and digital platforms.’ Even the labour-intensive sectors like mining and agriculture are affected by digitalisation of the economy led by data driven platforms. These twin pillars are central to the rapid growth of the digital economy and ‘platform capitalism’ thereby creating new value (Srnicek, 2016; Liang *et al.,* 2022).

Data is a new form of commodity and capital (Sadowski, 2019), which is central to allproductive and distributive activities and economic systems (Kitchin, 2014). This new form of capital (data capital) is generating new products, services and values (Brynjolffson, 2016; Tang, 2021). So, the modern organisations have become data driven organisations (Fourcade and Healy, 2017). Oracle considers data as ‘a new kind of capital on par with financial capital for creating new products and services. And it’s not just a metaphor; data fulfils the literal textbook definition of capital.’ (OracleANZ, 2015). IBM considers that ‘everything is made of data these days’ (IBM, 2014). These data driven organisations are creating platforms for production, distribution and consumption by developing all-encompassing networks between producers, consumers and distributors.

The troika of data, platforms and capitalism is becoming all pervasive and moving in a direction of technological singularity (Shanahan, 2015). The unpredictable transformatory power of data driven platforms and their social and economic impacts have given rise to various forms of capitalisms. The relationship between data and capitalism has led the foundation for the growth of digital capitalism, surveillance capitalism, platform capitalism, informational capitalism, communicative capitalism, iCapitalism (Sadowski, 2019) and cognitive or cinderella capitalism (Boutang, 2012). The platform capitalism (Srnicek, 2017) helps the surveillance capitalism (Zuboff, 2019) to grow in an authoritarian manner. The information technology, AI and data have accelerated the further growth of existing forms of inhuman capitalism (Dyer-Witheford et al., 2019). Such growth has led to mass alienation. It is radically reshaping human lives and society where neuro capitalism (Helbing and Hausladen, 2022) grows to further control and domesticate labour for the higher accumulation of capital and expansion of capitalist profit at the cost of labour. In this way, AI is facilitating the growth of multiple forms of capitalism often branded as ‘varieties of capitalism’ (Hall and Soskice, 2001). In reality, it is a few corporations, individuals and their families that control global capitalism in all its old and new forms (Hay, 2020).

These new forms of capitalisms have created a new industrial landscape based on data driven platforms. It moves beyond the arguments of ‘varieties of capitalism’ (Hay, 2020), which is based on distinct types of market economics defined by liberal market economies (LME) and coordinated market economies (CME). The regional dimensions of varieties of capitalism and its arguments in terms of ‘Mediterranean capitalism’, ‘dependent market economies’, and ‘hierarchical market economies’ outside Europe and USA (Hall and Soskice, 2001) are defunct and reductionist conceptualisations in the age of all-encompassing data driven platform capitalism. The collection and processing of data is a new stage of capitalism (Cohen 2018; Zuboff 2015) where people, cultures, consumption habits, political and religious processes, places, experiences and relationships are mere numbers in the digital platforms. This new industrial landscape shaped by platform based digital capitalism is very different from the industrial capitalist landscape in 19th and 20th century. The modern data mining and platform internet companies operate differently with different business models to create value (Gawer, 2009; 2021) with the help of digital labour. So, the capitalist accumulation processes are very different in this new industrial landscape based on data driven platform capitalism.

## **Contextualising capital accumulation**

The accumulation of capital is the foundation for the growth of the capitalist system in all its forms. The different forms of capitalist dynamism and their trends of capital accumulation takes place in different stages of history shaped by different forms and modes of production and dominant forms of accumulation (Clark, 1992). The privatisation of land, commercialisation and industrialisation of agriculture led to the growth of capitalist accumulation processes in agricultural societies that established patriarchal and feudal capitalism. The agricultural surplus was the foundation of commercial capitalist society and commercial surplus laid the foundation for industrial capitalism. The development of distinct forms of property, modes of production and labour relationships with capital have established different forms of capitalist accumulation processes in different stages of history (Wood, 2017).

The state has created different regimes, institutions and structures for enabling and enhancing conditions for capital accumulation (Harvey, 2006). The processes of globalisation led to the further growth of new patterns of transnational capitalist accumulation processes (Robinson and Harris 2000), which decentralised production but centralised command, control and concentration of global capital (Robinson, 2001) in the hands of a few corporations. From primitive accumulation to accumulation by dispossession, global capitalism continues to accumulate and expand itself by reproducing capitalist social relations (Hall, 2013), despite all the inherent contradictions within capitalist accumulation (Clark, 1992). Therefore, the contextualisation and periodisation of capitalist accumulation underpins the periodisation of capitalist institutions, processes and regimes led by the state and different stages of its ideological formulations (ibid). The state continues to play a major role in the processes of accumulation and development of digital capitalism driven by data and platforms.

**Varieties of Capitalism and Platform Economy**

The Varieties of Capitalism arguments by Hall and Soskice (2021) was developed by focusing on coordinated market and liberal economies in core capitalist countries like US, UK, Canada, Australia, New Zealand, Ireland, Germany, Japan, Sweden, Austria. These arguments have failed to understand and incorporate the dynamic nature of capitalism and the way it operates outside these countries. The institutional and non-institutional dynamism of capitalism has further developed with the rise of artificial intelligence and digitalisation economy. All productive and non-productive forces within capitalist and non-capitalist economies are undergoing considerable transformations, which can’t be captured within the dualities of coordinated market and liberal economies under the theoretical foundations of Varieties of Capitalism. Seidl (2018) was trying to capture digital transformation within varieties of platform capitalism and outlined the conceptual challenges in the process. The standardisation of varieties of capitalism during the age of platform economy is not possible due to ‘contested institutionalisation and stand out digital labour’ within the diversity of platform capitalism. Seidl (2018)’s study is again confined within Germany and Sweden. It does not provide a worldwide picture of varieties of platform capitalism.

For example, platform economy operates like guerrilla capitalism in China, Taiwan, and Hong Kong (Chan and Kwok, 2020). Therefore, it is important to move beyond and rethink varieties of capitalism arguments in the era of information and communication technologies (Soskice, 2022). The planform economy has not changed the fundamental nature of capitalism while operating differently and moving beyond territorial boundaries. It has consolidated capitalism further in the hands of few platform capitalists living within the core of capitalist world economy.

## **Data, digital labour and platform capitalism**

The data led digital and platform capitalisms have not only undermined manual, mental and digital labour and its social foundations, but also undermined capital as a social relation with the help of monetisation and commodification of individual labour. According to Marx, capital is the accumulation of money, which is used to obtain more money for the circulation of capital. The process involved buying a good or service in order to sell it at a higher profit. Capital also transformed the circulation of commodities based on Marx’s C-M-C formula. This involved an exchange of a commodity for money which would then be exchanged for another commodity (Commodity-Money-Commodity). A commodity was therefore any good or service produced by human labour and offered for general sale on the market. Other priced goods were also treated as commodities such as human labour-power. Meanwhile, capitalism according to Marx was defined as a socio-economic system based on private ownership of the means of production and the exploitation of the labour force (Marx 1987).

In the post-industrial era, however, platform capitalism has inverted many of the traditional Marxist principles (Walton and Nayak, 2021). Unlike traditional manufacturing firms, platform companies operate differently thus giving rise to the concept of ‘platform capitalism’. Platform capitalism (Liang *et al.,* 2022) is defined as the activities performed by Internet companies operating as platforms using hardware and software-based business models which form the foundations for other actors to conduct business (Srnicek, 2016). Unlike, the manufacturing firms in the Marxist industrial era, ‘pure’ two-sided platforms do not produce goods or services, nor are they involved in any direct physical distribution. The role of these platform companies is to “manufacture” connections (Moazed and Johnson, 2016) between users on different sides of the platform and perform a “matching” service using data gathered from the online activities of the users themselves. The process involved in buying a good or service in order to sell it at a higher profit does not take place. The C-M-C relationship is also inapplicable. On the large e-commerce platform marketplaces such as Amazon and Alibaba, any physical distribution of products and exchange of money takes place outside the platforms and the platforms generate profits through data monetisation (commissions and advertising etc.).

Marx’s definition of capitalism and the separation of the owners of the means of production (bourgeoise) from those who sell their labour (proletariat) to the owners is also now irrelevant (Walton and Nayak, 2021). Since the content of the major platform companies is user-generated and “free”, this has changed the relationship between owners and workers and removed any direct C-M-C relationship. Meanwhile, in the sharing economy, (Uber and Airbnb) this relationship is even more pronounced with the ‘proletariat’ owning the productive assets (cars and properties) not the bourgeoise (Walton and Nayak, 2021). The factors of production have also changed from land, labour and capital in the industrial era to data and information in the platform age.

These developments have given rise to a new source of capital known as data capital. The concept of data capital is relatively new, dating back to 2015. Data capital is an asset that is used to increase revenue, gain profit or generate new income. It is essentially organizational data that is used to increase profits or maximise efficiency (Ramadhan, 2022). In the industrial era, the most valuable assets were physical including raw materials and plant and equipment. These were used to transform resources and to trade goods and services. Data was not an asset because it was largely intangible and could not be captured, stored and analysed due to the lack of IT technologies. However, in the platform era, this relationship between physical assets and data assets has been inverted. For example, data in the form of ordinary transactions owned by a retailer such as Walmart or Tesco can be more valuable than the goods sold by the retailer (Biddulf, 2020). Amazon, meanwhile, makes more money from its marketplace model than from its physical e-commerce platform.

Data capital can be used to produce goods and services but not in the same way as in the Marxian industrial era. For example, data is the raw material for most digital services and this is often provided by users free-of-charge in the form of photos, videos, blogs, search enquiries, texts, emails and completed transactions etc. (Jemielniak and Przegalinska, 2020). Analytics is then performed to generate marketing insights and demand forecasts and dynamic pricing. In this case the commodity isn’t a physical product but data. Money isn’t paid but monetisation through analytics takes place resulting in new data (commodity) which can them be sold on through the generation of advertising and/or subscription revenues. The producer of the data (commodity) isn’t paid any money for the data but the platform owner ultimately generates a profit through the analytics performed on the data. The services offered to the user are nevertheless free, such as Google search, Gmail, maps and Android etc. Where a “freemium” business model is used, such as gaming, the user (data generator) gains free access but they are then charged for the purchase of digital accessories. This means that Marx’s (1987) definition of “capital as money used to obtain money” does not apply whilst the concept of labour power is also undermined since the abstraction of human labour into something that can be exchanged for money does not exist where “digital labour” is being used (Fuchs, 2014).

**Big data and new forms of capital accumulation**

Not only have the platform companies changed the meaning and characteristics of capital in the twenty first century, they have also changed the dynamics relating to capital accumulation. According to Sonderegger (2016), data capital is even more important than Big Data. Although Big Data plays a critical role in the management of the 3Vs, the variety, velocity and volume of data; it has no value unless it is analysed and subsequently monetised as part of a modern-day capital accumulation process. Big Data therefore feeds the artificial intelligence algorithms that drives this accumulation process (McAfee and Brynjolfsson, 2017).

Capital accumulation is important because it forms the basis of capitalism and it is a defining characteristic of a capitalist economic system (Richards, 2013). Capital accumulation is driven by the pursuit of profit. It involves the investment of money - or some other form of financial asset - with the objective of increasing the initial monetary value of the asset as a financial return. Capital accumulation also involves a net addition to existing wealth and a redistribution of wealth. This naturally raises the question of how evenly the wealth is distributed. Capital accumulation according to Marx’s economic theory occurred when profits were reinvested into the economy thereby increasing the total quality of capital. Capital was defined as economic or commercial asset value that was used by capitalists to obtain additional value (surplus value). This required property rights which enabled objects of value to be appropriated and owned and for trading rights to be established (Marx, 1987). Marx also believed that capital had the tendency for concentration and centralisation in the hands of the richest capitalists.

In the platform Internet era, the commercial asset that drives the capital accumulation process is data not money. The producers of this data, who intentionally upload content onto Internet platforms or whose data is captured through search results or actual transactions, do not receive any monetary reward. Their data is harvested in return for free services which are broad ranging. This will depend upon the platform that they use and the level of integration with other platforms through application programming interfaces (APIs). Meanwhile, the users who produce the data hold no property rights or trading rights relating to the data capital. Once the data has been captured by the platform, the platform owners such as Google, Facebook, Amazon, Apple and Microsoft retain ownership of the data without providing any direct financial return.

The platform companies achieve capital accumulation and a new addition to existing wealth by using the captured data to perform Big Data analytics. This generates new insights into purchasing behaviour and enables platforms to perform micro-targeting and demand forecasting. This leads to more revenues and profits and even more data. This is known as the data flywheel effect (see Figure 1). A data flywheel effect occurs when the momentum of a process increases at an accelerating rate due to the strategic usage of data and can be used to improve a customers' digital experience. For example, more users generate more data which builds smarter AI algorithms leading to better products and services (Gurkan and de Vericourt, 2022). This is obviously very different to how a new edition to existing wealth occurs according Marx’s economic theory of capital accumulation.

Capital accumulation through the data flywheel would originally have required sophisticated systems dynamics (Forrester, 2007). This involves a computer-based mathematical modelling approach for strategy development and better decision making in complex systems (Sterman, 2001). This approach uses a computer-aided simulation methodology based on feedback systems theory which complements other ‘Systems Thinking’ approaches (Reppening, 2000). Statistical modelling was originally required in order to compensate for inadequate data or to fill in the spaces between data. However, as Amazon’s data became denser (big data) over time, modelling became less important. Therefore, through the use of artificial intelligence algorithms and machine learning, the former trade-off between modelling and data was removed with the adoption of stream analytics and in-motion analytics which resulted in high automation of the capital accumulation process that follows a flywheel business strategy.

A flywheel business strategy involves a systems-thinking mindset and incorporates system dynamics. The flywheel strategy consists of a self-reinforcing feedback loop made up of a chain of key actions. Each action influences the next one which forms a virtuous cycle and drives long-term growth. This requires a holistic perspective where the whole is greater than the sum of the parts (Collins, 2019). Amazon’s flywheel consists of a self-reinforcing closed feedback loop that starts with the customer experience and returns to it in an iterative manner.

* This process involves the following:
* A customer’s positive experience leads to growth in the customer base which in turn;
* drives customer traffic thereby resulting in increased revenues.
* The increased volume of consumers then attracts third party sellers.
* The third-party seller growth expands Amazon’s fulfilment capacity - in order to improve the quality of fulfilment.
* This means that more third-party sellers contribute to the platform thereby creating more product variety and more product choice for the customers.
* The increased revenue growth, relative to the fixed costs, also helps to lower customer prices making the platform more attractive.
* Greater choice and variety, higher-quality fulfilment and lower prices further enhance the customer experience.

Amazon’s flywheel business strategy is also unique because it doesn’t simply consist of a single flywheel but multiple inter-connected flywheels. This includes the integration of Amazon Web Services (AWS), artificial intelligence, machine learning and deep learning plus its Internet of Things (IoT) devices. The increased scope and complexity of Amazon’s flywheel system has resulted in the increasing use of system dynamics (Morecroft, 2015)

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So, where the redistribution of wealth is concerned, this is controlled by the platform owners. First and foremost, the platforms own the data uploaded by users or captured from the users indirectly. Second, the platforms are not only data-rich but they have unique capabilities in areas such as Natural Language Processing (NLP), Big Data analytics, artificial intelligence (AI) and machine learning. This means that they have a monopoly over the resources and capabilities required to achieve capital accumulation through data capital. These platforms also single home where possible (Park *et al.,* 2021), which means data sharing across platforms does not occur nor are there any spillovers into non-Internet companies (Aghion and Jaravel, 2015). This is why the large platform companies have been referred to as modern monopolies or even natural monopolies (Moazed and Johnson, 2016; Ducci, 2020). This has raised questions relating to the need for individual users to have data ownership rights and to receive financial returns for the data that large platform companies harvest and use as part of the modern-day capital accumulation process. This aspect of capital accumulation is closely aligned with Marx’s (1987) belief that capital had the tendency for concentration and centralisation in the hands of the richest capitalists. In this case data ownership and data capital accumulation is now concentrated and centralised, through aggregation (Parker *et al.,* 2016), in the hands of an elite oligopoly of platform companies. These are the ‘new bourgeoise’ that exploit and leverage data from the ‘new proletariat’ (Walton and Nayak, 2021). In this modern-day analogy, there is no good or commodity being purchased and sold at a higher price and the ‘new proletariat’ have no ownership rights. The commodity is provided free-of-charge in return for intangible service benefits.

Meanwhile, according to Karl Marx’s economic theory, capital accumulation involved the reinvestment of profits into the economy thereby increasing the total quantity of capital. This was a means of expanding value and was expressed as money that was then transformed through human labour into a larger value and extracted as profits (Marx, 1987).

The leading platform companies have expanded value and extracted profits but this process has not followed Marx’s economic theory. The large platform companies have democratised the availability of data and information. Google’s original mision statement was to “organize the world's information and make it universally accessible and useful” (Schmidt and Rosenberg, 2014). They have also appropriated huge economic rents from their data by becoming the world’s most profitable and valuable companies (in terms of market share value). However, when considering the reinvestment of profits into the economy this can be considered from two perspectives. First, the reinvestment of financial returns from the accumulation process and second, the reinvestment and expansion of value from data capital. With regards to the reinvestment of financial returns, the large technology platforms are global enterprises that have been heavily criticised for tax avoidance and for the non-remuneration of digital labour. Digital labour being the users who generate the raw material (data) that comprises data capital. The large platforms are reinvesting profits in new infrastructure such as cloud computing platforms, artificial intelligence and machine learning capabilities. This enables these companies to enhance the internal efficiencies and profits not only of their own platforms but also the internal efficiencies and profits of companies using their cloud infrastructure to store and manage their data (Faroukhi., *et al* 2020).

However, Marx’s theory that the reinvestment process from capital accumulation would be transformed by human labour is now under threat from artificial intelligence and machine learning. Since Big Data is essential for the development of AI algorithms and machine learning and the data-rich platforms are leaders in this field, this has the potential to reduce the use of human labour. Amazon is already automating its warehouses using software and mechanical robots on an industrial scale. Amazon, Google, Apple and Microsoft are also working with hospitals in the UK and USA to automate analytics processes reducing the need for human input. As artificial intelligence and machine learning continue to develop, these trends will continue across both the advanced Western economies and Asia (Ma and Sun, 2020).

Another important aspect of capital accumulation is the rate of accumulation and the problems of overaccumulation. In Marxian economics, the *rate of accumulation* is defined as (1) the value of the real net increase in the stock of capital in an accounting period and (2) the proportion of realized surplus-value or profit-income which is reinvested, rather than consumed.

Other things being equal, the greater the amount of profit-income that is paid out as wages and used for consumption (rather than investment), the lower the savings rate and the lower the rate of accumulation is likely to be. However, earnings spent on consumption can stimulate market demand and higher investment.

When applying Marx’s rate of accumulation theory, if we treat the stock of capital as data, then the real net increase achieved by the platform companies is exponential (Azhar, 2021). Meanwhile, if we apply the data flywheel model (discussed earlier), the proportion of realised surplus value which is reinvested rather than consumed is also substantial (see Figure 1). Using the data flywheel model to analyse the rate of accumulation on modern platforms, it can be seen that the net increase in stock of capital (data) and the proportion of resource reinvested are inextricably linked. As more users visit a platform this increases the stock of capital (data) which makes the existing product service outputs even more valuable. However, the profit/income created by these activities is reinvested in the platform to generate more data capital but no financial reward is paid directly to the users or digital labour that has created it.

**More Users**

**More Data**

**Better Products/**

**Services**

**More Profit**

**Smarter Algorithms**

**Figure 1: The Data Flywheel (Collins, 2019)**

In the early stages of their life cycles (Reillier and Reillier, 2016), the major Internet companies invested heavily in generating network effects on both sides of their platforms. Amazon ran at a loss for nearly ten years as any surplus-value that was generated was reinvested in attracting additional users and data and building a larger product portfolio. Google, meanwhile, offered free search and online services in order to attract users to the platform before monetising the business using advertising. Due to the low costs of running a platform and the power of network effects, the rate of capital accumulation was exponential and non-linear. This was known as the ‘law of accelerating returns’ – LOAR (Kurzweil, 1999).

Marx (1987) also identified the potential for an overaccumulation of capital. Since capital accumulation is only possible if there is a continual reinvestment of surplus value, accumulation can reach a point where the reinvestment of capital no longer produces returns. However, overaccumulation of capital is not a serious problem in the platform economy due to a number of factors. Firstly, a ‘pure’ platform doesn’t manufacture a product or directly deliver a service in the Marxian industrial sense. What platforms excel at is “manufacturing” connections (Moazed and Johnson, 2016) between the producers of products and services and facilitating transactions and innovation between different sides of the platform. They are therefore unlikely to experience a surplus product because any inventory that is held by a platform is digital and not physical. Meanwhile, the data flywheel (Figure 1) ensures that the relationships between supply and demand on all sides of a platform are tightly coupled due to the sophisticated AI-driven algorithms that have been trained by the Big Data generated by the platforms.

Moreover, the content on the platforms is non-rivalrous and anyone accessing the platform can view it. This means that only one version (digital copy) has to be produced avoiding issues regarding over-capacity and surplus inventory. Those “products/services” that may be downloaded via a platform are also digital not physical. For example, music, movies, books, magazines and newspapers have been dematerialised from a physical to a digital format. This means that the marginal cost of scaling these products (including apps) is close to zero (Rifkin, 2014) thereby avoiding the diseconomies of scale experienced by brick-and-mortar businesses in the manufacturing and service sectors.

Zero marginal cost refers to a situation where the cost to produce each additional unit of a good or service approaches zero. For example, goods that can be sold and distributed via the Internet, such as software apps or electronic books, still require bandwidth and electricity for each copy but the marginal cost of any additional copy is negligible. Once an app has been developed and uploaded into the app store, the marginal cost of distributing the app going forward is close to zero because no further production costs are incurred. However, once the minimum efficient scale (MES) of producing a physical book has been achieved, the cost of producing each additional book increases because further resources are required resulting in a diminishing return to scale. However, if the book has been digitised, there are no additional production costs and there is an increasing return to scale instead (Arthur, 1996). This increases the total addressable market (TAM) for platform companies, and it is for this reason that overaccumulation is not a major issue. Platforms remove inefficiencies and the problems of unsold items and over-capacity.

Finally, platforms operate as marketplaces rather than hierarchies (Coase, 1937). This means that they can scale indefinitely without incurring large investments in plant and equipment and raw material inventories that were commonplace in the Marxist industrial era. The ‘pure’ platforms such as Google, Airbnb and Uber leverage the resources and capabilities provided by the members of their ecosystems rather than owning them themselves and this avoids the problems of surplus value (Marx, 1987).

The following Table-1 outlines the differences between Marxist and Platform perspectives on capital accumulation.

Table- 1: A summary of the key differences between the “Marxist and Platform Perspectives” of capital accumulation.

|  |  |
| --- | --- |
| **Marxist Perspective** | **Platform Perspective** |
| Capital accumulation involves the accumulation of money – financial capital | Capital accumulation involves the accumulation of data – data capital |
| Commodity-money-commodity (CMC) - a direct transactional relationship | Transactions take place “outside” the platforms - an indirect relationship |
| The manufacture of products and services and the exploitation of labour by the owners of the means of production | The “manufacture” of connections and exploitation of user data by the platform owners |
| Factors of production are land, labour and capital | Factors of production are data and information |
| Separation of the bourgeoise owners of the means of production and the exploitation of the proletariat who sell their labour to the owners | The proletariat become the new owners of the means of production - the “new proletariat” – (cars, dwellings and data) and are exploited by the platform owners |
| Bourgeoise ownership of the means of production | Platform ownership of the data and the data source |
| Bourgeoise owners of the means of production have property rights and trading rights | Proletariat owners of the means of production (data) have no property rights or trading rights |
| Physical resources – raw materials, plant and equipment | Intangible resources – data (videos, blogs, search requests, texts and emails) |
| Monetisation through a CMC relationship | Monetisation through Big Data analytics and AI |
| Physical labour and the exchange of money for labour hours | Digital labour and the exchange of “free” services for unpaid data |
| Capital accumulation through commercial transactions and reinvestment in the economy | Capital accumulation through network effects and the data flywheel |
| Bourgeoise monopoly power and concentration from the ownership of the means of production (raw materials, plant and equipment) | Platform monopoly power and concentration from the ownership of unique resources and capabilities – data, NLP, AI, Big Data analytics and machine learning |
| Financial capital concentrated and centralised in the hands of the richest bourgeoise capitalists | Data capital concentrated and centralised  through platform aggregation and control of the Internet gateways |
| The reinvestment process from capital accumulation is transformed by human labour | The reinvestment process from capital accumulation is transformed by big data-driven AI algorithms and automation |
| Rate of capital accumulation is linear | Rate of capital accumulation is exponential – the law of accelerating returns (LOAR) |
| The overaccumulation of capital and declining returns | Increasing capital accumulation and returns to scale due to near-zero marginal cost of scaling plus digital products and inventories |
| Industrial era factories were hierarchies often resulting in surplus value | Platforms are marketplaces and distribute value more efficiently with larger, total addressable markets (TAMs). |

The above table shows that institutions, regimes and processes of capital accumulation under the capitalist platform economy or platform capitalism is fundamentally different from capitalist accumulation in agricultural, mercantile and industrial capitalism. Data (free, digital and “dead labour”) is capital and central to the accumulation process in platform capitalism whereas living labour is central to capitalist accumulation in other forms of capitalism. In all forms of capitalism, the centrality of labour in different forms can’t be undermined.

## **Conclusion**

The AI led technological revolution and data driven digital capitalism have transformed societies, states, individuals and their everyday lives as mere numbers stored in a machine. This technological process has fundamentally transformed the capitalist accumulation process by domesticating individuals, their labour power and their choices in everyday lives. The profound changes have transformed individual identities from social beings to alienated digital citizens defined by a machine or orderly organised processes within cloud platforms. The new forms of capital accumulation under new forms of capitalism in the age of AI and big data follow the old method of domesticating and exploiting labour power. Such a process is established by collecting, coordinating, analysing, managing, manipulating information and consolidating data with the help of automation, and machine learning algorithms (Dwivedi et al., 2021; Makridakis, 2017).

The rise of technology has not only transformed processes of production and labour relationships but it is also changing the nature of capitalist accumulation processes with the help of digitalisation. The digital activities are moving into the circuit of capital accumulation where digital labour is central to the creation of value both in terms of use value and exchange value. The technology led digital revolution and its industrial landscape - where “man succeeded for the first time in making the product of his past labour work on a large scale gratuitously – is like a force of nature” (Marx 1987: 366). Technology is not only a product of labour but also a product of repetitive past dead labour. Data, digitalisation and platforms use both dead and living labour to expand the processes of capitalism. Therefore, labour continues to create both use and exchange value within the processes of mechanisation and digitalisation. Mechanisation is socially meaningless if ‘‘a machine which does not serve the purposes of labour is useless’’ (Marx 1987:178). Similarly, digitalisation of the economy and its sustainability depends on its abilities to produce socially meaningful work and values.  (Jemielniak and Przegalinska, 2022).

The future of platforms, big data and new forms of capitalist accumulation have not only transformed capitalism but also transformed societies, states and individuals. However, the new forms of capitalism are displaying tendencies of old forms of capitalist determinism within technological singularity and its inherent contradictions within the abyss of digital animism. The autonomous machine and bonded labour in its manual and digital forms make new forms of capitalisms and its accumulation processes are path dependent on the centrality of labour in its living and dead form. The ‘data about and data on’ belongs to people, their social, economic, political, cultural and religious lives. It cannot and should not be controlled by a machine, a product of human labour and its creativity. It is time for the labour to reclaim its share from new forms of capital and its profit driven system. The new forms of capitalisms are evolving with the changing landscape of the technology led digital revolution. The big data led platform capitalism and its new forms of accumulation is moving in an unpredictable direction.

Data and platforms are twin pillars of new forms of capitalist accumulation processes within digital capitalism, which domesticates labour, determines price, product, demand, supply and market conditions. The digital labour theory of value is central to understanding new forms of capitalism and their accumulation processes determined by ‘platforms’ and ‘big data’. The core and peripheries of data management and control, shape institutions, regimes, and structures that are concomitant with requirements for the capital accumulation under digital capitalism. The social and economic outcomes of such a systemic transformation within capitalism create conditions where our data is used as resources and digital labour or dead labour is used as tools for further expansion of capitalism in its new forms. In conclusion, it can be said that ‘our data-our capital’ is the foundation of digital and all other forms of evolving capitalisms. The sustainability and future of the platform economy and its capitalist system depends on its ability to acknowledge centrality of digital labour and human data in the making of surplus and profit.

**Limitations and Future Research Direction**

This is a conceptual paper and not an empirical analysis of “The Future of Platforms, Big Data and New Forms of Capital Accumulation”. The paper undertakes a qualitative comparative analysis (QCA) by exploring a broad range of complex factors with case study examples from leading firms within the platform economy. It draws upon seminal concepts and economic theories that form the basic building blocks of political science and critiques Marxist principles using new theories from the platform economy. Due to the complexity of the topic and the intangibility and qualitative nature of the subject, it was not feasible nor appropriate to undertake a quantitative empirical study. The purpose of the philosophical inquiry was to perform research using intellectual analysis and to clarify meaning using an interpretivist rather than a positivist research philosophy. However, this was constrained to a certain extent by a number of factors such as the breadth of the hypothesis being investigated, the diverse range of perspectives being considered and the speed of technological and environmental change.

This, however, has created opportunities for further research. For example, capital accumulation through data capital is expected to follow a growth path in the future (Walton and Nayak, 2021) as new technological trends unfold such as Central Bank Digital Currencies (CBDC’s), cryptocurrencies, blockchain, the Internet-of-Things (IoT), Industry 4.0, satellite Internet and artificial general intelligence (AGI). To counter balance this trend towards monopoly capitalism (Rikap, 2021), global regulatory pressures in Europe, China and the USA are now emerging. This has the potential to negatively impact upon the economic rents and capital accumulation of the larger platform companies. The extent to which this will be off-set by their growth in other areas of the global economy remain to be seen thereby requiring further, ongoing research.

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