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DIGITAL LABOUR, PRODUCTION RELATIONS, AND SOCIAL CLASS IN THE AGE OF AUTOMATION

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Abstract - *This literature-based study examines how digital labour and automation reorganize social structure through changing production relations, shifting class identities, and emerging patterns of stratification. Drawing on thematic synthesis of theoretical and empirical works, the article shows that ownership and control of data, algorithms, and digital infrastructure have become central axes of power in contemporary labour regimes. Production processes are fragmented into small tasks allocated through platforms, while surveillance operates through continuous data tracking, ratings, and performance scores. Workers experience a tension between narratives of independence and concrete dependence on opaque technical rules that govern access to income. New social layers crystallise around differentiated access to education, digital skills, infrastructure, gendered divisions of labour, age, ethnicity, and citizenship. The study argues that digital labour does not dissolve hierarchy; it rearranges it around proximity to technological decision making and capacity to shape platform rules. The article concludes by highlighting the need for renewed class theory, regulatory frameworks addressing algorithmic governance, and inclusive digital skill formation to reduce emerging inequalities in digitally mediated work.*

Keywords: digital labor, automation, production relations, class identity, social stratification, platform work, algorithmic governance

INTRODUCTION

Rapid changes in digital technology are shifting the way humans work, interact, and assess their daily lives. Automation, online platforms, and work management algorithms are reshaping the structure of opportunities that were once largely determined by land ownership, factories, or physical offices. In this new landscape, the relationship between workers, capital owners, and technical devices is becoming increasingly complex, as the boundaries of work space and time are blurring. Family spaces, public spaces, and production spaces intersect through constantly connected devices. Work experiences that were once structured by fixed schedules and formal hierarchies are now driven by notifications, performance scores, and data-based monitoring. These changes raise questions about what kind of new social order is being formed, how people interpret their position within it, and to what extent the old class structures are persisting or shifting. All of these questions require a sensitive reading of the daily experiences of workers and the meaning they give to the changes they are experiencing (Joyce et al., 2023).

Amidst the digitalisation of work, automation is no longer limited to heavy industrial production lines, but has permeated service, administrative, and even creative work. Artificial intelligence systems, process robots, and recommendation algorithms are beginning to take over tasks that once required human labour with specialised skills. This situation has created new tensions between expectations for efficiency and concerns about the diminishing role of humans in the production process. Many workers are faced with demands for reskilling and upskilling in order to remain recognised as part of the legitimate value chain, while others are pushed to the margins of the labour market. At the same time, new forms of work are emerging, such as gig work, microtasking, and freelancing platforms, which offer flexibility but are often accompanied by income and status uncertainty. The interconnection between automation, fluid employment contracts, and data-based assessments presents a social landscape that invites a new reading of the structures and hierarchies that are being formed (Rodriguez-Lluesma et al., 2021).

The digitisation of work is shifting the way production relations are structured, both in large organisations and small businesses. The processes of supervision, coordination and distribution of work, which used to be done face-to-face, are now mediated by information systems, performance dashboards and task management applications. Employers, managers and shareholders are able to view productivity in real time, while workers receive a series of instructions summarised in a digital interface. The relationship between employers and employees often becomes more impersonal, as many decisions are made through algorithmic logic that is not easily negotiable. In this situation, questions arise about how forms of domination, obedience, or resistance are rearticulated. Digitalisation has profound socio-technical impacts, changing the way humans organise and interact. In the context of work, as explained by Dorschel (2022), it shifts production relations towards impersonal digital mediation. Meanwhile, in the social context, research such as that conducted by Issalillah and Hardyansah (2022) shows that digitalisation also changes the landscape of community

participation, where the digital divide and misinformation pose a threat to trust and social engagement. Together, these two studies describe a comprehensive transformation in which technology not only automates tasks but also reconfigures human relationships, both economically and socially. This transformation can be observed specifically in the dynamics of contemporary organisations. An exploratory study by Darmawan et al. (2023), for example, investigates changes in management-employee relationships in multinational companies in the era of literacy-based digitalisation, which aptly captures the complexity of the shift from face-to-face supervision to digital mediation and new competency demands.

Technology-driven changes in work structures have consequences for class identity. The once relatively clear boundaries between office workers, factory workers, civil servants, and educated professionals are becoming increasingly blurred. An individual may work from home for a global company, complete tasks through a platform, and at the same time drive for an online transportation service to supplement their income. Fixed-salary jobs are mixed with piecework paid per task, blurring the boundaries between the stable middle class, low-wage workers, and vulnerable groups. In the digital space, work identities are presented through profiles, portfolios, and ratings, which do not necessarily reflect actual economic positions. There is a gap between the professional image displayed on screen and the experience of desperation, debt, or dependence on algorithms. The tension between image and daily reality requires a theoretical explanation of how social class is felt, recognised, and renegotiated. (García Ruiz, 2023). This new social reality not only changes the lives of workers, but also radically complicates the reputation landscape for companies. Technology corporations and platforms now operate amid tensions between their image as drivers of efficiency and demands to take responsibility for the economic stratification they may be reducing or exacerbating. Therefore, the challenges in managing corporate reputation in the digital age, as analysed by Darmawan et al. (2022), are increasingly deep and structural, requiring an approach that is sensitive to broader socio-economic issues, beyond traditional communication management.

Social stratification has also shifted as access to technology, digital literacy, and data management capabilities have become new determinants of life opportunities. Ownership of the latest devices, stable internet networks, and the ability to use various applications give certain groups an advantage over those who lag behind in terms of infrastructure and education. At the same time, technology companies and global investors control data on a large scale, enabling them to influence consumption patterns, recruitment, and investment. The gap is no longer just a matter of wages and physical asset ownership, but extends to technical knowledge, network access, and control over algorithms. In the field, digitally skilled workers can move nimbly across various platforms, while those who are less trained are stuck in low-value routine work. The question of how new social layers are formed from differences in digital access and capacity is a key theme that will be explored in this literature study. The analysis of digital-based stratification is rooted in the discourse on how inequalities in access to technology and digital skills, as studied by Arifin and Darmawan (2021), can widen the opportunity gap in various areas of life. Thus, this literature not only describes the symptoms but also offers a framework for understanding the mechanisms of social injustice reproduction in the era of technology 4.0.

The problems arising from these developments are layered and interrelated. First, there is uncertainty about how exactly production relations are restructured when digital technology and automation become the main basis for work management. Long-term employment contracts are replaced by short-term assignments, formal working hours are replaced by almost continuous online availability, while workers' bargaining power shifts to score-based assessments and reviews. In such circumstances, it is difficult to determine who is in control, how the value of work is measured, and to what extent workers can influence the conditions that bind them. Questions about new forms of exploitation, oppression, or opportunities arising from digital work arrangements still require structured analysis through conceptual review and empirical findings from previous studies.

Another issue relates to how class identity and social stratification structures are reconstructed through technology. On the one hand, the digitisation of work is often praised as opening up opportunities for anyone with skills and network connections, as if all individuals start from an equal footing. On the other hand, evidence of recurring patterns of inequality shows that certain groups remain stuck in subordinate positions, while others expand their existing advantages. The narrative of digital meritocracy faces the reality of structural barriers rooted in education, gender, region, and race. The question that arises is whether technology truly blurs class boundaries or simply rearranges old hierarchies in a more subtle form, concealed in algorithms and user-friendly interfaces. Unravelling this contradiction is an important task for literature studies that seek to assess the direction of social structural change in the digital age.

This topic is worth examining at this time because the acceleration of work digitalisation is occurring alongside economic crises, climate change, and political uncertainty in various countries. Decisions made by governments, corporations, and educational institutions regarding technology investment, curriculum, and social protection will have a long-term impact on class structure and life opportunities for future generations. Studies that summarise and critique existing thinking enable a more focused understanding of general patterns, variations, and global trends. Without a strong theoretical foundation, policy formulation risks relying on narratives promoting the technology industry that tend to highlight efficiency benefits while ignoring the accompanying inequalities. A systematic literature review can help to re-evaluate these assumptions by re-examining the work experiences generated by technology.

In addition, studies on social structural transformation due to work digitalisation and automation are important for contributing critical thinking in the field of social sciences. Many new terms such as platform economy, surveillance

capitalism, and algorithm-based work are widely used, but their theoretical meanings are often fragmented. Through targeted literature studies, various approaches in the sociology of work, class theory, and technology studies can be brought together to formulate a more complete picture of the direction of change. This understanding is necessary to avoid overly optimistic or pessimistic attitudes towards technology. By revisiting the arguments, findings, and debates that have developed, this study seeks to provide a solid conceptual basis for future empirical research that seeks to explore the daily experiences of workers in various fields. Efforts to formulate a comprehensive picture of social transformation in the digital age have begun in various studies, including those focusing on cultural dimensions. For example, Al Hakim et al. (2021) examine the transformation of cultural values and social practices in the digital age, providing a complementary perspective to studies of transformation in the world of work.

The aim of this study is to systematically describe the changes in social structure that have emerged from the digitalisation of work and automation by reviewing various theoretical works and empirical findings that have been published. This literature review aims to explain how production relations, forms of control, and patterns of compliance and resistance shift when work is mediated by algorithms and digital platforms. In addition, this study aims to reinterpret class identities and patterns of social stratification that arise from differences in access, digital capacity, and position in the global value chain. Theoretically, the research is expected to enrich the discourse on the sociology of work and class theory in the digital age, while practically it can provide a basis for the formulation of employment, education, and social protection policies that are more sensitive to social structural changes caused by technology.

RESEARCH METHODS

This study uses a qualitative literature review approach with thematic synthesis to formulate a systematic understanding of social structural transformation due to the digitalisation of work and automation. The initial step was conducted through a targeted search of indexed international journal databases, such as Scopus, Web of Science, and Google Scholar, as well as recognised national journal portals. The keywords used combined terms related to digital work, automation, production relations, social class, and social stratification in various combinations. The search focused on journal articles, scientific books, and book chapters containing theoretical studies and empirical findings on changes in the technology-based world of work. The search framework was organised in a repetitive and reflective manner, referring to the hermeneutic literature review approach that emphasises the back-and-forth cycle between text and interpreter (Boell & Cecez-Kecmanovic, 2014). In this way, the initial understanding of the theme of work digitalisation was sharpened through repeated reading and sorting of sources.

The inclusion criteria covered publications that examined the relationship between digital technology or automation and class structure, production relations, or social stratification, either through theoretical reviews or empirical research. Sources that focused only on technical, managerial, or descriptive aspects without explicit links to social structures were filtered out. Articles that touched on platform work, work management algorithms, or data-based surveillance were prioritised, insofar as they contained analyses of workers' positions, forms of control, or patterns of inequality. The source selection process followed the principles of systematic review, emphasising transparency and traceability of steps (Petticrew & Roberts, 2006), with all inclusion and exclusion decisions recorded. To synthesise the variety of qualitative research designs, a thematic synthesis framework was used as a guide to connect findings across studies into more abstract themes (Thomas & Harden, 2008; Dixon-Woods et al., 2006). Each text was read in full, then units of meaning related to changes in production relations, class identity, and patterns of stratification were identified.

The literature data coding process followed the thematic analysis stages proposed by Braun and Clarke (2006), starting with a detailed introduction to the text content, the creation of initial codes, the grouping of codes into themes, a review of the themes, the naming of themes, and the preparation of a synthesis narrative. The initial codes included terms and statements about new forms of surveillance, dependence on algorithms, changes in work status, class experiences, and patterns of social mobility. Quality assurance was carried out through several strategies: complete documentation of the search trail, storage of reflective notes during reading, and cross-comparison of themes to avoid hasty reduction. The principles of transparency, consistency, and readability are maintained by presenting a logical path connecting the literature findings to the final argument structure. Thus, the resulting synthesis is expected to describe the current configuration of thinking about the digitisation of work and automation in relation to the transformation of social structures.

RESULTS AND DISCUSSIONS

Work Digitalisation, Production Relations, and Class Identity Reconstruction

The digitisation of work is shifting the way production is organised from a physical space-based model to a distributed network connected through platforms and data infrastructure. In this new arrangement, production decisions, task allocation and supervision are no longer centred on a physically present supervisor, but rather on a system that regulates the flow of information, assignments and rewards. Work applications, performance dashboards, and ranking algorithms structure

workers' daily experiences, from when they receive orders to how their work is evaluated. The relationship between capital owners and labour has become increasingly layered, as between them stands a seemingly neutral digital intermediary, which in fact contains a set of rules and preferences that guide behaviour. In this environment, workers often feel connected to interfaces and scores rather than to visible employers. This shift shows that digital infrastructure has become a central actor that regulates various dimensions of life. The formative influence of this infrastructure is also evident in the social landscape outside of work, particularly in how digital media shapes public opinion. As explained by Zulkarnain and Al Hakim (2023), the evolution of digital media has serious implications for the credibility of information and social dynamics, reflecting how platforms and algorithms similar to work applications not only connect but also actively direct and shape human interactions and beliefs. These changes reshape how people understand who controls the production process, where power lies, and how responsibility for work outcomes is shared (Valenduc, 2019).

This transition has an impact on the structure of authority in the workplace. In the classic industrial model, the chain of command can be traced through job titles, organisational structures, and relatively clear written regulations. Now, many decisions are left to algorithmic rules embedded in software, such as order assignment logic, incentive calculations, or account access termination. These rules are rarely fully transparent to workers, so decisions that have a major impact on income and job security appear to be automatic. This condition fosters a new form of subordination, as workers are compelled to adjust their behaviour to the assessment patterns they have learned through experience, without really knowing the limits that have been set. At the same time, platform managers and capital owners gain the flexibility to change work parameters without direct negotiation with the workforce. Production relations are moving towards a configuration where control is embedded in the code and design of the system, rather than simply in explicit instructions (Arcidiacono et al., 2019).

The digitisation of work also breaks down and recombines production processes into task units that can be distributed to many workers in different locations. Work that was once carried out entirely by a single team within an organisation can now be broken down into micro-tasks performed by many people who do not know each other. They only interact through the quality standards set by the platform and the automatic assessment that follows each delivery of results. This fragmentation of the work process reduces workers' involvement in the entire production cycle, so that their understanding of the ultimate goals and social benefits of their work tends to diminish. At the same time, system owners can combine separate work outputs into high-value products or services. This pattern reinforces the imbalance between those who control the design of the value chain and those who only have access to the lowest segment of easily replaceable, repetitive tasks (Hünefeld et al., 2021).

In the digital workplace, production time and space have been reorganised. Working hours are no longer strictly limited by factory sirens or office attendance, but rather by platform availability and user demand. Workers must constantly weigh when to go online to get the most orders, when to take breaks, and how to manage their family life amid a constant stream of notifications. Home, city streets, or small roadside stalls can all become work locations, as the most important factors are network connectivity and the ability to respond to work calls. This form of flexibility is often marketed as freedom, but in practice it can turn into an almost constant demand for presence. Production relations also take on a new dimension, where control over time and the rhythm of daily life becomes a tug-of-war between the needs of the company, the desires of customers, and the physical and emotional endurance of workers (Cruz & Gameiro, 2023).

The digitisation of work has shifted the form of supervision from direct observation by superiors to widespread monitoring through sensors, GPS, activity logs, and other digital records. Every step a worker takes, from the time they receive a task, the duration of the work, to the way they interact with customers, can be recorded and processed into performance indicators. Such data enables companies to compile highly detailed productivity profiles, which are then used to determine rankings, bonuses, or access restrictions. Workers realise that almost all actions have consequences on the scores that determine their next job opportunities, so they adjust their behaviour to conform to these assessment patterns. Surveillance becomes integrated into the daily workflow, and the boundary between external control and self-control becomes blurred. In this atmosphere, production relations are shrouded in a new layer of discipline that is subtle yet powerful, as it is embedded in habits formed through repeated interactions with digital systems (della Porta et al., 2022).

Beyond altering power relations in the workplace, digitalisation reshapes how workers perceive themselves as part of a particular social class. In many cases, platforms promote the image of workers as independent partners, micro-entrepreneurs, or self-employed professionals managing client portfolios through applications. This narrative encourages many people to see themselves not as labourers or employees, but as individuals who are free to choose when and how they work. However, daily experiences often reveal a strong dependence on the policies of one or two large platforms, income fluctuations that follow algorithm changes, and limitations in determining rates. The tension between the image of independence and the experience of dependence triggers an internal bargaining process regarding one's true class position, whether closer to traditional wage labourers or to business owners who control the means of production (Umanets & Shatalova, 2022). This class identity tension creates a latent internal conflict, which requires rethinking how not only external and visible conflicts can be reconciled in the digital age. In a different but related realm, Rianto, Darmawan, and Negara (2023) propose the application of restorative justice as an approach to resolving conflicts in the digital space. Their principles of relationship restoration and participatory solution-seeking can provide a relevant lens for understanding how these worker

identity tensions can be acknowledged and potentially addressed, not through the courts, but through strengthening collective awareness and dialogue about class positions in the platform economy.

Class identity in the digital work era is also shaped through self-representation in online spaces. Worker profiles, photos, skill descriptions, and customer reviews are an important part of how a person is socially recognised. Workers who are able to construct a convincing personal narrative, display an attractive portfolio, and maintain good relationships with clients are more likely to obtain high-value assignments. Conversely, those who struggle to package their professional identity often find themselves trapped in low-value jobs, even though they may have equally strong substantive skills. This situation marks a shift from class identity based solely on structural grouping to one that is also influenced by the ability to manage impressions in the digital space. However, mastery of self-presentation techniques is greatly influenced by educational background, access to training, and social networks, so that initial differences between social groups tend to be repeated in new forms (Martindale & Lehdonvirta, 2023). The dynamics of class identity formation through online representation are a specific manifestation of a broader social phenomenon in the digital age. As examined by Costa et al. (2022), the digital world has become a central space for the formation of individual identity and social perception through interactions that occur within it. Thus, the ability to manage "digital impressions" for workers is not merely a technical skill, but participation in a larger social process in which identity is continuously constructed, displayed, and assessed.

The class experience in digital work is inseparable from urban spatial organisation and infrastructure. Workers who live in areas with stable internet connections, adequate transport access, and proximity to service demand centres have a clear advantage. They find it easier to meet delivery deadlines, respond to orders, and maintain user satisfaction scores. Meanwhile, workers from peripheral areas face higher connection costs, longer travel times, and the risk of order cancellations that impact their ratings. These conditions place certain groups in a more vulnerable position, even though they access the same platform. In this sense, geographical, infrastructural, and class stratification intersect within the digital work experience, reinforcing differences in opportunities and mobility barriers across social strata (Santos, 2021).

The digitisation of work also changes patterns of solidarity and separation between groups of workers. In traditional factories or offices, colleagues share physical space and similar daily rhythms, providing greater opportunities to engage in conversation, recognise problems, and formulate joint action. In platform-based work, many workers carry out tasks separately, meeting occasionally in public places without strong formal relationships. Work communities must be formed through messaging groups, online forums, or informal meetings that depend on the initiative of individuals or small groups. On the one hand, this type of network opens up opportunities for cross-regional solidarity. On the other hand, the high level of fragmentation can hinder the emergence of a strong collective class identity. As a result, many workers experience similar structural pressures but interpret them as personal problems that must be overcome individually (Graham et al., 2017).

Changes in production relations triggered by digitalisation also have an impact on the younger generation entering the world of work. Many new graduates encounter a labour market dominated by temporary contracts, project-based work, and freelance opportunities facilitated by applications. They shape their professional identities through experimentation across various platforms, combining formal work with online side jobs to meet their living needs. In the process, the boundaries between transitional periods and long-term working conditions become blurred. What was once considered a temporary path to a stable career often develops into an ever-changing work pattern with no certainty of status. This affects how the younger generation envisions the future of their class, whether as part of the established middle class, low-bargaining-power workers, or a flexible group that constantly moves between jobs (Muntaner, 2018).

In the theoretical realm, the digitisation of work invites a reinterpretation of classic class categories that rely on the division between owners of the means of production and sellers of labour. Digital platforms introduce new forms of ownership based on control of data infrastructure, algorithms and user networks. Workers may own tools and vehicles for work, but the main value lies in access to the platform that determines the flow of orders. Thus, physical ownership of tools does not necessarily place someone in the category of an independent entrepreneur. Instead, bargaining power is greatly influenced by the ability to influence platform rules, which are usually concentrated at the global corporate level. This new arrangement requires an understanding of social class that captures the layers of data ownership and digital infrastructure as part of the production structure (Woodcock, 2023).

Overall, the digitalisation of work reshapes production relations through a shift in oversight to data systems, the fragmentation of production processes into small tasks, and the replacement of many direct interactions with algorithmic decisions. These changes give rise to new configurations of power that are difficult to see, as they are embedded in platform design and performance assessment logic. At the same time, workers' class identities are shifting through narratives of independence, practices of self-representation in online spaces, and daily experiences marked by dependence on platform policies and infrastructure conditions. These fragments of experience compose a more fluid class pattern, yet one still marked by inequalities of access to and control over technology.

Automation, Digital Work Technology, and New Patterns of Social Stratification

Automation and digital work technologies are shaping new patterns of social stratification through a clear distinction between groups that design, control, and own technological systems and groups that depend on these systems as a means of earning an income. (Hong & Shell, 2018) The upper layer consists of platform owners, software developers,

data analysts, and managers who regulate technical architecture and economic value flows. Below them are skilled professionals who operate systems, design data-based policies, and are able to move between global organisations. This layer enjoys high mobility and extensive network access. Meanwhile, at the bottom are groups of workers whose tasks are partially automated, dependent on platform assignments, and easily replaceable. Although all layers interact through the same digital network, the gap in terms of job security, income, and influence on strategic decisions remains wide. Thus, social stratification in the digital age is not only determined by differences in occupation, but also by proximity to the centre of technological decision-making.

Differences in access to technical knowledge and digital literacy are among the main determinants of position in this new structure. Those who have had the opportunity to learn programming, data analytics, and systems management from the outset gain a significant advantage because these skills are in high demand (Martindale & Lehdonvirta, 2021). This group is relatively freer to negotiate wages, choose where to work, and even work across borders through remote schemes. At the same time, individuals with limited educational opportunities are often absorbed into routine work that only utilises the basic features of the platform, such as receiving orders, following routes, or uploading task results. The space to move up to the layer that controls the system is narrow because structured training pathways are less accessible. As a result, social stratification is marked by a divide between those who understand the logic of technology and those who merely use it as a tool, without much opportunity to influence its development.

This gap is exacerbated by the uneven distribution of digital infrastructure. Large urban areas enjoy fast internet networks, data centres, technology incubators, and active professional communities. In these areas, high-value job opportunities in technology, system design, and advanced digital services are growing rapidly. In contrast, rural areas or small towns often still rely on slow connections, outdated equipment, and minimal training institution support. As a result, residents there tend to access digital work in its simplest and lowest-paid forms, such as microtasking or platform work with meagre rewards. Differences in infrastructure quality contribute to forming a dividing line between areas that are centres of digital skill and income accumulation and areas that are merely suppliers of cheap labour. This pattern repeats the old inequality between centres and peripheries in a new form centred on technological infrastructure (Borghese, 2022).

Gender dimensions and household relations also strongly influence emerging patterns of social stratification. Automation in manufacturing and routine services often hits hard at jobs predominantly filled by working-class men, while the expansion of domestic and care platform work through apps often involves women (Orlova & Borovitskii, 2022). On the one hand, platforms provide opportunities for women to earn an income while staying at home. However, the demands of flexible online presence often clash with the undiminished burden of family care work. Women from lower economic groups are often trapped in low-wage jobs that do not provide adequate social protection, widening the gap with highly educated women working in advanced technology sectors. Thus, automation and digitalisation can reinforce divisions among women themselves, based on class, education, and ability to negotiate family work structures.

Age and generation are also important differentiating factors in this new stratification. Young workers generally adapt more quickly to digital interfaces, new programming languages, and remote collaboration patterns (Gil-Hernández et al., 2023). They can take advantage of online courses, virtual communities, and global freelance projects to build their careers. However, not all young workers have the same resources to access these opportunities. Those from high-income families find it easier to obtain certificates, attend paid training, and intern at well-known technology companies. Conversely, young workers from vulnerable families tend to enter platform work that demands long hours with unstable incomes. On another level, older workers face the risk of being displaced as their skills are replaced by automated technology and they struggle to learn new tools. This intergenerational tension reinforces hierarchical patterns that combine age, class, and digital literacy.

The automation of work processes also creates very different categories of jobs in terms of job security and income predictability. At one end of the spectrum are jobs that design, manage, and maintain automated systems, which generally offer stable contracts, benefits, and clear career paths (Calderón-Gómez et al., 2020). Workers in this category are protected by professional institutions, industry networks, and their reputation for expertise. At the other end of the spectrum are jobs that depend on automated systems for assignments, such as app-based drivers, couriers, or microtask workers controlled by assignment algorithms. This second group often operates without formal contracts, unclear working hours, and no protection in the event of a sudden drop in demand. Although technically all these jobs exist within the same digital ecosystem, the level of social vulnerability they experience is vastly different. The accumulation of advantages at one end and vulnerability at the other reinforces the stratification between maintainers and users of automated systems.

Social mobility patterns in this new structure tend to follow highly filtered paths. In theory, digital work allows anyone with an internet connection to access the global market. However, to truly move from the routine work layer to the system designer layer, a combination of educational capital, networks, and long learning times is required (Brussevich et al., 2018). For workers who have to spend most of their time chasing daily income targets on platforms, the space to invest in strategic skills improvement is very limited. They are easily trapped in a cycle where meagre earnings must be immediately used to meet basic needs, making it difficult to set aside resources for training. Thus, the claim that technology opens wide avenues for upward mobility often collides with the reality of structural barriers that make it difficult for low-income workers to escape vulnerable positions.

Dimensions of race, ethnicity, and nationality also shape the face of social stratification in the era of automation and digital work (Park et al., 2023). In many cases, high-value work in the technology sector is concentrated in certain global countries or cities, while fragmented, low-paying tasks are distributed to developing countries. Companies can contract freelance workers from different parts of the world at rates adjusted to local standards, which are far below market value in the client country. Workers from ethnic minorities in developed countries are also often trapped in low-paid platform work due to subtle discrimination in formal technology sector recruitment. They meet workers from other countries in online task spaces, but differences in passports and legal status limit their ability to access equal protection or rights. Structural barriers to accessing legal remedies are a universal challenge in the digital ecosystem, applicable on both a global and individual scale. In line with this, Fitrotinisak et al. (2023) examine the legal compliance framework needed to protect digital service users who face losses, highlighting that the effectiveness of the legal system is highly dependent on its ability to reach and restore the rights of vulnerable parties in complex and often asymmetrical technological structures. This situation gives rise to transnational stratification in which class divisions intersect with national borders and ethnic identities.

Rating-based assessment technology and public reviews also reshape stratification within groups of workers who appear to be similar (Ebben, 2022). Workers with high ratings tend to receive orders more often, get better-paying clients, and enjoy user trust. Meanwhile, workers with low ratings or a history of minor violations are easily pushed to the margins of the system, even though the causes of their low scores may stem from factors beyond their control, such as network disruptions or customer bias. In the long term, the rating system creates a subtle distinction between workers who are considered reliable and those who are considered problematic, which then affects income stability and opportunities for social advancement. This internal stratification often occurs without strong appeal mechanisms, reinforcing feelings of powerlessness among workers stuck with low scores.

It is also important to consider how public policy responds to automation and the digitalisation of work, as these responses contribute to either increasing or reducing inequality. In regions with strong social protection, workers who lose their jobs due to automation can still rely on unemployment benefits, retraining, and adequate access to public services. This provides a buffer against the risk of falling into long-term poverty. In regions with weak social safety nets, workers displaced by machines or algorithms often move to platform-based informal work with little protection. This lack of protection accelerates the formation of a digital working class that lives in constant uncertainty. Tax policies on technology companies, recognition of the legal status of platform workers, and support for basic technology education are determining factors in the direction of emerging social stratification. Among these factors, fiscal policy, particularly taxation, is a concrete instrument that can be engineered by the state to fund social safety nets and regulate the behaviour of digital economic actors. For example, an analysis by Nurhadi, Wibowo, Darmawan, Negara, and Hardyansah (2023) on the application of Value Added Tax (VAT) on e-commerce transactions in Indonesia highlights the challenges and implications of one form of digital tax policy, which will ultimately affect the extent of the technology sector's contribution to state revenue and, indirectly, to the state's capacity to provide social protection.

At the level of everyday experience, new social stratification often emerges in the form of differences in how social groups interact with technology. The upper middle class utilises home automation, digital subscription services, and virtual assistants to reduce domestic work, giving them more time and energy to develop their careers. In contrast, many low-income workers interact with technology primarily as a tool for surveillance, work assignments, or a means of entertainment to unwind. They deal with applications that determine income, measure speed, and record every violation. Meanwhile, the very wealthy can manage their assets through automated financial instruments, which further widens the wealth gap. This pattern of technology use reinforces the distance between those who control their time and living space through personal automation and those whose working time is controlled by production algorithms.

Overall, automation and digital work technologies are producing new patterns of social stratification characterised by sharp distinctions between system owners and designers, skilled operators, and workers dependent on algorithmic assignments. Differences in access to education, infrastructure, gender, age, ethnicity, and social protection intertwine to form layers that are difficult to penetrate. Although technology is often promoted as a means of opening up broad opportunities, in reality many paths to upward mobility are locked by the need for significant initial capital, whether in the form of knowledge, networks, or learning time. This new structure shows that the digital era does not eliminate stratification, but rather reorganises it around control over data, algorithms, and infrastructure.

CONCLUSIONS

This study shows that the digitisation of work and automation are changing the way production relations are structured while shifting the boundaries of class identity. Control over data, algorithms, and digital infrastructure has emerged as a new source of power that overshadows the relationship between capital owners, platform managers, and workers. The production process is fragmented into small task units that are divided through an application-based assignment system, while supervision has shifted to a continuous data monitoring mechanism. In this space, workers are confronted with interfaces and performance scores that determine their employment opportunities, even though the rules

underpinning them are often not fully transparent. Class identity is reshaped through narratives of platform worker independence, practices of self-representation in online spaces, and experiences of dependence on technical policies that are difficult to negotiate. At the same time, new patterns of social stratification are emerging through differences in access to education, infrastructure, digital literacy, gender, age, ethnicity, and citizenship. The overall findings of the literature confirm that the era of digital work has given rise to a more fluid social structure on the surface, but one that remains fraught with inequality when viewed from the perspective of control over technology and the economic outcomes it produces.

Theoretically, the results of this study encourage a renewal of how we read categories of class and social stratification by incorporating the dimensions of data ownership, algorithms, and infrastructure as key elements in production relations. The traditional classification between owners of the means of production and sellers of labour needs to be enriched through a more detailed distinction between system designers, data-based policy managers, skilled operators, and workers who depend on algorithmic assignments. This opens up space for the development of class theory that is more sensitive to the logic of platform work and automation. In practical terms, this study provides a basis for the state, trade unions, civil society organisations, and educational institutions to formulate social protection schemes, labour regulations, and skills enhancement programmes in line with changes in the structure of work. Policy design should not only regulate the form of formal contracts, but also address rules on algorithm transparency, data rights, recognition of the legal status of platform workers, and affordable basic technology education support for marginalised groups.

Based on literature findings, further research is recommended to explore the concrete experiences of workers in various digital and automated work sectors, with particular attention to differences in class, gender, region, and generation. A careful qualitative approach to workers' narratives can enrich the picture of how they interpret platform scores, ratings, and rules in their daily lives, while also revealing the survival strategies they have developed. In the policy realm, decision-makers need to test various regulatory models that place algorithm transparency, collective bargaining rights in online spaces, and portable social security as key components of labour governance. Educational and training institutions are expected to develop critical digital literacy curricula that go beyond mastery of devices and encourage participants to understand the power structures at work behind technology. Finally, cross-border and cross-disciplinary cooperation is needed to map the patterns of transnational social stratification that have emerged from the expansion of platform-based work and global automation.

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