



Beyond the Traditional Workplace: Dematerialized Work and the Future of Human Labour

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Abstract

The modern digital economy is reshaping the nature of work, shifting value creation from physical production to intangible, platform-mediated services. This article explores the concept of work dematerialization and its effects on human labour, focusing on the roles of Artificial Intelligence (AI), algorithmic management, and new employment policies. A critical approach is adopted to examine how the labour economy can adapt to these changes, highlighting the need to redefine work as a social good.

Keywords: Dematerialization of work; digital economy; artificial intelligence; job insecurity; employment policies

Introduction

When work becomes invisible, can it still be valued in the same way?

For centuries, work was based on physical presence, fixed schedules, and clear labour rights, serving as the foundation of production and social organization. The digital revolution, driven by the spread of networks, platforms, and AI technologies, has fundamentally disrupted this model. The transition from tangible to intangible work extends beyond changes in how or where work is performed; it profoundly affects how work is valued, recognized, and protected socially and legally. The dematerialization of work, as a shift from producing physical goods to providing digital services, introduces new challenges. These range from job insecurity and worker isolation to the need to rethink the value of work in a technology-dominated world.

This transformation raises key questions about the nature of work: How is productivity defined when work becomes 'invisible'?

How can fair pay and protection be guaranteed in an environment where traditional labour structures are breaking down? This article attempts to analyse the impacts of work dematerialization, exploring the interactions between technology, human resources, and social institutions. Through a critical perspective, it proposes a repositioning of human labour in the digital economy, aiming to strengthen its human-centered dimension and foster policies that promote fairness and sustainability.

Economic impacts and new work models

The dematerialization of work profoundly affects the economy, reshaping labour market dynamics, unemployment levels, and wealth distribution. Automation and AI, core components of the digital economy, significantly alter labour demand. Industries such as manufacturing, administrative support, and retail face a decline in traditional jobs as routine tasks are increasingly replaced by algorithms and robotic processes. Research indicates

that exposure to AI increases job insecurity in occupations reliant on repetitive or predictable tasks, such as accounting and data processing, while simultaneously boosting demand for specialized skills in areas like software development and data science [1]. Unemployment resulting from this transition is uneven. Workers with lower educational attainment or limited access to digital skills face a higher risk of long-term unemployment, while highly skilled workers benefit from growing demand for technological expertise.

This polarization of the labour market widens economic inequalities, as opportunities become concentrated among smaller groups of workers with advanced skills. In addition, dematerialization disrupts the traditional balance between labour supply and demand. Platform-based work, such as delivery services or digital freelancing platforms, often creates an oversupply of workers, diminishing their bargaining power and leading to lower wages and precarious working conditions. A study using European Social Survey data highlights that Italy, in particular, experiences high levels of precarious employment, with almost 48 percent of workers classified as low paid and significant proportions lacking fixed working hours or employment contracts [2]. Moreover, dematerialization impacts productivity and economic growth. While digital work can enhance efficiency through faster service delivery, the lack of stable labour structures limits investments in human capital, such as professional training.

The short-term flexibility offered by platforms frequently conflicts with long-term economic stability, as workers without social security or pension schemes face a higher risk of poverty. Finally, dematerialization challenges the traditional concept of full-time employment, as digital platforms promote the 'gig economy', where workers undertake short-term tasks without long-term commitments, which can affect consumer confidence and overall economic demand. Dematerialization is not only a technological shift but a socio-economic transformation. Workers on digital platforms, such as Uber drivers or freelancers on platforms like Upwork, operate as 'service providers' without stable contracts or social benefits. AI is expanding into sectors like law, accounting, and tourism, where automated systems handle tasks previously requiring human judgement. Exposure to these technologies creates a divided landscape: some sectors face the threat of automation, while others can benefit through skill upgrading, fostering human-machine collaboration [1].

Remote work, a key example of the digital economy, illustrates both the opportunities and challenges of dematerialized work. The shift to working from home (WFH) during the COVID-19 pandemic increased non-routine analytical tasks and reduced routine manual tasks, impacting overall productivity through greater use of information and communication technologies (ICT) [3]. However, the success of this model depends on organizations' ability to address worker isolation and maintain engagement in an 'invisible' work environment. The lack of physical interaction can lead to alienation, while the need for family-friendly policies and supportive technologies emerges as critical for the sustainability of remote work.

Adapting to the Digital Transformation of Work: Policy, Ethical, and Social Considerations

Work, beyond its productive role, is a social relationship and a source of identity. The evolution of the nature of work, particularly its increasing dematerialization through algorithmic management and remote practices, poses significant challenges to this inherent social and identity-forming roles. This shift risks fostering depersonalization and a loss of meaning, as platform and remote workers often experience isolation and limited visibility of their contributions. As a result, questions arise about whether their work is being valued fairly. Addressing these issues requires a human-centered approach that focuses on and strengthens the social aspect of work. The shift toward digital transformation requires comprehensive political, ethical and social considerations. Regulatory frameworks must evolve to acknowledge platform workers as employees, affording them rights such as social security and collective bargaining. Furthermore, the taxation of digital platforms requires adaptation to their cross-border operations.

Investment in reskilling and upskilling initiatives is crucial to foster human-machine complementarity. For remote work, policies should promote transparent communication, ensure robust technological infrastructure, and provide support for workers' mental well-being to ensure the model's long-term viability [4]. International organizations, such as the International Labour Organization (ILO), highlight the need for global regulations to mitigate job insecurity and advance sustainable development in the digital era. Ethical concerns are crucial in the dematerialization of work. The role of business ethics is to ensure that the entire process of developing and implementing digital technologies, as well as company decisions based on the information provided by these technologies, align with ethical considerations, respect rights, and do not compromise moral principles [5].

The invisibility of digital work, often performed in isolation, complicates its fair valuation. Furthermore, skill gaps widen social inequalities, as workers with limited access to education risk marginalisation. A redefinition of work is needed, one that perceives it not merely as a productive input, but as a social good. In this context, protecting human labour does not imply a return to traditional models, but rather the development of policies that promote transparency, foster participation, and ensure fairness. Ultimately, technology should serve humanity, not replace it.

Conclusion

The dematerialization of work is a defining feature of the digital age, offering significant opportunities such as increased productivity through AI-driven efficiencies and streamlined digital processes, but also poses challenges, such as rising unemployment in low-skilled sectors, labour market polarization and growing inequalities. Labour economics should adopt new analytical tools and redefine labour as a social good to harness the productivity gains and at the same time mitigate the risks of labour insecurity and social inequality. Policies that ensure fair valuation, protection, and enhancement of human labour are necessary to ensure that

technology benefits society. The challenge is not only technological but also ethical: how can we preserve the human dimension of work in an increasingly digital world?

Conflict of Interest

None.

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