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Gig Economy: Is It a Trap or Stepping Stone for the Informal Sector?

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Abstract: The informal sector and technology have complex interactions, shaping economic activity, job trends, and social outcomes, especially with the rise of the "gig economy", in which individuals work on an as-needed basis through online platforms. This article explores several theoretical frameworks, such as modernization theory, dependence theory, structuralist approaches, and post-structuralist viewpoints, and investigates how different frameworks explain the effects of technology on informal economic activity. This article also reviews for comprehending the correlation between the informal sector and technology. Besides that, this article explores the dual nature of the gig economy, examining whether it serves as a trap that perpetuates the vulnerabilities of the informal sector or as a stepping stone toward more excellent economic stability and mobility. Although the gig economy provides opportunities for income generation, skill development, and flexible working conditions, it also presents substantial challenges, such as job insecurity, a lack of benefits, and potential exploitation. This paper also addresses the implications for policy and future research directions by the sustainable development goal (SDG) of fostering sustainable, inclusive, and long-term economic growth, as well as full and productive employment and decent work for all.

Keywords: *Gig Economy, Informal Sector, Labour Economics, Informal Employment.*

1. Introduction and Background

For the past decades, the booming of the digital economy has offered new jobs for individuals involved in formal and informal sectors. The combination of rapid digital transformation, the expansion of information and communication technologies, and the extended period of economic inactivity in the manufacturing industry has significantly transformed the worldwide labor market and employment trends (Donovan et al., 2016; Stewart & Stanford, 2017; Kassi & Lehdonvirta, 2018). Indeed, the expanding relevance of the digital economy is crucial for the country to offer jobs, especially for the growing technologically savvy educated labor force. It also supplements the rising number of self-employed individuals who rely on the Internet to communicate with potential clients. As a result, the informal sector's scope and employment quality are also affected by the digital revolution of labor.

In recent years, an increasing number of people have joined the gig economy, searching for additional income or as their primary source of income. Moreover, it is influenced by the flexibility of working hours and location and the freedom to select the type of job (Stefano, 2016). After the COVID-19 crisis and the subsequent spike in unemployment, many professionals and skilled laborers started working online to maintain their standard of living. Consequently, it allowed the gig economy to proliferate quickly, creating bottom-up demand and supply in the online market. Many people, including students looking for employment, retirees, and those with low and high skills, also turn to gig work to make a living. Gig work has opened up new opportunities for underemployed or jobless people to transition from full-time employment to a new online-based flexible employment (Huang et al., 2020).

The term "gig economy" refers to this short-term job phenomenon, a metaphor taken from the music business, in which musicians are paid to play live shows. It was first driven by experienced IT professionals who began using online digital platforms to hunt for gig economy opportunities. The gig economy is often referred to as the 'platform economy', 'on-demand economy', or 'sharing economy'. It relates to the demand and supply of temporary or task-based labor (Howe, 2006; Cherry, 2016; Felstiner, 2011; Bergvall-Kåreborn & Howcroft, 2014; Eurofound, 2015).

As stated by ILO (2020), while the gig economy is an attractive alternative source of income, data reveal that on a worldwide scale, the gig economy tends to attract more young individuals, those aged 25 to 34 (46.2%) and 35 to 44 (32.5%). Pew Research Center (2016) found that 24% of Americans made money via the digital

'platform economy' the previous year. According to the study, this source of income is crucial for younger individuals. Meanwhile, according to the McKinsey Global Institute (2016), approximately 20-30% of the working-age population, or up to 162 million individuals in Europe and the United States, are involved in some form of independent work.

Because of internet technology and social media growth, younger adults have quickly adopted this new way of life. According to Hershatter & Epstein (2010), the gig economy frequently arises due to its online platform element, enabling millennials to utilize their talents and abilities, such as freelance photographers and videographers, social media content creators and influencers. This argument highlights the fact that many millennials are leaving traditional jobs for freelance work, which provides them with greater freedom and flexibility. Research published in the Harvard Business Review (2018) revealed that gig workers value flexibility, independence, and the opportunity to pursue their passions, with over 74% of respondents reporting high satisfaction with gig employment.

Given the limited evidence of the relationship between the gig economy and the informal sector, this paper seeks to investigate two questions. Firstly, how does technology affect the informal sector? Secondly, what are the gig economy's implications for the informal sector? This paper addresses critical questions about its role in economic development and social protection. This study also contributes to the literature in two ways. Firstly, this paper provides a theoretical framework for comprehending the direction of the gig economy in the informal sector. Secondly, this research illustrates both the advantages and disadvantages of the gig economy. The remainder of the study is presented as follows. The following section elucidates a comprehensive literature review of conceptual approaches defining the informal sector and technology. The third part discusses the technological impacts on the informal sector. The fourth section comprises the intersections between the informal sector and the gig economy. The following section discusses the challenges and risks of the gig economy. Finally, the last section summarises the implications and discussion by presenting a brief conclusion, limitations, and possible future studies.

2. Conceptual Approaches: Defining the Informal Sector and Technology

The informal sector, which includes non-regulated or recognized economic activities, plays a significant role in global labor markets, especially in developing nations. The rapid advancement of technology, mainly digital technologies, has brought new modifications to the informal sector, influencing how informal businesses operate and interact with formal economic systems. Technology refers to digital tools and innovations, including mobile phones, internet access, digital platforms, and financial technologies (fintech). The informal economy's technology integration can potentially influence economic activities and employment patterns in a transformative and disruptive manner. This section explores the conceptual approaches to understanding the intersection of the informal sector and technology, providing insights into the theoretical frameworks that guide this understanding.

Modernization Theory: The word "modernization theory" originates from older concepts of economic development (Geertz, 1963; Lewis, 1954; Rostow, 1959). The informal sector is viewed as a step in the market economy's developmental process (Lewis, 1954; Rostow, 1959; Harris and Todaro, 1970; Rauch, 1991). In this view, informal activities will cease to exist as a result of economic development in emerging nations. Workers with lower levels of human capital are more likely to find employment in informal and smaller firms that receive lower wages. On the other hand, workers with higher levels of human capital are more likely to find employment in larger, more productive firms, where they receive higher wages.

Based on this theory, the informal sector is said to result from a surplus of labor supply. As the economy becomes more modernized, the "excluded" informal laborers will eventually find employment in the formal market. Modernization theory suggests that economic development and technological advancement are inherently linked, with technology driving progress and modernization. From this perspective, adopting technology in the informal economy is seen as a pathway to formalization and economic development. Technology is expected to increase productivity, enhance market access, and integrate informal businesses into the formal economy.

Consequently, according to the modernization theory, the adoption of technological advancements has the potential to assist in bridging the gap between the informal and formal sectors, hence fostering economic growth and development. Bosch, Goni-Pacchioni, and Maloney (2012) conducted an empirical study that utilized data from Latin American countries, which showed that the impact of economic growth, industrialization, and technology adoption had reduced informal employment. Technology helped informal laborers in Brazil and Chile migrate to salaried jobs. Over a decade, informal employment in Brazil dropped 10% due to policies that formalized businesses and labor. This corresponds with modernization theory's assumption that economic development, driven by technological advances, facilitates the progressive shift of labor from the informal to the formal sector. Policies should, therefore, focus on facilitating access to technology and supporting digital literacy among informal workers.

Dependency Theory: This approach emerged as a counterpoint to modernization theory, which views technology as a universal driver of progress. Dependency theory originated in the 1960s and 1970s, primarily through the works of scholars such as André Gunder Frank and Immanuel Wallerstein. The theory proposes that the disparities in global economic conditions result from historical colonialism and economic exploitation processes. According to this theory, developed countries (the core) exploit developing countries (the periphery) through unequal trade relationships and the extraction of resources and labor (Frank, 1967; Wallerstein, 1974). This dynamic creates a dependency that hinders the economic development of peripheral countries and continues to maintain their inferior status.

In addition, dependency theory offers a contrasting view, arguing that technological advancement can boost existing inequalities and dependencies. From this perspective, integrating technology into the informal sector may lead to the exploitation and marginalization of informal workers. Technological tools and platforms, often controlled by large corporations, can extract value from informal labor without offering equivalent benefits. In brief, dependency theorists argue that technology controlled by developed countries and large corporations might contribute to the ongoing marginalization and exploitation of workers in developing nations and informal sectors. Subsequently, the dependency theory highlights the risks of exploitation and disparities in development associated with technological adoption in the informal sector.

To support this argument, the World Bank (2019) highlighted the widening digital gap in Sub-Saharan Africa, where urban elites can access internet infrastructure while rural informal laborers do not. Technological integration favors urban populations but not rural laborers, worsening regional inequality. This example emphasizes the unequal distribution of technological benefits within developing countries, where access to technology remains concentrated among privileged populations, further marginalizing informal laborers in rural areas. Additionally, the OECD Development Centre's (2020) findings are consistent with dependency theory, as they illustrate how dependency relationships can be worsened by reliance on foreign technology, which in turn keeps developing countries reliant on developed nations for essential technological infrastructure. Therefore, the empirical studies suggested that the policies should protect informal workers from exploitation and ensure that technological advancements are inclusive and equitable.

Structuralist Approaches: Moser (1978) and Castells and Portes (1989) promoted the structuralist school. Structuralist approaches focus on the structural conditions that shape economic activities and labor markets. These approaches emphasize the role of institutions, regulations, and economic structures in determining the outcomes of technological integration in the informal economy. Technology can either reinforce existing structures of inequality or disrupt them, depending on how it is implemented and regulated.

Chen et al. (2004) discussed that according to this theory, informal economic units (micro-enterprises) and employees are subjugated to minimize input and labor costs, enhancing major capitalist firms' competitiveness. The informal economy may be seen as a structural component of the modern development of capitalism. By exploiting unprotected informal laborers (such as women, youth, immigrants and unskilled), capitalist businesses aim to decrease wages, and labor safety requirements, and increase flexibility with the government's assistance. The informal sector is viewed as a consequence of globalization and capital accumulation, where it is not a phase in the transition from a traditional to a modern economy. It is not dependent on the formal economy's failure to absorb workers or on the voluntary decision of self-employed individuals. Therefore, according to structuralists, the informal sector is common in developed nations.

A study by Tokman (2007) found that multinational firms in Latin America minimize production costs by using informal laborers with lower labor standards, especially in textiles and manufacturing. Supporting the structuralist perspective, this study showed that even when technology and automation reduced manufacturing costs, informal laborers continued working in vulnerable conditions and earning low salaries. In addition, Chant and Pedwell (2008) found that communication and microfinance technology have created economic opportunities for women in informal businesses in Sub-Saharan Africa, but the lack of regulatory oversight leaves them vulnerable to exploitation. Despite technological advances, women in agriculture and handicrafts are underpaid and excluded.

These studies support the structuralist claim that institutional frameworks influence technological uptake where the lack of regulatory protections perpetuates the informal sector exploitation of workers. In short, structuralist approaches propose that institutional and regulatory frameworks operate as intermediaries in influencing the effect of technology on the informal sector. Policies should, therefore, focus on creating supportive regulatory environments that facilitate positive outcomes from technological adoption.

Post-Structuralist Perspectives: Post-structuralism emerged as a critique of structuralist theories, which tended to view social and economic structures as stable and deterministic. Instead, post-structuralists argue that social and economic realities are constructed through language, power relations, and cultural practices and are, therefore, fluid, contingent, and subject to constant change (Foucault, 2013; Derrida, 2016). However, post-structuralist viewpoints require a more refined understanding to comprehend the informal sector and its interaction with technology fully.

In the informal sector and technology context, post-structuralist perspectives focus on how technological advancements disrupt traditional jobs and create new forms of economic activity. Post-structuralist perspectives challenge the dual distinctions between formal and informal economies, emphasizing economic activities' fluid and dynamic nature. These perspectives highlight the diverse and context-specific ways in which technology interacts with informal economic activities. Technology can enable new forms of informal work, create hybrid economic spaces, and redefine the boundaries between formal and informal sectors. This is where the gig economy comes in the way laborers frequently work in an ambiguous space: they are not exclusively formal or informal employees.

To support this argument, digital freelancing platforms like Upwork and Freelancer in India have blurred the lines between formal and informal labor, according to Aneesh (2015). These platforms employ workers in flexible, non-formal roles without contracts, job security, or benefits. These platforms have produced a hybrid economy where freelancers switch jobs based on their skills and technology. Meanwhile, Grab and Gojek have altered Southeast Asia's transportation business, establishing hybrid economic activities where these p-hailing and e-hailing drivers deliver their jobs informally yet use formal digital platforms. Lim (2018) found that many drivers or riders work under informal conditions with flexible hours and no formal employment status, even though the platforms require registration and legal compliance.

These scenarios show how post-structuralists see technology disrupting economic systems. Ride-sharing platforms connect informal workers to structured digital systems, fluidizing labor markets. Therefore, they suggest that policies should be flexible and context-specific, recognizing the diversity of informal economic activities and how technology can be integrated.

To summarise, the effects of technology on informal economic activity can be viewed through different perspectives of the various theoretical frameworks—modernization theory, dependency theory, structuralist approaches, and post-structuralist viewpoints. Collectively, these frameworks offer a thorough comprehension of the diverse, complex, and frequently conflicting ways in which technology influences informal economic activities, thereby highlighting the necessity of inclusive, adaptive policies that respond to particular countries.

Technological Impacts on the Informal Sector

The informal sector is subject to significant and varied effects brought about by technology, which in turn affects how workers in the informal sector conduct business, access markets, and interact with formal economic structures. This section aims to investigate how technology influences the informal sector, stressing

both the positive and negative implications of these changes.

In particular, technology can enhance productivity and economic growth within the informal sector by improving business communication, marketing, and operations. Digital platforms can provide informal businesses with new markets and customer bases (Heeks, 2017). Social media platforms such as Facebook, Instagram, and WhatsApp also serve as marketing and sales channels for informal businesses, allowing them to advertise their products and engage directly with customers (Donner & Escobari, 2010). These platforms, including the growing and popular TikTok platform, enable informal sector workers to access more extensive and diverse markets. Besides that, marketplace platforms like eBay, Amazon, and local equivalents allow small-scale producers and sellers to sell their products online, attractive to customers outside of their geographical region (Graham et al., 2017).

In addition, technology can facilitate job creation and entrepreneurship in the informal sector. Digital platforms like ride-sharing and e-commerce sites offer new opportunities for income generation (Graham et al., 2017). Mobile technology can support micro-entrepreneurs by providing access to information and resources that were previously unavailable (Donner, 2007). Digital platforms such as Uber, Upwork, Grab, Foodpanda and TaskRabbit have created new opportunities for informal workers to engage in gig and freelance work. These platforms provide flexible work arrangements and the ability to earn income task-by-task (De Stefano, 2016). Advances in communication technologies have also enabled telecommuting and remote work, offering informal workers opportunities to participate in the global economy from their local contexts (Kässi & Lehdonvirta, 2018). This transition can enhance work-life balance and diminish the necessity for migration to urban areas. However, it also presents concerns regarding the digital gap and inequitable technological access (Graham et al., 2017).

Technology can also facilitate skill development and education for informal sector workers. Online learning platforms and mobile apps can provide training and resources to improve business practices and technical skills (Aker et al., 2016). In addition, mobile learning applications allow informal sector workers to learn at their own pace and on their schedule, offering flexible learning opportunities that can be customized to meet their specific requirements (Aker & Mbiti, 2010). Hockly (2018) added that microlearning platforms that offer short, targeted learning modules are especially suitable for informal workers. These platforms provide quick lessons on specific skills that can be immediately applied, enhancing job performance and productivity. Virtual simulations and video tutorials are essential for developing skills that require visual demonstration, including carpentry, plumbing, and electrical work (Traxler & Kukulska-Hulme, 2007).

ICTs, including smartphones and internet access, enable informal workers to access information on market prices, weather conditions, and best practices in their respective industries. This information can improve decision-making and increase productivity (Aker & Mbiti, 2010). Technology also facilitates better supply chain management and inventory control for informal businesses, reducing waste and improving efficiency (Qiang et al., 2011). Automation and digital tools can also streamline administrative tasks such as bookkeeping and tax filing, allowing informal businesses to operate more effectively and potentially transition to formality (Heeks, 2017). In addition, mobile applications facilitate the efficient management of appointments, deliveries, and customer feedback by informal businesses, thereby directly influencing customer satisfaction and productivity (Donner, 2007).

Financial technology (fintech) innovations, such as mobile money and digital payment systems, have significantly increased financial inclusion for informal sector workers. These technologies enable secure transactions, savings, and access to credit, which can support business growth and resilience (Jack & Suri, 2011). Besides that, these services offer a secure and efficient means of transferring money, saving, and accessing credit, which are crucial for business operations (Donovan, 2012). Financial inclusion through mobile money reduces the reliance on cash transactions, lowers transaction costs, and enhances the ability of informal workers to invest in their businesses, indirectly improving business productivity by reducing the necessity for physical travel, lowering transaction costs, and providing a secure method of saving money (Suri & Jack, 2016). Digital credit platforms provide small-scale loans to informal workers who typically do not have access to traditional banking services. This access to capital is crucial for expanding business operations and improving efficiency (Galbraith, 2017).

In conclusion, technology significantly impacts the informal sector, offering opportunities for market access, productivity improvements, and new employment forms such as gig employment. In the next part, we will discuss the intersections between the informal sector and the gig economy due to the impact of technological progress.

3. Intersections Between the Informal Sector and the Gig Economy

The gig economy and the informal sector are two dynamic components of the global labor market. While the informal sector has long been a feature of economies, particularly in developing countries, the rise of the gig economy has introduced new dimensions to informal employment. This section aims to synthesize existing research on the relationship between the informal sector and the gig economy, exploring how these two sectors interact and the implications for workers and economic development.

Informality is still relevant today because of the widespread and increasing incidence of various forms of informality. Compared to the past, informal workers nowadays are associated with individuals in the informal sector, such as traditional street vendors or home-based workers, and contract or gig workers hired by formal businesses (Sazali & Gen, 2019). The altering nature of work was recognized at the 2018 International Conference of Labour Statisticians (ICLS), which recommended a new classification to reflect the blurring lines between formal and informal employment. For example, there is a distinction between self-employed or entrepreneurs and contract workers in the case of platform workers such as e-hailing drivers and p-hailing riders. In general, the informal sector encompasses economic activities that are not subject to formal business regulation or taxation and are not monitored by the government. Workers in this sector usually do not have secure employment contracts, legal rights, or social protections. Both sectors involve flexible, non-traditional employment forms. However, the gig economy is often mediated through digital platforms, differentiating it from the broader informal sector, which might not utilize digital means.

According to Heeks (2017), the International Labour Organization (ILO) recognizes gig workers as a vulnerable labor market sector because of the chronic precariousness and structural inequities caused by informal employment. In brief, the gig economy comprises short-term contracts or freelance work instead of permanent jobs, facilitated mainly through digital platforms. De Stefano (2016) considered “crowd work”, which refers to working activities including the completion of several tasks via online platforms and “work-on-demand visa applications”. The work is accomplished through apps managed by businesses, examples of work that can be performed in the gig economy. This sector is characterized by on-demand work that provides flexibility but lacks traditional employment protections. Most gig workers combine multiple tiny “gigs” to make a living since they have to compete with many other workers for jobs, which further worsens their sense of exclusion (Tran & Sokas, 2017). Gig employment may be well-paid and safe. Nevertheless, both sectors experience income instability compared to formal employment due to the transient nature of job opportunities and the absence of employment benefits.

Work processes have been transformed due to the growth of business models based on smart platforms in the digital era (Scuotto et al., 2020). There is a gap in the global landscape in which this phenomenon cannot be conceptually described and statistically assessed uniformly to produce a comparable metric across nations. According to Messenger (2018), gig workers are typically independent, geographically dispersed, and in direct competition with each other. Hence, they are frequently categorized as independent contractors. Gig employment is often performed on a task- or event-by-task basis, and it has a more significant presence in online and offline platforms for labor (De Stefano, 2018). The on-demand labor force prefers non-traditional employment, which promotes the flexibility of both income and working hours (Gleim et al., 2019). Similarly, the digital economy environment enables the gig economy’s growth and a peer-to-peer design to increase information sharing and social decision-making processes (Kaine & Josserand, 2019).

According to MacDonald and Giazitzoglu (2019), the gig economy may bring about new economic gains but also give rise to new economic challenges. Ravenelle (2019) says that platforms for the gig economy can be seen as a “psychological contract violation” for workers and a barrier to the spread of individual loci of knowledge, which makes jobs less secure and lower-quality entrepreneurial activities more common. On the other hand, Burtch et al. (2018) say that platforms for the gig economy reduce the number of low-quality

entrepreneurial activities since they choose only the most solid business ideas. Because of this, it is now widely acknowledged that the gig economy is a new employment structure brought about by the rise of new technology (Gleim et al., 2019; Maalaoui et al., 2020).

To sum up, digital platforms offer access to a broader range of jobs and clients, potentially increasing earnings and reducing the dependence on local markets (Heeks, 2017). The gig economy and the informal sector offer flexibility and autonomy in work. This flexibility can benefit workers with caregiving responsibilities or those seeking to supplement their income. However, this often comes at the cost of job security and stability (Graham et al., 2017). The gig economy can facilitate skill development and entrepreneurial activities within the informal sector. Platforms like Upwork and Fiverr allow workers to market their skills globally, build their portfolios, and gain experience in various fields (Donovan et al., 2016). Therefore, the gig economy can provide new income-generating opportunities for workers in the informal sector.

4. Challenges and Risks

While technology can create jobs, it can also lead to job displacement and exacerbate inequality. Automation and digitalization may replace certain types of informal work, leading to unemployment and income loss for low-skilled workers (ILO, 2018). The benefits of technology are often unevenly distributed, with those lacking digital literacy or access to technology being left behind (Graham et al., 2019). The digital divide remains a significant challenge, particularly in developing countries. Limited access to technology and the Internet can prevent informal sector workers from fully benefiting from technological advancements. Therefore, cost, infrastructure, and digital literacy contribute to this divide (World Development Report, 2016).

While the gig economy can offer pathways for economic mobility for informal sector workers by providing access to higher-paying gigs and opportunities for skill development, the lack of stability and benefits can limit long-term economic advancement (Farrell et al., 2018). The gig economy can exacerbate income inequality, as workers with higher skills and better access to technology are more likely to secure well-paying gigs, while lower-skilled workers may struggle to find sufficient work (Schwellnus et al., 2019). The informal nature of gig work often means that workers do not have access to social protection and security such as health insurance, retirement benefits, or unemployment insurance. The absence of these benefits also places a greater burden on public resources, potentially increasing the costs to society in the long term. This lack of social safety nets can increase vulnerability and poverty (Berg, 2015).

One of the primary challenges of the gig economy for informal sector workers is job insecurity. Gig work is often characterized by irregular income, lack of benefits, and minimal labor protections, which can exacerbate the vulnerabilities associated with informal work (Rosenblat & Stark, 2016). Digital platforms can create power imbalances between workers and employers, leading to potential exploitation. Gig workers may face issues such as low pay, unfair working conditions, and lack of bargaining power (Wood et al., 2019). The rapid growth of the gig economy has outpaced regulatory frameworks, leading to gaps in labor rights and protections for gig workers. This regulatory lag can leave informal sector workers without legal recourse in exploitation cases or unfair treatment (Codagnone et al., 2016). Gig workers may be misclassified as independent contractors rather than employees, leading to exploitation and denial of workers' rights and protections (Rosenblat & Stark, 2016).

The lack of stable, predictable employment can lead to economic uncertainty for workers, which may negatively impact consumer spending and hinder long-term economic planning (Kalleberg, 2011). These effects can be particularly pronounced during economic downturns, where gig jobs are often the first to be cut, exacerbating economic instability (Wood et al., 2019). This issue can perpetuate the vulnerabilities associated with informal work. Therefore, the rapid pace of technological change poses challenges for regulation and policy. Governments often struggle to keep up with the innovations in the informal sector, leading to gaps in protection and oversight (Heeks, 2017).

Besides that, the informal nature of gig work also complicates taxation and regulation, often leading to lower tax revenues than traditional employment sectors. Tax authorities struggle with enforcement, as tracking income generated through these platforms can be elusive due to the lack of formal reporting mechanisms and

the use of third-party payment processors (Smith, 2016). Many gig workers are either unaware of their tax obligations or deliberately evade taxes due to the perceived transience of their jobs (Oei & Ring, 2017). This loss of revenue can affect public investment in infrastructure, education, and health, which are critical for sustainable economic growth (Schwellnus et al., 2019). The evasion of income taxes and related contributions affects the ability of governments to fund essential public services and infrastructure, which are crucial for long-term economic growth (Auerbach & Hassett, 2015). The lack of clear regulatory frameworks can hinder the sector's development and contribute to market inefficiencies (Prassl & Risak, 2015). Thus, the decentralized and informal nature of gig work complicates tax compliance.

Even though technology can boost productivity, generate employment opportunities, and advance financial inclusion in the informal sector, it also poses substantial threats, such as the displacement of jobs, inequality, unfair treatment of workers, and loss of tax revenue.

5. Implications for Policy and Future Research

The gig economy, characterized by flexible, on-demand work facilitated through digital platforms, offers significant potential to formalize aspects of the informal sector. There are several ways in which the gig economy can contribute to this formalization process, such as improved tracking and documentation and access to financial services. Typically, gig economy platforms require participants to register and log their activities digitally. This process generates a record of their work history and earnings, creating a verifiable digital footprint often lacking in traditional informal work settings. By partnering with gig economy platforms, governments can facilitate formalization efforts. These partnerships could focus on ensuring that platforms operate within legal frameworks, contribute to tax collections, and provide necessary data to local authorities to help in policymaking and planning.

Policies should also ensure that technological advancements are inclusive and beneficial for all informal sector workers. This includes promoting access to technology, digital literacy, and financial inclusion. Many gig platforms offer training to their workers to ensure quality service. This training helps workers develop professional skills that can elevate their employability and transition them into more formal roles within or outside the gig economy. Some platforms provide certifications for completed training, which can be recognized by other employers and institutions, further integrating workers into the formal economy. Governments can invest in education and training programs to support workers transitioning from the informal to the formal gig economy. These programs would focus on digital literacy, rights awareness, and specific skills training to increase the employability and productivity of workers within the gig economy.

In addition, governments should develop regulatory frameworks that protect informal workers from exploitation and ensure fair treatment. This includes addressing issues such as job security, benefits, and labor rights. While the gig economy presents opportunities for formalization, it also poses challenges such as job insecurity and potential exploitation. Therefore, policy interventions are crucial to ensure that the transition from informal to formal work within the gig economy is beneficial, sustainable, and inclusive. Governments can use data and insights from gig economy platforms to craft policies that better meet the needs of flexible and informal workers, ensuring they receive legal protections and benefits. By leveraging technology, regulatory reforms, and strategic partnerships, the gig economy can play a transformative role in reducing informality and integrating more workers into the formal economy, ultimately contributing to broader economic development and stability.

Future research should adopt an intersectional approach, considering how factors such as gender, age, and ethnicity intersect with technology and informality because different countries might develop and experience different factors and impacts of informality. This can provide a more comprehensive understanding of the impacts of technology on the informal sector.

Conclusion

The relationship between the informal sector and technology is complex and multifaceted, influenced by various conceptual approaches. While technology has the potential to enhance productivity, create jobs, and promote financial inclusion in the informal sector, it also presents significant risks, including job displacement,

inequality, and exploitation.

The gig economy can serve as a stepping stone for some workers in the informal sector. By providing opportunities for income generation, skill development, and entrepreneurial endeavors, gig work can help individuals transition to more stable and formal employment. The digital nature of gig platforms can also facilitate greater access to economic opportunities for marginalized groups. Conversely, for many workers in the informal sector, the gig economy can be a trap that perpetuates their vulnerabilities. The lack of job security, benefits, and protections can leave gig workers in a precarious position, struggling to make ends meet and vulnerable to exploitation. Moreover, the gig economy's flexibility can be illusory, as workers may have little control over their working conditions and earnings.

Other than that, creating supportive environments for technological adoption in the informal sector can help maximize its benefits. This includes providing infrastructure, training, and resources for informal workers. Policymakers and stakeholders must navigate these dynamics carefully, ensuring that technological advancements are inclusive and beneficial for all informal sector workers. Future research should continue to explore technology's diverse and context-specific impacts on the informal sector, address existing gaps, provide insights that can inform effective policies and interventions, and offer deeper insights into the long-term and diverse impacts of the gig economy on the informal sector.

References

Aboagye-Da-Costa, D. P. (2012). Internet Quality in Southern Ghana for Businesses Vendor: Viope Solutions Oy. Bachelor Thesis. Leppävaara, Finland: Laurea University of Applied Sciences.

Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *Journal of Economic Perspectives*, 24(3), 207-232.

Aker, J. C., Boumnijel, R., McClelland, A., & Tierney, N. (2016). Payment mechanisms and antipoverty programs: Evidence from a mobile money cash transfer experiment in Niger. *Economic Development and Cultural Change*, 65(1), 1-37.

Aneesh, A. (2015). Virtual migration: The programming of globalization. *Duke University Press*.

Berg, J. (2015). Income security in the on-demand economy: Findings and policy lessons from a survey of crowdworkers. *Comp. Lab. L. & Pol'y J.*, 37, 543.

Bergvall-Kåreborn, B., & Howcroft, D. (2014). A Mazon Mechanical Turk and the commodification of labor. New technology, work and employment, 29(3), 213-223.

Bosch, M., Goni-Pacchioni, F., & Maloney, W. F. (2012). Labor markets in Latin America: A supply-side story. *Latin American Journal of Economics, 49*(2), 189-228.

Burtch, G., Carnahan, S., & Greenwood, B. N. (2018). Can you dig it? An empirical examination of the gig economy and entrepreneurial activity. *Management Science*, 64(12), 5497-5520.

Castells, M., & Portes, A. (1989). World underneath: The origins, dynamics, and effects of the informal economy. *The informal economy: Studies in advanced and less developed countries*, 12.

Chant, S., & Pedwell, C. (2008). Women, gender, and the informal economy: An assessment of ILO research and suggested ways forward. *International Labour Organization*.

Chen, M. A., Vanek, J., & Carr, M. (2004). *Mainstreaming informal employment and gender in poverty reduction: A handbook for policymakers and other stakeholders*. Commonwealth secretariat.

Cherry, M. A., & Aloisi, A. (2016). Dependent contractors in the gig economy: A comparative approach. Am. UL Rev., 66, 635.

Codagnone, C., & Martens, B. (2016). Scoping the sharing economy: Origins, definitions, impact and regulatory issues. *Cristiano Codagnone and Bertin Martens (2016). Scoping the Sharing Economy: Origins, Definitions, Impact and Regulatory Issues. Institute for Prospective Technological Studies Digital Economy Working Paper*, 1.

De Stefano, V. M. (2016). The rise of the 'just-in-time workforce': on-demand work, crowd work and labor protection in the 'gig-economy'. *Comparative labor law and policy journal*, 37(3), 471-504.

De Stefano, V. (2018). The rise of the just-in-time workforce: On-demand work, crowdwork, and labor protection in the gig economy. *Harvard Business Review*. https://hbr.org/2018/04/the-rise-of-the-just-in-time-workforce

De Stefano, V. (2018). The gig economy and labor regulation: an international and comparative approach. *Law*

J. Soc. & Lab. Rel., 4, 68.
Derrida, J. (2016). *Of grammatology*. Jhu Press.
Donner, J. (2007). The rules of beeping: Exchanging messages via intentional "missed calls" on mobile phones. *Journal of computer-mediated communication*, 13(1), 1-22.
Donner, J., & Escobari, M. X. (2010). A review of evidence on mobile use by micro and small enterprises in developing countries. *Journal of International Development*, 22(5), 641-658.
Donovan, K. (2012). Mobile money for financial inclusion. *Information and Communications for development*, 61(1), 61-73.
Donovan, S. A., Bradley, D. H., & Shimabukuru, J. O. (2016). What does the gig economy mean for workers? (CRS Report R 44365). Washington DC: Congressional Research Service.
Eurofound. (2015). *New forms of employment*. Publications Office of the European Union.
Farrell, D., Greig, F., & Hamoudi, A. (2018). The online platform economy in 2018: Drivers, workers, sellers, and lessors. *JPMorgan Chase Institute*.
Felstiner, A. (2011). Grappling with online work: lessons from cyber law. Louis ULJ, 56, 209.
Foucault, M. (2013). *Archaeology of knowledge*. Routledge.
Frank, A. G. (1967). *Capitalism and underdevelopment in Latin America* (Vol. 93). NYU Press.
Galbraith, J. K. (2017). *Seduced and betrayed: Exposing the contemporary microfinance phenomenon*. University of New Mexico Press.
Geertz, C. (1963). The integrative revolution: primordial sentiments and civil politics in the new states. *Old societies and new states: The quest for modernity in Asia and Africa*, 105-157.
Gleim, M. R., Johnson, C. M., & Lawson, S. J. (2019). Sharers and sellers: A multi-group examination of gig economy workers' perceptions. *Journal of Business Research*, 98, 142-152.
Graham, M., Hjorth, I., & Lehdonvirta, V. (2017). Digital labor and development: impacts of global digital labor platforms and the gig economy on worker livelihoods. *Transfer: European review of labor and research*, 23(2), 135-162.
Graham, A. K., Wildes, J. E., Reddy, M., Munson, S. A., Barr Taylor, C., & Mohr, D. C. (2019). User-centered design for technology-enabled services for eating disorders. *International Journal of Eating Disorders*, 52(10), 1095-1107.
Harris, J. R., & Todaro, M. P. (1970). Migration, unemployment and development: a two-sector analysis. *The American Economic Review*, 60(1), 126-142.
Heeks, R. (2017). Decent work and the digital gig economy: a developing country perspective on employment impacts and standards in online outsourcing, crowd work, etc. *Development Informatics Working Paper*, (71).
Hershatter, A., & Epstein, M. (2010). Millennials and the world of work: An organization and management perspective. *Journal of business and psychology*, 25, 211-223.
Hockly, N. (2018). Blended learning. *Elt Journal*, 72(1), 97-101.
Howe, J. (2006). The rise of crowdsourcing. Wired magazine, 14(6), 176-183.
Huang, N., Burtch, G., Hong, Y., & Pavlou, P. A. (2020). Unemployment and worker participation in the gig economy: Evidence from an online labor market. Information Systems Research, 31(2), 431-448.
ILO, I. L. O. (2018). The impact of technology on the quality and quantity of jobs. *Global Commission on THE FUTURE OF WORK*, February(15-17 (Cluster 3)), 1–14.
ILO. (2020). Global Employment Trends for Youth 2020: Asia and The Pacific. In *International Labour Organization* (Vol. 33, Issue 1). https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_737648.pdf
Jack, W., & Suri, T. (2011). *Mobile money: The economics of M-PESA* (No. w16721). National Bureau of Economic Research.
Kaine, S., & Josserand, E. (2019). The organization and experience of work in the gig economy. *Journal of Industrial Relations*, 61(4), 479-501.
Kalleberg, A. L. (2011). *Good jobs, bad jobs: The rise of polarised and precarious employment systems in the United States*, 1970s-2000s. Russell Sage Foundation.
Kässi, O., & Lehdonvirta, V. (2018). Online labor index: Measuring the online gig economy for policy and research. Technological forecasting and social change, 137, 241-248.
Lewis, W. A. (1954). Economic development with unlimited supplies of labor.
Lim, S. (2018). Ride-sharing in Southeast Asia: Disruptive innovation or unequal opportunity? *Asian Economic Review, 32*(1), 45-62.

MacDonald, R., & Giazitzoglu, A. (2019). Youth, enterprise and precarity: or, what is, and what is wrong with, the 'gig economy'? *Journal of Sociology*, 55(4), 724-740.

Maalaoui, A., Ratten, V., Heilbrunn, S., Brannback, M., & Kraus, S. (2020). Disadvantage entrepreneurship: Decoding a new area of research. *European Management Review*, 17(3), 663-668.

McKinsey Global Institute (2016). Independent work: Choice, necessity, and the gig economy. https://www.mckinsey.com/featured-insights/employment-and-growth/independent-work-choice-necessity-and-the-gig-economy

Messenger, J. (2018). Working Time and the Future of Work. ILO Future of Work Research Paper Series (p. 44). Retrieved from https://www.ilo.org/global/topics/future-of-work/publications/research-papers/WCMS_649907/lang--en/index.htm

Moser, C. O. (1978). Informal sector or petty commodity production: dualism or dependence in urban development? *World Development*, 6(9-10), 1041-1064.

OECD Development Centre. (2020). *Digital transformation in developing countries: The role of technological infrastructure*. OECD Publishing.

Oei, S. Y., & Ring, D. M. (2017). Tax issues in the sharing economy: Implications for workers. *Forthcoming, Cambridge Handbook on the Law of the Sharing Economy (Nestor M. Davidson, Michele Finck & John J. Infranca, eds.), Boston College Law School Legal Studies Research Paper*, (480).

Prassl, J., & Risak, M. (2015). Uber, TaskRabbit, and co.: Platforms as employers-rethinking the legal analysis of crowd work. *Comp. Lab. L. & Pol'y J.,* 37, 619.

Pew Research Center. (2016, November 17). Gig work, online selling, and home sharing. Pew Research Center. https://www.pewresearch.org/internet/2016/11/17/gig-work-online-selling-and-home-sharing/

Qiang, C. Z., Kuek, S. C., Dymond, A., Esselaar, S., & Unit, I. S. (2012). *Mobile applications for agriculture and rural development*. Washington, DC: World Bank.

Rauch, J. E. (1991). Modelling the informal sector formally. *Journal of Development Economics*, 35(1), 33-47.

Ravenelle, A. J. (2019). "We're not Uber:" Control, autonomy, and entrepreneurship in the gig economy. *Journal of Managerial Psychology*, 34(4), 269-285.

Rosenblat, A., & Stark, L. (2016). Algorithmic labor and information asymmetries: A case study of Uber's drivers. *International journal of communication*, 10, 27.

Rostow, W. W. (1959). The stages of economic growth. *The Economic History Review*, 12(1), 1-16.

Sazali, N. T., & Gen, T. Z. (2019). The Demise of Formal Employment?—a Literature Update on Informality.

Schwellnus, C., Geva, A., Pak, M., & Veiel, R. (2019). Gig economy platforms: Boon or Bane?

Scuotto, V., Beatrice, O., Valentina, C., Nicotra, M., Di Gioia, L., & Briamonte, M. F. (2020). Uncovering the micro-foundations of knowledge sharing in open innovation partnerships: An intention-based perspective of technology transfer. *Technological forecasting and social change*, 152, 119906.

Smith, R. S. (2016). Taxation in the New Economy: New Models for the 21st Century. *Economic Policy Review*, 22(2), 18-38.

Stefano, V. D. E. (2016). The rise of the « just-in-time workforce »: On-demand work, crowd work and labor protection in the « gig economy » (Issue 71).

Stewart, A., & Stanford, J. (2017). Regulating work in the gig economy: What are the options? The Economic and Labour Relations Review, 28(3), 420-437.

Suri, T., & Jack, W. (2016). The long-run poverty and gender impacts of mobile money. *Science*, 354(6317), 1288-1292.

Tokman, V. E. (2007). The informal economy, insecurity, and social cohesion in Latin America. *International Labour Review, 146*(1-2), 81-107.

Tran, M., & Sokas, R. K. (2017). The gig economy and contingent work: An occupational health assessment. *Journal of Occupational and Environmental Medicine*, 59(4), e63-e66.

Traxler, J., & Kukulska-Hulme, A. (Eds.). (2007). Mobile learning: *A handbook for educators and trainers*. Routledge.

Wallerstein, I. (1974). The Modern World-System I Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century, With a New Prologue.

Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2019). Good gig, bad gig: autonomy and algorithmic control in the global gig economy. *Work, employment and society*, 33(1), 56-75.

World Bank. (2019). *World Development Report 2019: The Changing Nature of Work*. World Bank Group.

World Development Report, 2016: digital dividends. (2016). *Choice Reviews Online*, 53(11), 53-4889-53–4889.