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The Impact of Digital Transformation on Wage Determination: A Literature Study on the Service Industry in Indonesia

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ABSTRACT

This study discusses the impact of digital transformation on wage determination in the service industry in Indonesia through a literature review approach. The development of digital technologies such as automation, artificial intelligence, digital platforms, and online-based services has changed the structure of the labor market and compensation system in Indonesia. This study aims to analyze the influence of digital transformation on wage determination, identify factors that affect wage changes, and examine the implications of digitalization on labor inequality in the service sector. The research uses the Systematic Literature Review (SLR) method by examining various national and international articles. The results show that digital transformation affects wage structures by increasing demand for high-skilled labor and reducing the need for routine and low-skilled jobs. In addition, the emergence of the gig economy and digital platform-based jobs has also created a more flexible wage system and increased income disparity between workers. Digital skills, education, technology adaptation, and productivity are the main determinants in determining wages in the service industry. This study concludes that digital transformation provides opportunities as well as challenges for the wage determination system in Indonesia, especially related to wage inequality and workforce readiness.

Keywords: Digital Transformation, Wage Determination, Service Industry

1. Introduction

Digital transformation is one of the most significant developments affecting global economic activity, especially in the service industry sector. The development of digital technologies such as artificial intelligence, cloud computing, big data, and digital platforms has changed the way companies run operations and manage human resources [10]. In Indonesia, digital transformation is growing very fast in line with the increasing use of the internet, smartphones, and the expansion of digital-based businesses such as e-commerce, fintech, online transportation, and digital banking.

The service industry in Indonesia has an important role in national economic growth and job creation. However, the application of digital technology has led to changes in the structure of the labor market and wage determination system in the sector [2]. Companies increasingly need a workforce with digital competence and technological adaptability, resulting in wage disparities between high-skilled and low-skilled workers. In addition, automation and digital platform-based work models are also transforming traditional employment relationships and compensation mechanisms [8].

Previous research has more discussed the relationship between digital transformation and company productivity, innovation, and performance. Meanwhile, research that specifically discusses the impact of digital transformation on wage determination in the service industry in Indonesia is still limited. In addition, there is still little literature review research that integrates the issues of digitalization, labor market changes, wage inequality, and the gig economy in the Indonesian context.

Based on these conditions, this study aims to analyze the impact of digital transformation on wage determination in the service industry in Indonesia through a systematic literature review approach. This study also identifies the factors that affect wage changes and the implications of digitalization on labor mark dynamics.

The formulation of the problem in this study is: How does digital transformation affect wage determination in the service industry in Indonesia? What factors affect wage changes in the digital age? What are the implications of digital transformation on labor inequality and the employment system.

This research is expected to make a theoretical contribution to the study of the digital economy and labor economy and provide practical implications for governments, companies, and workforce development institutions.

2. Materials and Methods

This study employed a qualitative approach using the Systematic Literature Review (SLR) method, consisting of identification, screening, eligibility, and inclusion stages to systematically analyze literature on digital transformation and wage determination in Indonesia's service industry. The literature search utilized Google Scholar, Scopus, ScienceDirect, and SpringerLink because these databases provide comprehensive peer-reviewed publications related to digital transformation, labor economics, and wage systems. These databases were selected because they provide extensive literature related to digital transformation, labor economics, wage determination, and the service sector. The search process combined keywords using Boolean operators such as AND and OR to improve search precision and identify relevant studies related to digital transformation and wage determination." The study initially identified relevant publications from selected databases, followed by a screening and eligibility process to obtain studies that met the inclusion criteria for final thematic analysis in digital technology and labor market transformation. Thematic analysis was conducted through coding, categorization, and theme development processes to identify recurring patterns related to digital skills, automation, wage inequality, and gig economy development. (2) studies discussing digital transformation and labor market outcomes, (3) studies related to wage determination, employment, or income inequality, and (4) articles published in English or Indonesian. Duplicate and irrelevant studies were removed through a multi-stage screening process to minimize selection bias and improve the reliability of the literature review findings, and studies unrelated to the research objectives. The selected studies were analyzed using thematic analysis to identify major themes related to digital transformation, wage determination, digital skills, automation, gig economy development, and wage inequality in Indonesia's service industry.

3. Results

Digital Transformation in the Service Industry in Indonesia

Digital transformation has significantly changed the structure of the service industry in Indonesia. Service companies are starting to integrate digital technologies such as artificial intelligence (AI), big data, cloud computing, automation, and digital platforms to improve operational efficiency, speed up services, and reduce labor costs [7]. These changes can be seen in the digital banking, e-commerce, fintech, online transportation, hospitality, and application-based services sectors. The emergence of platform-based companies such as Gojek and Grab Indonesia has also changed the work system and labor income structure in the service industry.

Digitalization has led to a change in work patterns from conventional systems to technology-based systems. Many administrative and routine jobs are starting to be replaced by automation systems, digital applications, and data-driven technologies. Digitalization has led to a shift in work patterns from conventional systems to technology-based systems. Many administrative and routine jobs are increasingly being replaced by automation systems, digital applications, and data-driven technologies [3].

Platform-based companies such as Gojek and Grab Indonesia have introduced new business models and platform-based employment arrangements in the service industry. Research on technological change and wage inequality in Indonesia shows that technological developments increase the demand for skilled workers and increase wage premiums for workers who have higher education and digital skills [3].

Impact on Wage Determination

Digital transformation affects the wage determination system through several key mechanisms, namely changes in labor demand, increased digital skills needs, and routine job automation. Service companies tend to provide higher compensation to workers who have: information technology skills, data analysis, digital marketing, software operation, and the ability to adapt to new technologies. In contrast, workers with low skills face the risk of wage stagnation because their jobs are more easily replaced by automation technologies [9].

Research on Technological Change, Skill Demand, and Wage Inequality in Indonesia explains that technological developments have led to an increase in demand for skilled labor so that there has been an increase in wage inequality since the early 2000s in Indonesia.

In addition, technology transfer through foreign investment and the use of digital technology in companies increases the need for high-skilled workers so that companies provide greater wages to workers who are able to operate modern technology. Companies provide greater wages to workers who are able to operate modern technology.

Wage Inequality and Skills Gap

Digital transformation has also increased wage inequality in the service industry in Indonesia. Workers who have digital literacy and technological skills earn higher incomes than workers with low digital skills. Some of the factors that affect wage inequality include Education Level, Digital Skills, Technology Adaptation, Productivity, Access to Technology [1].

Digital transformation has also led to a reduction in the need for routine and administrative work. The automation system is able to replace repetitive work such as: data input, basic administration, standard services, and simple operational work.

Routine-Biased Technological Change in Indonesia explains that technological developments tend to replace routine work, both cognitive routine work and manual routine work. As a result, low-skilled workers are experiencing wage pressure as their productivity is increasingly easily replaced by digital technology. On the other hand, workers who have non-routine skills such as problem solving, communication, creativity, and interpersonal skills actually gain increased economic value in the digital labor market.

Recent research has also shown that interpersonal non-routine work has a positive correlation with wage increases, while manual routine work tends to experience a decrease in wage value.

Gig Economy and Flexible Work System

Digital transformation is driving the development of a gig economy system characterized by flexible working patterns and performance-based compensation systems. Digital platform workers often face unstable income structures as they are affected by platform algorithms and fluctuations in market demand.

The literature shows that while the gig economy opens up new job opportunities, it also poses challenges related to labor protection, wage security, and worker welfare. The development of digital platforms has encouraged the emergence of a gig economy or platform-based economy. This system transforms formal employment relationships into partnership-based flexible working relationships. In the gig economy system, wages are no longer determined in the form of a monthly fixed salary, but based on: the number of orders, service performance, customer ratings, working time, and digital platform algorithms.

Digital platform workers gain flexibility in working hours, but their income becomes more volatile as it relies on market demand and the company's algorithmic system. The wage system is becoming more flexible but also increasing income uncertainty for informal workers and digital workers. A review of the literature on the digital economy shows that platform workers often face challenges in the form of: lack of job security, limited social protection, fluctuating incomes, and unclear formal employment relationships [1]

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Wage Inequality Due to Digital Transformation

Digital transformation has also increased wage inequality in the service industry in Indonesia. This inequality occurs because not all workers have the same access to education, technology, and digital skills.

Workers with higher education, digital skills, technology access, and technology experience have a greater chance of obtaining high-paying jobs. In contrast, workers with

low skills have difficulty keeping up with technological changes and are more vulnerable to receiving low wages or losing their jobs [5].

Indonesia's labor market shows that technological developments increase premium skills and widen the income gap between skilled and unskilled workers. This inequality is also influenced by regional disparities. Workers in urban areas have better access to the internet and digital facilities than workers in rural areas or underdeveloped areas [6].

Technology increases the productivity of skilled workers so that companies are more willing to provide high compensation to workers who are able to operate digital technology. In contrast, workers with low skills face the risk of economic decline due to automation.

4. Discussion

Digital transformation has brought major changes to the employment system and wage determination mechanism in the service industry in Indonesia. The development of digital technologies such as artificial intelligence, automation, big data, cloud computing, and digital platforms has led to changes in work patterns, labor competency needs, and compensation structures in service companies. This change occurs because companies are increasingly oriented towards efficiency, speed of service, and the use of technology in business operations.

In the service industry, digital transformation encourages companies to reduce their dependence on routine and administrative work. Various jobs that were previously done manually are starting to be replaced by digital systems and automation. For example, the use of digital applications in banking services reduces the need for labor in conventional services such as tellers and customer service. Likewise, the retail and hospitality sectors have started to use self-service systems, digital payments, and customer service automation.

This condition has led to changes in the wage determination system. Companies tend to provide higher compensation to workers who have digital skills, data analysis skills, information technology capabilities, and adaptability to technological changes. In contrast, low-skilled workers face the risk of wage stagnation because their jobs are more easily replaced by technology.

This change in wage structure shows that digital skills are the main factor in determining the value of labor in the digital economy era. The higher a person's ability to operate technology and adapt to digital systems, the greater the chance of earning a higher income. Therefore, digital transformation creates the phenomenon of premium wages for high-skilled workers.

The work model provides flexibility for workers as they can determine working hours independently. However, on the other hand, the system also creates income uncertainty as

workers' earnings are heavily influenced by market demand and algorithmic policies of platform companies. As a result, digital workers often face fluctuations in income and limited social protection compared to formal workers.

Digital transformation also shows that there is an inequality of access to digital economy opportunities. Not all workers have the same skills, facilities, and access to technology. Workers in urban areas tend to have better access to internet, education, and digital literacy than workers in rural areas or disadvantaged areas. These differences in access cause the benefits of digital transformation to be felt more by certain groups.

In addition to regional gaps, inequality also occurs based on education level and technological ability. Workers with higher education levels have a greater chance of keeping up with technological developments and obtaining higher-paying jobs. In contrast, workers with low education tend to have difficulty adapting to changes in the digital work system, making them more vulnerable to losing their jobs or receiving low wages.

Digital transformation ultimately creates dualism in the labor market. On the one hand, digitalization is able to create new job opportunities that are more modern, productive, and technology-based. On the other hand, digitalization also increases the risk of wage inequality, reduction of routine labor, and income instability for informal workers and digital platform workers.

This phenomenon is in line with Human Capital Theory which explains that education, skills, and competencies are important factors in increasing labor productivity and income. In the digital era, human capital is not only determined by formal education, but also digital skills, creativity, innovation, and technological adaptability.

In addition, this condition also supports the theory of Skill-Biased Technological Change (SBTC) which explains that technological developments are more beneficial to high-skilled workers than low-skilled workers. Technology increases the productivity of the skilled workforce so companies are willing to provide greater compensation to workers who are able to operate digital technology.

In the Indonesian context, digital transformation provides great opportunities for economic growth and the development of the service industry. However, without equal access to technology and improving the quality of human resources, digital transformation can widen social and economic gaps. Therefore, the government needs to strengthen the development of digital infrastructure, expand internet access, increase people's digital literacy, and provide reskilling and upskilling programs for the workforce to be able to adapt to the needs of the digital industry.

Companies also need to invest in employee competency development through technology training and digital skills upswing. This step is important so that the workforce is not only a

user of technology, but also able to create innovation and increase work productivity. Thus, digital transformation can provide more inclusive benefits to the employment and wage determination system in Indonesia.

The results of the study show that digital transformation has a significant influence on wage determination in the service industry in Indonesia. The increased use of digital technology has led to the labor market prioritizing workers with digital skills and higher education levels. This condition supports the Human Capital Theory which states that individuals with higher knowledge and competence tend to receive greater compensation.

In addition, the results of the study are also in line with the theory of Skill-Biased Technological Change (SBTC) which explains that technological developments are more beneficial to high-skilled workers than low-skilled workers. As a result, wage inequality is increasingly visible in industries that are undergoing digital transformation.

The emergence of digital platforms and the gig economy has also changed the wage determination mechanism from a fixed salary system to a performance-based system and digital algorithms. Although this system increases the company's work flexibility and operational efficiency, it also has the potential to reduce the stability of income and worker welfare.

In the Indonesian context, digital transformation provides both opportunities and challenges. On the one hand, digitalization is able to increase productivity, innovation, and job opportunities. But on the other hand, limited digital skills and access to technology can widen the labor market gap. Therefore, governments and companies need to increase digital training, reskilling, and upskilling programs to increase workforce readiness to face changes in the digital economy.

The findings indicate that digital transformation has fundamentally changed labor market dynamics in Indonesia's service industry. The increasing adoption of automation, digital platforms, and data-driven technologies has shifted labor demand from routine manual tasks toward occupations requiring digital literacy and technological competencies.

Furthermore, the results suggest that digital skills have become a key determinant of wage levels in the digital economy. Workers possessing advanced technological capabilities are more likely to receive higher compensation, whereas low-skilled workers face greater risks of wage stagnation and job displacement.

The findings also reveal that digital transformation is reshaping the value structure of labor. Non-routine skills such as problem-solving, creativity, communication, and adaptability are becoming increasingly valuable compared with routine manual work.

In addition, the expansion of platform-based employment and the gig economy has transformed traditional compensation systems. Wage determination is increasingly

influenced by performance indicators, customer ratings, platform algorithms, and market demand rather than fixed salary structures.

These findings support the Human Capital Theory and Skill-Biased Technological Change (SBTC) theory, which explain that technological progress tends to generate greater benefits for workers with higher levels of education and digital competencies. Consequently, digital transformation may contribute to widening wage inequality when access to technology, education, and digital skills remains uneven.

5. Conclusion

This study concludes that digital transformation has a significant influence on the wage determination system in the service industry in Indonesia. The use of digital technology is changing the structure of the labor market, the compensation system, and the pattern of labor needs. Workers with high digital competence tend to earn greater wages, while low-skilled workers face the risk of wage stagnation and reduced employment opportunities.

This study also found that digital transformation contributes to increasing wage inequality due to differences in access to education, digital literacy, and technological adaptability. In addition, the development of the gig economy has created a more flexible but less stable wage system. The limitation of this study is the use of secondary data from previous research without conducting direct empirical testing. Further research is recommended using

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