



How Digitalization Affects the Formal Sector Workers in Indonesia?

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ABSTRACT

Formal sector work is a major aspect of poverty alleviation efforts and successful sustainable development. One of the problems that the government must consider is the employment problem, where there is an increase in the labor force every year, but it is not balanced with the availability of decent jobs. This study aims to analyze how digitalization affects the workforce in the formal sector by considering human character and digitalization. Indonesia and understanding the readiness of Indonesia in the digital era. By using cross section data from SAKERNAS Indonesia 2019 This study's analysis method includes descriptive Analysis and using binary logistic regression. The results indicate that the digitalization era can replace labor. The results obtained from this study show that the variables of sex, education, marital status, use of computers, smartphones, and the Internet have a significant partial effect on the formal sector workforce except for the use of other technologies.

Keywords: *Formal Sector Labor, Digital Economy.*

1. INTRODUCTION

In the era known as the Industrial Revolution 4.0, digital technology has become the center of attention in various aspects of human life. Tulungen, et al. [1] explains that digital transformation has penetrated almost all sectors, including the formal sector in Indonesia. Then, digital transformation, according to Verhoef, et al. [2], has three main areas, namely *customer experience*, which is an aspect of understanding customers more deeply with technology and increasing the number of customers and *customer touchpoints*. Next is *the operational process*, which is a process that is expected to improve internal operations with digitization and automation. The last is *the business model*, which is a business model that adapts to market changes and customer needs innovatively and flexibly.

In this context, work and the world of work are experiencing significant changes due to digitalization. Information and communication technology development has shaped a new paradigm in how we work, collaborate, and interact in the workplace. An understanding of today's digital impact or influence on formal sector workers in Indonesia must be studied, analyzed, and given serious attention.

The study of the impact of digital on formal sector workers has very strong relevance in the context of current global developments. According to Haug, et al. [3], The world has become an era where digital technology has become a major driver of economic, social, and cultural change. According to Muara [4], In Indonesia, the formal sector remains an important component of the economy, contributing significantly to growth and employment. Therefore, a deep understanding of how digital technology affects how workers work, productivity, job satisfaction, and well-being in the formal sector is essential.

Digitalization has presented several advantages for formal sector workers in Indonesia. Digital technology enables easier and faster access to information, facilitates efficient collaboration through online platforms, and increases task flexibility. Collaborative software, project management applications, and digital communication tools have become indispensable to a company's daily operations. This tool allows workers to work together, even in different locations.

However, behind its advantages, digitalization also brings some challenges. According to Paundralingga [5], one of the challenges faced is that 56% of the workforce in ASEAN-5 will be at risk due to technology in the next two decades. The number of 1.7 million workers in Indonesia has a large potential risk. Then, it is associated with increased cybersecurity risks. According to Hidayah [6], the entry of the era of change (digital technology) made it easier for people because of the increasingly diverse types of work that can be accessed. Still, on the other hand, it can also cause feelings of anxiety or feeling threatened. Digital technology opens the door to potential cyberattacks and data leaks that can harm companies and workers. In addition, rapid technology adoption can also create a digital divide between workers who can keep up with technological developments and those who cannot. Another challenge is the impact on worker welfare, where workers tend to feel more easily isolated due to a lack of direct social interaction.

The formal sector consists of jobs with written employment contracts, social security, legal protection, and minimum wages [7]. According to data from BPS [8], the number of formal sector workers in Indonesia in February 2020 reached 55.86 million people or 42.6% of the total labor force. However, the Covid-19 pandemic has caused a decrease in the number of formal sector workers to 53.01 million people or 40.8% in August 2020. In addition, the COVID-19 pandemic has also accelerated the digitization process in various economic and business sectors in Indonesia. According to Nur Hilmi [9], one of the original phenomena that reflects the impact of digital on the formal sector in Indonesia is the increasing adoption of *remote work* models. This phenomenon has become more real and significant since the outbreak of the COVID-19 pandemic. Many companies in Indonesia, both large and small, have been forced to change the way they operate by adopting remote working in response to physical restrictions and health protocols. Digital technology is crucial in supporting the continuity of company operations.

A survey conducted by Bappenas Republic of Indonesia in 2020, according to an article from Mungkasa [10], shows that more than 80% of companies in Indonesia implemented remote work during the pandemic. This phenomenon involves various sectors, ranging from information technology to manufacturing. Online communication platforms, collaborative software, and video conferencing applications are key components in supporting remote work. However, this concept is usually applied under normal conditions and not because of a pandemic like today. Moreover, it is suspected that the current condition will last at least until a vaccine is found, estimated to be as early as the end of 2021, and even suspected to be part of the new normal of our daily lives so that the application of telecommuting becomes a necessity.

This phenomenon also presents new challenges, such as difficulty separating work time from personal time, fatigue due to working too long in front of a screen, and lack of social interaction that can impact mental well-being. With the phenomenon of remote work adoption as a case study, the internet in general by larger populations. Several researchers have tried to tackle measurement problems by creating more subtle classifications of internet skills, supported by Alevizou [11]; Eshet-Alkalai [12]; Helsper, E [13]. In the current contribution, we applied an internet skill classification such as smartphone usage, internet usage, computer usage, and other technologies usage. We also added some demographics variables such as gender, high education, and marital status. Their framework integrates several conceptualizations and considers both techniques. This study will analyze the impact of digital in depth on the formal sector in Indonesia. With a deeper understanding of how digital technology affects the way of working, worker welfare, and the challenges faced, it is hoped that this research can provide valuable insights for policymakers, business practitioners, and the public in facing the evolving digital era.

2. METHOD

This study used a quantitative approach using SAKERNAS 2019 data. The quantitative approach answers two things: (1) answering hypotheses and (2) generalizing the population level. Meanwhile, based on the research framework, the quantitative approach consists of formulating problems, compiling models, obtaining data, finding solutions, testing solutions, analyzing results, and implementing results, supported by Alevizou [11]. This study explores formal sector workers using technology in Indonesia. The type of data used in this study is a cross-sectional type of secondary data. According to Eshet-Alkalai [12], secondary data are data obtained from previous research indirectly but through intermediary media (obtained and recorded by other parties). The data in this study is obtained indirectly from ready-made research objects and collected by other parties in various ways or methods, both commercially and not. At the same time, cross-sectional data consists of one object but requires other related sub-objects or one parent object at a time. This study used secondary data from microdata from the results of the 2019 National Labor Force Survey (Sakernas) collected by the Central Bureau of Statistics of the Republic of Indonesia. This study aims to determine the effect of technology on formal sector workers in Indonesia. The analysis method in this study uses logistic regression by looking at the marginal effect after logitics. The equation model formed is different from the OLS equation.

$$\ln \frac{y(x)}{1-y(x)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k + \epsilon \tag{1}$$

If it is associated with the title of the study, then the logistic regression model used is as follows

- Y: Employment Sector
- X1: Gender
- X2: Education Level
- X3: Marital Status
- X4: Computer Use
- X5: Smartphone Use
- X6: Other Technology Uses
- X7: Internet Use

The operational definition of the above variables is as follows:(1) The employment sector is defined as dummy data with Details 1 working in the formal sector and 0 working in the informal sector. (2) The gender variable consists of 1 male and 0 female. (3) The level of education consists of 6, namely the highest education equivalent to elementary school; nine, the highest education equivalent to junior high school; 12, the highest education equivalent to high school / vocational school; and 16, the highest education equivalent to undergraduate. (4) Marital status consists of 1 married and 0 unmarried/unmarried. (5) Computer use consists of 1 using a computer and 0 not using a computer. (6) Smartphone use consists of 1 using a smartphone and 0 not using a smartphone. (7) using other technologies consists of 1 using other technologies and 0 not using other technologies, and (8) using the Internet consists of 1 using the Internet and 0 not using the Internet.

3. RESULTS

3.1 Hypothesis Test

Table 1. Results Odds Ratio and Marginal Effect After Logit

Variables	Odds Ratio		Marginal Effects	
	Odds Ratio	P> z	Coefficient	P> z
Gender	1.166788*	0.000	0.0367321*	0.000
High Education	1.591687*	0.000	0.1101892*	0.000
Marital Status	0.6893838*	0.000	-0.0861875*	0.000
Computer Usage	8.133127*	0.000	0.3819416*	0.000
Smartphone Usage	0.8953386*	0.000	-0.0262991*	0.000
Another Technology Usage	1.542912	0.983	-0.0000934	0.983
Internet Usage	0.2793059*	0.000	0.1015033*	0.000

Based on Table 1, the estimation results of each independent variable are obtained. The following describes the results of the statistical t-test for each independent variable.

3.1.1 Gender (X1)

The gender variable statistically has an odds ratio of 1.167 and a marginal effect value of 0.036. The probability value of z is less than the limit of alpha value (0.01) or $0.000 < 0.01$ so that accepting H_a can be concluded that gender

has an individual tendency to work in the formal sector by 1,667 times and increases the probability of working in the formal sector by 3.6%.

3.1.2 Education Level (X2)

The variable education level statistically has an odds ratio of 1.519 and has a marginal effect value of 0.110. The probability value of z is less than the limit of alpha value (0.01) or $0.000 < 0.01$ so that receiving H_a can be concluded that the variable level of education has a tendency for individuals to work in the formal sector by 1,591 times and increases the probability of working in the formal sector by 11%.

3.1.3 Marital Status (X3)

The marital status variable statistically has an odds ratio of 0.689 and a marginal effect value of -0.086. The probability value of z is less than the limit of alpha value (0.01) or $0.000 < 0.01$ so that receiving H_a can be concluded that the marital status variable has a tendency for individuals to work in the formal sector by 0.689 times and decreases the probability of working in the formal sector by 8.6%.

3.1.4 Computer Use (X4)

The variable computer use statistically has an odds ratio of 8.133 and a marginal effect value of 0.038. The probability value of z is less than the limit of alpha value (0.01) or $0.000 < 0.01$, so it can be concluded that the variable of computer use has an individual tendency to work in the formal sector by 8.133 times and increases the probability of working in the formal sector by 3.8%.

3.1.5 Smartphone Use (X5)

The sex variable statistically has an odds ratio of 0.895 and a marginal effect value of -0.026. The probability value of z is less than the limit of alpha value (0.01) or $0.000 < 0.01$ so that receiving H_a can be concluded that the variable smartphone use has a tendency of individuals to work in the formal sector by 0.895 times and decreases the probability of working in the formal sector by 2.6%.

3.1.6 Use of Other Technologies (X6)

Other *technology use* variables statistically have an odds ratio of 1.542 and have a marginal effect value of -0.0000934. The probability value of z is smaller than the limit of alpha value (0.01) or $0.983 > 0.01$, so rejecting H_a can be concluded that other variables of *technology use* cannot be interpreted.

3.1.7 Internet use (X7)

The variable internet usage statistically has an odds ratio of 0.279 and a marginal effect value of 0.101. The value of probability z is less than the limit of alpha value (0.01) or $0.000 < 0.01$ so that receiving H_a can be concluded that the variable Internet use has a tendency for individuals to work in the formal sector by 0.279 times and increases the probability of working in the formal sector by 10%.

4. DISCUSSION

4.1 Labor Characteristics

This study used educational variables in describing the character of the formal sector workforce. The partial test results in Table 4 show that the education variable significantly affects and positively correlates to the absorption of formal sector labor. Kuncoro [14] found that migrant employees in the formal sector are significantly impacted by schooling. A person with a higher education tends to earn a higher income due to the benefits of education, which can improve one's abilities and skills. These abilities and skills will give the person a higher price in the labor market, thus making the person choose a job that offers a higher income. Following what Indriantoro [15] stated, higher wages in the formal sector are available compared to other sectors, which encourages someone to work in the formal sector. Therefore, someone with a higher education is more likely to work in the formal sector to earn a higher income. The odds ratio for the education variable is 1.591, meaning that workers with a high school education and above tend to

work in the formal sector by 1.591 times compared to workers with education below high school/equivalent, assuming that the other variables are constant.

According to Table 1, workers in the formal sector are significantly influenced by sex variables with a positive relationship direction. Research conducted by Wazari and Agustiarini [16] also shows that the sex ratio significantly and positively influences labor absorption. The probability of male workers working in the formal sector is greater than that of female workers. Male workers are reportedly absorbed into occupations in the formal sector due to their higher level of productivity than female workers. The odds ratio for the sex variable is 1.166, meaning that the male workforce is 1.166 times more likely to work in the formal sector than the female workforce, assuming the other variables are constant.

On the other hand, marital status variables also influence the absorption of formal sector labor. It significantly influences workers' decisions to work in the formal or informal sector. In the world of work, everyone will try to meet their economic needs by working in the formal sector, married and unmarried people. Wazari and Agustiarini [16] also stated that marital status has a role in the work workers do.

4.2 Digitization

The economic influence on the formal sector workforce in this study is described through the variables of computer users, smartphone users, other technology users, and internet users. From Table 1, it can be concluded that the variables of computer, smartphone, and internet users have a significant and positive influence on the absorption of formal sector labor. The stability of income obtained in the formal sector results in the use of computers, smartphones, and the Internet tends to work in the formal sector. The odds ratio for the computer user variable is 8.133, which means that the computer-using workforce tends to work in the formal sector by 8,133 times compared to the non-computer-using workforce, assuming that the other variables are constant. In its utilization, using computers can increase labor productivity because it speeds up the completion of an activity. Encourage the efficiency of spending costs for additional labor so that the input costs of a business are reduced. Then, it can increase the surplus or added value of a business.

The odds ratio for user variables Smartphones is valued at 0.895, meaning that the labor using Smartphones tends to work in the formal sector by 0.895 times compared to the workforce that does not use smartphones, assuming that other variables are constant.

The odds ratio for user variables on the Internet is valued at 1,542 which means that the workforce using the Internet tends to work in the formal sector by 1,542 times compared to the workforce that does not use the Internet, assuming that other variables are constant. Convenience, flexibility, and relatively low costs are why workers use computers, smartphones, and the Internet to find work. Thus, computers, smartphones, and the Internet can make it easier for companies to absorb formal labor following the desired classification. Other than that, because formal sector work is more coordinated and systematized than the informal sector, it demands the use of computers, smartphones, and the Internet, at least to communicate.

5. CONCLUSION

Formal sector jobs are mostly filled by workers with high school education levels and above, computer users, smartphone users, internet users, and male and married. Variables that partially influenced the formal sector workforce at the 5 percent significance level were education, gender of computer, smartphone, internet users, and marital status.

From Analysis that has been done before, some suggestions that researchers can give to the government include the importance of the workforce being literate in computers, smartphones, and the Internet, where it will be easier to get decent work in today's digital era.

AUTHORS' CONTRIBUTIONS

REH and BAA make the main idea of this research, PSP running data and DGS as the main editor.

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