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THE RELATIONSHIP OF TECHNOLOGICAL DEVELOPMENTS AND INCOME ON LABOR PARTICIPATION AND ITS IMPACT IN THE GIG ECONOMY IN INDONESIA

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ABSTRACT
Technological advances that have been achieved today really provide convenience and comfort for human life. This convenience is one of the popular keys to provide opportunities to improve the economy and people's welfare through the gig economy. This study aims to analyze the relationship between technological development and income on labor participation in the gig economy. The methodology used is descriptive quantitative by describing the formulation of the problem which is then followed by a regression of the model using the ordinary least squares (OLS) method. In this test, it was found that the development of technology infrastructure can increase labor participation in the gig economy, while increasing income can have a negative impact on this participation.

Keywords:
Gig Economy; Technological Development; Income; Digitalization; Labor Market

INTRODUCTION

According to Kalleberg and Dunn (2016), the gig economy is a media to promote entrepreneurship and innovation without limits with a form of service that is flexible, autonomous, and can provide life balance and opportunities for individuals to generate income through services and also expertise that they have to fulfill the purpose of customer demand. In addition, some jobs in the gig economy are short-term and there are also workers who use the gig economy to highlight their talents. Companies that connect employees with jobs through websites and phone applications are a new development (Hogan et al., 2016).

According to research from Edison Research (2018), the gig economy is a labor market that has evolved from the traditional work style that is full-time tied to office hours. The gig economy is driven by technological advancements that highlight a person's ability to use computers, smartphones, various applications, and online payments to meet customer demands. Among the factors that attract the interest of young people in particular to dabble in the gig economy is that it is flexible in terms of working hours. A study from Ai Group (2016) found that a job model characterized by entrepreneurship and business that is flexible in terms of working hours is increasingly in high demand, especially among young people.

Advantages of gig economy

The Gig Economy offers workers a novel employment arrangement that diverges from traditional full-time employment models. Gig workers, often referred to as independent contractors or freelancers, engage in temporary, project-based work, allowing them greater control over their schedules and working arrangements. According to research conducted by Priyanka & Nasution (2020), the flexibility has been widely touted as a significant advantage of the Gig Economy, offering workers the freedom to choose when, where, and how much they work. By enabling individuals to tailor their work hours to accommodate personal commitments, such as family responsibilities or further education, the Gig Economy provides a level of autonomy and work-life balance that is highly valued by many (Bulian, 2020).

Another advantage associated with the Gig Economy is the entrepreneurial opportunities it presents to workers. Gig workers often have the autonomy to select projects that align with their skills and interests, enabling them to showcase their talents and build their own personal brands (Priyanka & Nasution, 2020). From Priyanka & Nasution's article (2020), citing McKinsey's research, independent workers in the gig economy sector have higher levels of job satisfaction and freedom for creativity than traditional full-time workers. This entrepreneurial aspect of gig work can foster creativity, innovation, and self-motivation, as individuals take charge of their careers and actively pursue multiple income streams. Moreover, the Gig Economy provides a global marketplace for services, facilitating the expansion of entrepreneurial ventures and the potential for scalability (Gussek and Wiesche, 2022).

Additionally, the Gig Economy has been linked to job creation and economic growth. By breaking down geographical barriers and connecting workers with job opportunities on a global scale, the Gig Economy expands the labor market and creates employment opportunities for individuals who may have struggled to find traditional employment. According to Carlos et al. (2021), the benefits are not just for the workers but also contribute to overall economic growth by leveraging previously untapped talents and resources. Furthermore, gig work has been associated with increased productivity, as workers are motivated by the direct correlation between their efforts and the outcomes they achieve.

According to a survey conducted by McKinsey in the Priyanka & Nasution article (2020), in several countries (United States, United Kingdom and several European Union countries), independent workers in the gig economy sector have a fairly high level of satisfaction with their lives as gig economy workers. Workers in this sector who make the gig economy their main source of livelihood are reported to have a higher level of satisfaction than workers who do the gig economy on a casual basis or workers who are forced into this sector. This level of employee satisfaction can indicate the potential of the gig economy sector as a potential alternative sector in an effort to improve the quality of life of an individual.

Technological advancements and digital connectivity have played a pivotal role in enabling and expanding the Gig Economy. Online platforms and mobile applications have simplified the process of connecting gig workers with potential clients or customers, streamlining the gig work experience. These technological tools have reduced transaction costs, increased accessibility for both workers and employers, and facilitated remote work arrangements (Bulian, 2020).

Disadvantages of gig economy

The advancement of technology is one of the keys of the gig economy to be popular and gives the opportunity to increase the economy, along with social welfare among people. But, the advancement also brings other effects, as most of the time, the market-driven economy possibly allows exploitation from the companies to the workers to get the profit as much as possible, instead of increasing welfare and social economic equity. Based on this problem, Renny et al. (2020) argues that as a result of globalization and digitalization, the gig economy developed and advanced then allows to informalize of the traditional works through the platform economy in the gig economy system, but also comes along with the downside of the exploitation that causes the work quality decreasing, and conclude that the platform economy in this gig economy system threatens the quality of work and the job market.

De Stevano (2015) also discusses how the gig economy about the impact of the gig economy to the workers as a whole, and talks about the gig-economy phenomena, and argues that it was not a separate silo of the economy, and even with the differences in many things from regular work, like the flexible working hour and non-standard employment forms, he argues and advocates for full recognition of gig-economy activities as a real work too, but he also talks about how the gig economy grows high in recent years, but most of the time the impact of the gig economy to the labor rights was overlooked.

Similar to that, Balwant (2020) explores the prospects and challenges of gig work in India, after observing the changes of the nature of work from the developments in technology and industry 4.0 technologies; how it make the companies hiring freelancers as a common, he explains several challenges and proposes some policy suggestion to keep the growth and improvement to the gig economy.

But along with the flexibility of the gig economy, it brings uncertainty and work risks with the contract system that can be severed at any given time possible in most cases. Kurniati (2023) discusses on how the gig economy make the work hour disrupted, where in most cases as the work time and place are become flexible, the companies, if not most of the gig workers are forcing themself to work beyond the working hours, disrupting the work life balance and making several workers to resign, as they cant keep up with the absurdly high work hour, and making the workers stressful and exhausted. She discusses how the work systems in several countries like France and Italy are renewing their work policy and giving the "right to disconnect"; where workers could not be disturbed from the job outside the work hour, and discusses the urgency of the similar policy in Indonesia.

Gig Economy in Pandemic Crisis

Economic instability forced many companies to lay off some of their employees, and some of them were then more interested in hiring casual workers than full-time workers. This trend is increasingly driven by the increasingly rapid industry 4.0 with the freedom of remote access making informal sector jobs increasingly attractive. Joo & Shawl (2021) tries to evaluate whether the Covid-19 pandemic has had a significant impact on the gig economy in India, despite the fact that there has been an increase in the number of gig workers there. The Online Labour Index (OLI) data from the Oxford University's iLabor Project is used as the dependent variable in this study, and Our World in Data data on the rise in Covid-19 cases in India is used as the explanatory variable. The study found that the Covid-19 pandemic has had a significant positive impact on India's gig economy so it is hoped that the government can provide support to this sector as well as protection for its workers.

The Covid-19 crisis has caused some people to lose their jobs, thus encouraging them to get involved in the gig economy in order to survive. Rahim et al. (2021) has an objective to analyze existing practices and regulations and recommend a digital workforce platform framework to strengthen the gig economy. This study uses the library research method by obtaining important data from books, journals, documents, manuscripts, papers, proceedings and internet sources regarding information related to the research study and analyzing it using content analysis. In order to achieve the objectives of inclusive and sustainable economic growth, it was discovered that it is crucial to strengthen governmental policies regarding the digital workforce. As a result, the government must make a stronger effort to support a broad policy framework and encourage the development of gig workers' skills.

The gig economy has emerged as a result of the pandemic's rapid global spread, which led many businesses to request that their employees work from home. Omar et al. (2021) attempts to examine the impact of the Covid-19 pandemic on the gig economy. Two secondary data are used, namely data on the Online Labor Index (OLI) from the iLabor Project of Oxford University and data on an increase in Covid-19 cases taken from Our World in Data. This study uses the GARCH and VAR models to understand the relationship between the Covid-19 pandemic and the gig economy. According to this study, there are now significantly more people working in the gig economy as a result of the pandemic. Therefore, this study suggests that in order for the gig economy to be a viable alternative in getting through this difficult time, the government should adopt policies that support it.

There will probably be meaningful cooperation between full-time employees and independent contributors as a result of the pandemic. Mahato et al. (2021) seeks to explore a mixed workforce model between the traditional workforce and also the gig workforce in the post-pandemic period to ensure fairness. The methodology used in this study is library research, namely by collecting data and information through the help of various materials found in books, journals, the internet and other sources of related information. According to the study, in the future, it will be possible to meet short-term needs for specialized skills and scale operations while achieving a fair balance by utilizing the multilateral activities of gig workers and the regular workforce.

In general, all studies agree that the Covid 19 pandemic has driven labor force participation into the gig economy, perhaps the reason could be due to work from home programmes and also job termination, which forces them to join the gig economy to survive. On top of that, some studies found that the gig economy was one of the saviors of the economic downturn. However, in this case the role of the government is also needed in strengthening regulations on the gig economy in order to increase the comfort and safety of workers in this sector.

METHOD

This study uses a descriptive quantitative method guided by a problem formulation to explore or photograph social situations that will be thoroughly, broadly, and in-depth examined. The information and data needed can be found in various sources such as journals and websites. The data used in this study are the Online Labor Index (OLI), Indonesian Information, Communication and Technology Development Index (ICT-DI) and Indonesia's Per Capita Gross Domestic Product. The Online Labor Index is used to estimate the number of online gig workers in Indonesia, and then used as the dependent variable for the hypothesis of this study; Indonesia's Information and Communication Technology Development Index is used to measure technological progress in Indonesia, while GDP is used to measure the average income of Indonesia's population. This study then uses these data as the basis for seeing the correlation between technological progress and people's income on the number of online workers in Indonesia. To see the correlation, a regression was performed using the ordinary least squares (OLS) method on the existing model.

RESULT AND DISCUSSION

Gig Economy in Indonesia

In Indonesia, the development of the gig economy has also grown rapidly. This is due to the development of various digital platforms, such as sribulancer, fastworks, project.co.id, and so on. Companies are the main actors in the gig economy. However, not all companies are actors in the gig economy. The main characteristics of this company are setting flexible work schedules for each worker, providing online payments from platforms, providing transaction facilities to consumers and producers directly, as well as online profiles and reviews from producers to consumers.

In the gig economy, workers are divided into two, namely service provider workers and goods supply workers. As for those who are classified as service provider workers are couriers, drivers, handymen, and others. While goods supply workers are craftsmen, artists, clothing retailers, and so on. Consumers are parties who enjoy the goods or services offered in the economic market. Consumers are one of the actors of the gig economy. Without them, economic transactions will not work.

Data from the Central Statistics Agency, in May 2019 noted that there were 4.55% or 5.89 million of the workforce who were gig workers. Fairwork Indonesia noted that at least the number of motorbike-based gigs reached 2.5 million workers. Finally, in 2021, a survey by the Demographic Institute, Faculty of Economics and Business, University of Indonesia, showed that for one Gojek platform, there are at least 2.6 million driver partners. From the available data, the overall Gojek system itself managed to contribute around 249 trillion rupiah to the country's economy.

It is estimated that the number of gig workers will increase not only in Indonesia, but throughout the world, following the development of digital technology and the many digital platforms. Especially during the last Covid-19 pandemic, where the virtual world became much busier and busier than before. A study found that gig workers in Indonesia work an average of 12 hours a day. Another study stated that the majority of workers surveyed in Jakarta, Yogyakarta and Banyuwangi work 9-12 hours a day. This figure is far above the working hours allowed by the Labor Law, namely 7-8 hours per day, with a maximum limit of 40 hours per week.

In terms of income, research has found that the income of gig platform driver partners in Indonesia has continued to decline from 2018 to 2020. This shows that the gig platform honeymoon period in Indonesia is over. As a result, driver income is no longer controlled by the promos provided by the platform. Another problem with the partnership relationship concept is the normalization of piece-work or wages per job.

Previously, this scheme was widely used in the garment industry in the late 19th and early 20th centuries, before being abolished by the struggle for standardization of wages through the minimum wage policy. Because workers in partnership relationships are not bound by minimum wage provisions, the practice of piece-work which should be obsolete is something that cannot be avoided.

Moreover, various studies have criticized the use of partnerships in the gig economy. Court decisions in several countries even clearly state that relationships that occur on gig economy platforms, such as Uber, should not be classified as partnership relationships but as working relationships. This is because service provider platforms have great control over their "partners", for example through the use of algorithms that "force" workers to continue taking orders if they want their work performance to be maintained.

There has been no significant regulatory development related to partnership relations in Indonesia. In fact, the growth of gig economy workers in Indonesia is quite rapid. Although there is no exact data yet, a Fairwork Indonesia report believes that there are at least 2.5

million motorcycle-based gig workers, and one-fifth of Indonesia's population has used one of these services. So far, the term partnership relationship is not covered in Law (UU) Number 13 of 2003 concerning Manpower and its implementing regulations. The term "partnership" actually exists in Law Number 20 of 2008 concerning Micro, Small and Medium Enterprises. However, keep in mind that the partnership context regulated in this law is different from the partnerships that are currently happening in the field.

This means that there is a legal vacuum regarding partnership relations which are currently being implemented in Indonesia. The impact of the legal vacuum of this partnership relationship is diverse. First, the absence of regulation regarding partnership relations causes this term to be used freely without certain restrictions. For example, the term partnership is now not only used by gig economy platforms such as Gojek, Grab or Maxim, but is also commonly used by e-commerce companies such as Shopee Express which employs its couriers under a partnership scheme.

Model Development and Analysis

Hypothesis Development

This study tried to develop a model to analyze the relationship between the technological advancement in Indonesia and GDP per capita to the increase in the online labor supply in the market. Then, this study look for the data required from 2017 to 2021, taken from Indonesian Statistic Bureau (BPS), The World Bank Data and Online Labor Observatory, and after that this study tried to formulate and proposed the hypothesis:

H1: The number of Gig Workers in Indonesia is positively influenced by the advancement of technology in Indonesia.

H2: The number of Gig workers in Indonesia negatively influenced by the rising number of gross domestic product per capita.

Dependant Variable

Indonesia’s Online Labor Index

Online Labor Index, according to its definition, was the economic indicator similar to conventional labor market statistics, but instead it provides the data of the online gig economy workers. The data was gathered by tracking the projects and tasks from various online labor platforms, tracking five largest English websites, and several non-english websites; three Spanish and three Russian websites. This Index was gathered and processed by the researchers from Oxford University, which later can be used for several purposes, in this case it could help this research to measure the gig economy workers in Indonesia specifically.

The graph shows the data taken from the Online Labour Index, which shows the growth of online gig economy workers in Indonesia from 2017 to 2021. In 2017, the data recorded in the index for Indonesia was approximately 0.054% from the total global worker shares. In 2018, the numbers are reduced from 0.054% in 2017 to 0.356% from the global worker shares; but in the few years after that, the trends for the online gig economy was significantly increased; mostly during the COVID-19 Global Pandemic that mostly forces people to work online, especially for those who lost their job and in urge of income. The numbers in 2019 recorded approximately 1% of the total global worker share, and this number keeps going up each year, where in 2020 it rises to 1.506%, and 2021 to 1.636% from the global worker shares.

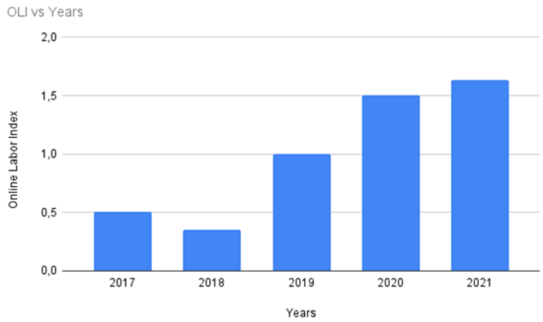

Figure 1. The Growth Of Online Gig Economy Workers In Indonesia

Explanatory Variables

Indonesia's Information, Communication and Technology Development Index

According to its definition, as the name says, it is an index for the information, communication and technology development in Indonesia, and also measures the growth of ICT development, measures the digital gap between regions, and measures the potential for ICT development in Indonesia. The relevant data was gathered and processed by the Indonesian Central Statistic Bureau or BPS (Badan Pusat Statistik), and the report released per year. This data later will be used in this research as an one of the explanatory variables to know how it related to the gig economy workers growth.

In 2017, the Index of ICT Development in Indonesia was recorded at 4.99, and the trend of ICT Development steadily increases each year, where in 2018 it was recorded to grow to the point of 5.07 percent, and this number keeps going up, where in 2019 it grow to the point of 5,32 percent, and even during global pandemic, the number of growth were still increasing, recorded 5,59 percent, and the latest number recorded in 2021 was reaching 5,76 percent in growth.

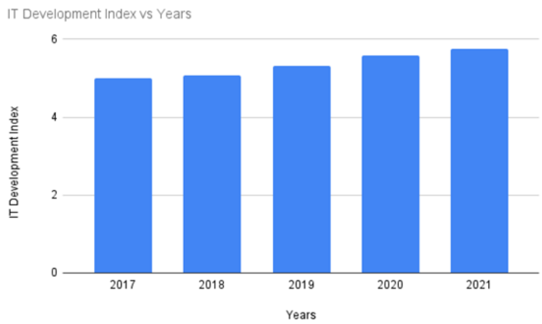

Figure 2. The Index Of ICT Development In Indonesia

Indonesia's Gross Domestic Product Per Capita

Gross Domestic Product (GDP) per capita which is the average income of the population in a country can be used as a measure of welfare and prosperity. Based on data from the world bank, Indonesia's GDP per capita continues to increase. It is noted that the GDP per capita income of Indonesia's population in 2021 has increased by around US$ 438.4 compared to the previous year or an increase of around 11%. It is noted that Indonesia's GDP per capita in 2021 is US$ 4,332.7.

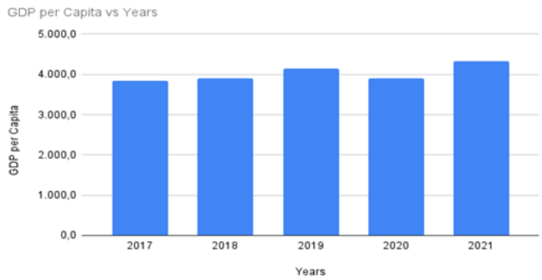

Figure 3. Indonesia's GDP Per Capita in 2017-2021

Oftenly, the level of income is a point of concern for companies in high-income countries in exploring human resources that are spread globally. In the current digital economy era, many of these companies then employ quality human resources who are in other parts of the world, especially from low-income countries, to work remotely so that in this way these companies can save more on their budgets. According to Beerepoot and Lambregts (2015), the digitization of services allows job offers from high-wage countries to move their jobs to countries with much lower wages, which enables cost reduction through offshoring.

For workers in low-income countries, this is certainly a positive thing because the salary offered is high enough for them. Increased labor productivity and higher wages are two major factors that encourage participation among workers in low-income countries (Gomes-Herrera et al., 2017). With the difference in salary standards between high-income countries and low-income countries, accompanied by differences in spending levels, of course this situation benefits both parties. This will certainly encourage these workers to accept the job offer in order to help them achieve economic prosperity.

Model

This study proposes an econometric model to test the hypothesis of the economic model of the relationship between the technological advancement in Indonesia and GDP per capita to the increase in the online labor supply in the market. This model is then formulated to study the determinants of the online labor index as a measurement of gig economy labor supply; which are Indonesian Technological Advancement and Development and Gross Domestic Product Per Capita:

$$\mathbf{OLI_i = \beta_0 + \beta_1 ICT_i + \beta_2 log(GDP_i) + \varepsilon_i}$$

Where:

OLI_i : Indonesia's Online Labor Index
ICT_i : Indonesia's Information and Technology Development Index
GDP_i : Indonesia's Gross Domestic Product Per Capita

Table 1. Multiple Regression Model of ICT Index, GDP Per Capita to The Increase In The Online Labor Supply In The Market

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.107617	16.31712	0.067881	0.9521
ICT	1.834553	0.329539	5.567026	0.0308
LOG(GDP)	-1.194692	2.106689	-0.567094	0.6278

R-squared	0.962619	Mean dependent var	1.000400
Adjusted R-squared	0.925237	S.D. dependent var	0.574735
S.E. of regression	0.157149	Akaike info criterion	-0.579539
Sum squared resid	0.049391	Schwarz criterion	-0.813876
Log likelihood	4.448847	Hannan-Quinn criter.	-1.208477
F-statistic	25.75125	Durbin-Watson stat	3.041592
Prob(F-statistic)	0.037381		

From the multiple regression model, this study derived the initial test result by using EViews. As stated in the result above, β_1 equals to 1.8345, while β_2 equals -1.1947. The negative sign of β_2 means that GDP Per Capita has a negative impact on the number of online workers, in contrast with the positive sign of β_1 which means that there is a positive impact on information and technological development to the number of online workers. So it can then be interpreted that the development of technological infrastructure can increase labor participation in the gig economy, while an increase in income can reduce their participation.

CONCLUSION

The gig economy, no doubt, has been growing ever since, especially during these recent years, and its workers have also grown in size along with its trends. The findings shows that the technology development was one of the determinants of the growing size of online gig workers in Indonesia. The advancement of technology increases the online gig workers, especially during these recent 5 years from 2017 to 2021, while the GDP was the negative factor of the growing number of gig economy workers in Indonesia based on the data observed in 2017 to 2021; where the income can impact the numbers of gig economy workers in Indonesia. Overall, both technology advancement and income could impact the gig economy workers number, based on the observation of the data of online labor workers to the technology advancement and GDP in Indonesia.

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