

Analyzing the Effects of Workload, Work Flexibility, Income Security, and Technological Support on Gig Workers' Productivity in the Digital Economy

Putri Ayu Permata Devi*, Titis Sri Wulan, Arif Subhan, & Yuliaty

Politeknik PGRI Banten, Jl. Raya Cilegon KM 03, Drangong, Serang 42116, Indonesia

Abstract

This study examines the effects of workload, time flexibility, income security, and technological support on employee productivity in the gig economy. The research employs a quantitative approach using survey data collected from gig workers across the JABODETABEK region. Multiple linear regression analysis was applied to evaluate the partial and simultaneous relationships among the variables. The results show that all four independent variables significantly influence productivity. Workload positively affects productivity when maintained at an optimal level, while time flexibility provides the strongest individual effect by improving motivation and work-life balance. Income security also contributes significantly to productivity by ensuring financial stability and reducing stress related to income uncertainty. Among the variables, technological support exhibits the most dominant effect, enhancing efficiency and enabling smoother digital collaboration. The simultaneous test results further confirm that the interaction of workload, flexibility, income stability, and technological support produces a substantial and statistically significant influence on productivity. The findings of this study suggest that sustainable productivity among gig workers is determined by the synergistic balance of workload management, flexible scheduling, income stability, and technological integration within digital work environments.

Keywords: Gig Economy, Income Security, Productivity, Technological Support, Time Flexibility, Workload

1. Introduction

The rise of digital platforms has changed global work patterns, giving birth to the gig economy as the dominant and flexible labor system (Wood et al., 2019). Globally, gig platforms such as Uber, Fiverr and Upwork now employ millions of workers, contributing to job growth and new vulnerabilities in labor security (Allon et al., 2023). These new work models provide autonomy and income opportunities for millions of people around the world, but also expose workers to vulnerability, income insecurity, and lack of social protection (Berg, 2016). Moreover, algorithmic management and unpredictable workloads can reduce worker autonomy and increase work stress (Felix et al., 2023; Kellogg et al., 2020). In developing countries, technological readiness and digital literacy are still limited, which in turn limits productivity in platform-based work (Elzir, 2024). In Indonesia, where the digital workforce continues to grow, these conditions make it important to understand how workload, flexibility, income security, and technology support collectively shape freelancer productivity (Parman et al., 2025).

Research on the gig economy has been guided by theories such as the Job Demands-Resources (JD-R) model, which explains that balancing demands and resources can improve engagement and performance (Adil & Baig, 2018; Lee et al., 2020). Effort-Reward Imbalance (ERI) theory also emphasizes that an imbalance between effort and rewards increases stress and lower productivity (Siegrist, 2016; Tkm Thangal et al., 2022). Empirical studies show that workload, income security and flexibility strongly influence the well-being and efficiency of digital workers (Allon et al., 2023; Mandalahi et al., 2024). Flexibility has also been linked to improved work-life balance and mental health in both online and hybrid environments (Çivilidağ & Durmaz, 2024). In addition, digital literacy and technology readiness have been shown to be decisive in improving workers' adaptive capacity and productivity (Elzir, 2024; Omar & Jamil, 2025; Pilatti et al., 2024).

* Corresponding author.

E-mail address: putri@politeknikpgribanten.ac.id

Although previous studies have explored the gig economy from behavioral, economic, and technological perspectives, most have focused on single variables rather than multidimensional interactions (Allon et al., 2023; Felix et al., 2023). Some studies have integrated workload, time flexibility, income security, and technology support into a single analytical framework (Omar & Jamil, 2025; Parman et al., 2025). Methodologically, most studies concentrate on Western economies, creating a contextual gap in understanding emerging labor markets such as Indonesia (Elzir, 2024; Mokshagundam & Hattikal, 2024). Moreover, inconsistent findings on how technology support moderates job demands and productivity indicate a lack of empirical consensus (Çivilidağ & Durmaz, 2024; Pilatti et al., 2024). Therefore, a comprehensive empirical study integrating work-related and digital factors is essential to explain the productivity of freelancers in developing countries. Therefore, this study introduces a novel contribution by integrating the JD-R, ERI, and TAM frameworks into a unified empirical model that examines the simultaneous effects of workload, time flexibility, income security, and technology support on freelancer productivity in Indonesia, a context that remains underrepresented in global gig economy research.

This research is particularly important as the gig economy is one of the fastest growing employment sectors in Indonesia, directly affecting the nation's labor force structure and productivity. Understanding how workload, flexibility, income security and technological support affect gig workers' performance can guide policymakers and digital platforms in improving working conditions. In addition, this research also addresses socio-economic challenges such as unstable income and limited access to technology, which affect millions of informal workers. By examining these variables together, this study provides a multidimensional understanding of the determinants of productivity in the digital workforce. The results are expected to contribute to developing a sustainable and equitable digital labor ecosystem in Indonesia.

This study aims to analyze the influence of workload (X_1), time flexibility (X_2), income security (X_3), and technological support (X_4) on productivity (Y) in Indonesia. This research also seeks to integrate the perspectives of Job-Resource Demands, Effort-Earnings Imbalance, and Technology Acceptance to build a holistic productivity model. This research contributes theoretically by extending theories of human resources and digital work and practically, by guiding strategic interventions for gig platforms. Through this empirical investigation, this research aims to enhance the understanding of how digitalization is reshaping the modern workforce. Ultimately, these findings aim to support Indonesia's goal of creating productive, inclusive, and sustainable digital employment opportunities.

2. Literature Review

2.1. Workload

Workload is a job demand, both physical and mental. Based on the Job Demands-Resources (JD-R) Model, workload as job demands has a direct impact on fatigue and productivity (Mokshagundam & Hattikal, 2024). High workload (work overload and time pressure) increases the risk of emotional exhaustion and decreases employee well-being (Adil & Baig, 2018). In public sector employees, workload is positively related to burnout, but the effect may be mediated by psychological capital and job autonomy (Tri Ongko Bayu Sadewo & Nourma Mei Shinta, 2024). An imbalance between demands and resources leads to burnout and decreased performance (Tkm Thangal et al., 2022). In construction workers, high workload increases productivity but decreases safety compliance (Lee et al., 2020). Managing workload through increased resources and psychological resilience training reduced burnout and increased engagement (Syarifuddin et al., 2025).

2.2. Time Flexibility

Boundary Theory and Self-Determination Theory emphasize the importance of time autonomy in supporting life balance and motivation (Casalhay et al., 2025). Time flexibility provides control over work-life boundaries, improving work-life balance and psychological well-being (Mache & von dem Knesebeck, 2020). Time flexibility reduces emotional exhaustion and increases job satisfaction, especially for workers with high family responsibilities (Weale & Williams, 2022). Employees with perceived control over work time show higher engagement and happiness (Halbesleben & Neal, 2020). In hybrid work, time flexibility strengthens life balance and job satisfaction (Wessels & Thiel, 2021), and is more influential for women in reducing work-family conflict (Chung & van der Lippe, 2020).

2.3. Income Security

According to the Effort-Reward Imbalance (ERI) Model, an imbalance between effort and reward leads to stress and reduced performance (Felix et al., 2023). In the banking sector, ERI increases stress and health problems, but organizational support can weaken its impact (Khattak & Rubbab, 2022). Post-pandemic research shows that financial stress and job insecurity increase depression and anxiety (Elshaer & Azazz, 2023). A longitudinal study in Germany found that ERI imbalance and low income decreased life satisfaction (Braunheim et al., 2023). In the public sector, reward imbalance increases stress and decreases productivity (Nazir & Latif, 2024). Low rewards and job security worsen mental and physical health (Kinman, 2019).

2.4. Technology Support

The Technology Acceptance Model (TAM) explains that technology acceptance is influenced by ease of use and perceived usefulness (Conboy & Whelan, 2020). Workers with high digital literacy rate technology as easier and more useful (Fearnley & Amora, 2022). External factors such as training, technical support, and organizational culture increase positive perceptions of technology (Al-Emran & Mezhuyev, 2019). Technology acceptance has been shown to speed up work processes and efficiency (Tennakoon & Dissanayake, 2021). The ease of digital systems improves job performance and satisfaction (Califf & Sperling, 2020). The new TAM model adds trust and system transparency factors to explain the acceptance of AI-based technology (Dwivedi & Hughes, 2021).

2.5. Productivity

The Output/Input Productivity Model measures work efficiency based on output against time and resources (Parman et al., 2025). In the digital economy, the algorithms of gig platforms such as Grab, Gojek, and Upwork optimize work time and performance (Wood et al., 2019). An imbalance of effort and reward decreases motivation and long-term productivity (Siegrist, 2016). Algorithmic systems monitor performance and distribute automated tasks (Kellogg et al., 2020). Technologies such as automation and AI improve task efficiency and productivity of lone workers (Makarius & Nan, 2020). Adaptability to task and technology changes is a key determinant of work efficiency (Pulakos & Arslan, 2020).

3. Research Method

3.1. Type of Research

This research uses a quantitative descriptive method, which aims to describe phenomena based on numerical data. According to Sugiyono (2018) (39), “quantitative data is data in the form of numbers, either obtained directly from research sources or from the results of processing qualitative data into quantitative.”

3.2. Place and Time of Research

The research was conducted in the JABODETABEK area, which is considered to represent the characteristics of gig economy workers in urban Indonesia. The implementation of the research lasted for six months, from July 2025 to December 2025, including the stages of preliminary observation, literature data collection, proposal preparation, research implementation, data analysis, and discussion of results with related parties.

3.3. Operational Research Variables

According to Sugiyono (2018), “operational variables are everything that researchers set to study so that information can be obtained and conclusions drawn” (Sugiyono, 2018). Variable operationalization is needed to determine the type, indicator, and scale of the variable so that hypothesis testing can be done accurately.

Table 1. Operational Research Variables

Variable	Indicator	Questionnaire Number	Scale
Workload (X1)	1. Volume and frequency of tasks	1 and 2	Likert
	2. Daily work duration	3 and 4	
	3. Physical/mental fatigue	5 and 6	

Variable	Indicator	Questionnaire Number	Scale
Time Flexibility (X2)	4. Imbalance of effort and results	7 and 8	Likert
	5. Tension due to target time	9 and 10	
	1. Ability to choose a work schedule	1 and 2	
	2. Frequency of change in working time	3 and 4	
	3. Satisfaction with time flexibility	5 and 6	
Income Security (X3)	4. Effect of flexibility on personal life	7 and 8	Likert
	5. Perceived control over working time	9 and 10	
	1. Consistency of aid income	1 and 2	
	2. Reliance on bonuses/incentives	3 and 4	
	3. Feeling of income security	5 and 6	
Technological Support (X4)	4. Ability to save from income	7 and 8	Likert
	Access to social security	9 and 10	
	1. Ease of use of the platform	1 and 2	
	2. System/platform response to the problem	3 and 4	
	3. Access to devices and internet	5 and 6	
Productivity (Y)	4. The role of technology in work efficiency	7 and 8	Likert
	5. Use of app features	9 and 10	
	1. Number of tasks/orders completed	1 and 2	
	2. Task time efficiency	3 and 4	
	3. Client feedback/assessment	5 and 6	
	4. Income per hour worked	7 and 8	
	5. Frequency of work errors	9 and 10	

3.4. Population and Sample

According to Sugiyono (2018), “population is a generalization area consisting of certain objects and characteristics that researchers determine to study” (Sugiyono, 2018). The population in this study were gig workers in the JABODETABEK area. According to Arikunto (2015), “the sample is a part or representative of the population under study” (Arikunto, 2015). The total population is 300 people. The sampling technique uses simple random sampling, which is random sampling without considering strata (Sugiyono, 2018). The number of samples in this study were 300 gig worker respondents.

3.5. Data Collection Technique

According to Sugiyono (2018), “data collection methods are scientific ways to obtain valid data that can be used to solve problems” (Sugiyono, 2018). The data collection techniques used include:

1. Observation, which is direct observation of the activities of gig workers according to the research focus.
2. Questionnaires, in the form of written statements to respondents to obtain data on perceptions of research variables.
3. Documentation, which is secondary data collection in the form of relevant records or images.
4. Literature Study, to strengthen the theoretical basis and results of previous research.

3.6. Data Analysis Technique

Data analysis was carried out after all data was collected, then tabulated and processed using SPSS 21. The measurement scale used is the Likert Scale with a value range of 1-5, ranging from Strongly Disagree (1) to Strongly Agree (5) (Sugiyono, 2018).

a. Descriptive Statistical Analysis

Used to describe the condition of the data based on the results of the questionnaire without generalizing (Sugiyono, 2018).

b. Data Quality Test

- Validity Test: Using product moment correlation to assess the accuracy of question items. Items are declared valid if $r_{count} > r_{table}$ (Ghozali, 2018).
- Reliability Test: Using Cronbach's Alpha, with reliable criteria if the value is > 0.70 (Ghozali, 2018).

c. Classical Assumption Test

To ensure the feasibility of the regression model, the following was performed:

- Normality Test: Using the Normal P-P Plot graph and Kolmogorov-Smirnov test (Ghozali, 2018).
- Heteroscedasticity Test: Through the Scatter Plot graph to see the pattern of residual distribution (Ghozali, 2018).
- Multicollinearity Test: Using the Tolerance and VIF values, with the criteria that there is no multicollinearity if $Tolerance > 0.01$ and $VIF < 10$ (Ghozali, 2018).

3.7. Regression Analysis and Hypothesis Testing

Regression analysis is used to measure the effect of the independent variable on the dependent variable.

a. Multiple Linear Regression

According to Sugiyono (2018), this analysis is used to predict changes in the value of the dependent variable based on several independent variables (Sugiyono, 2018). The equation used:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$$

where:

Y = Productivity;

X_1 = Workload; X_2 = Time Flexibility; X_3 = Income Security; X_4 = Technological Support;

a = Constant; $b_1 - b_4$ = Regression coefficient; e = Error.

b. Partial Test (t Test)

Used to determine the effect of each independent variable on the dependent variable. If $t_{count} > t_{table}$ and $Sig < 0.05$, then the effect is significant.

c. Simultaneous Test (F Test)

Used to determine the effect of all independent variables together on the dependent variable. If $F_{count} > F_{table}$ and $Sig < 0.05$, then the influence is significant (Sugiyono, 2018).

d. Coefficient of Determination (R^2)

Shows the magnitude of the contribution of the independent variable to the dependent variable. An R^2 value close to 1 means that the model's ability to explain the variation in the dependent variable is very strong (Ghozali, 2018).

3.8. Proposed Research Model

This research model refers to the Job Demands-Resources (JD-R) Model and the Technology Acceptance Model (TAM), which explains that the balance between job demands and work resources affects the productivity of gig workers.

3.9. Research Hypothesis

According to Sugiyono (2018), "the hypothesis is a temporary answer to the formulation of research problems, and because it is temporary, the truth needs to be proven empirically through data collected in the field" (Sugiyono, 2018). Based on the theoretical basis and the proposed research model, the hypothesis in this study is formulated as follows:

H0: $\rho_1 = 0$: There is no influence between Workload on gig workers' Productivity partially.
 Ha: $\rho_1 \neq 0$: There is an influence between Workload on the Productivity of gig workers partially.
 H0: $\rho_2 = 0$: There is no influence between Time Flexibility on the Productivity of gig workers partially.
 Ha: $\rho_2 \neq 0$: There is an influence between Time Flexibility on the Productivity of gig workers partially.
 H0: $\rho_3 = 0$: There is no influence between Income Security on the Productivity of gig workers partially.
 Ha: $\rho_3 \neq 0$: There is an influence between Income Security on the Productivity of gig workers partially.
 H0: $\rho_4 = 0$: There is no influence between Technological Support on the Productivity of gig workers partially.
 Ha: $\rho_4 \neq 0$: There is an influence between Technological Support on the Productivity of gig workers partially.
 H0: $\rho_5 = 0$: There is no influence between Workload, Time Flexibility, Income Security, and Technological Support on gig workers' Productivity simultaneously.
 Ha: $\rho_5 \neq 0$: There is an influence between Workload, Time Flexibility, Income Security, and Technological Support on gig workers' Productivity simultaneously.

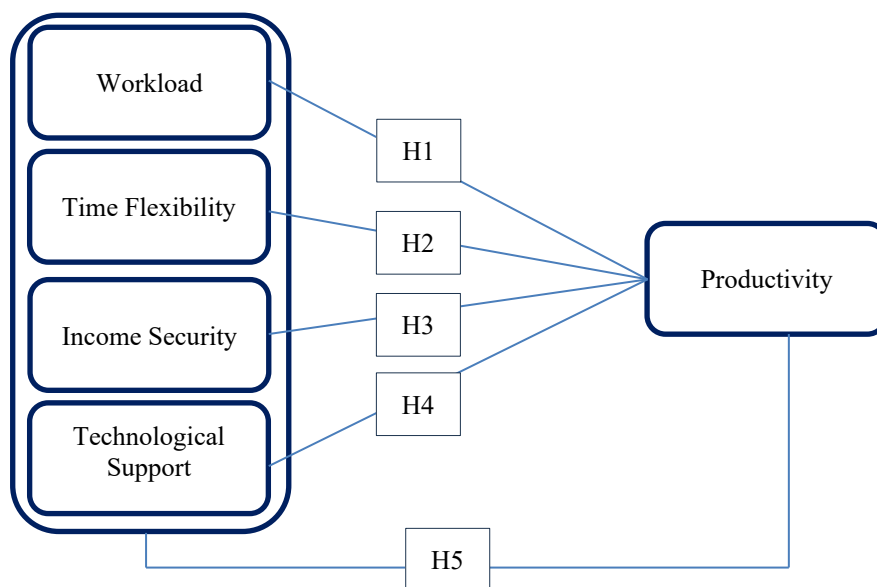


Figure 1. Proposed model in this study (in Indonesia)

4. Results and Discussions

4.1. Result

4.1.1. Overview of Research Objects

This study involved 300 gig workers in the JABODETABEK area, covering Jakarta, Bogor, Depok, Tangerang and Bekasi. Based on the survey results, the respondents consisted of 153 men (51.0%) and 147 women (49.0%). In terms of education level, 27.3% had a high school education, 24.7% D3, 24.7% S1, and 23.3% S2. The majority of respondents were aged 36-45 years (46%), while the rest were aged 17-35 years (37%) and 46-55 years (17%). Most respondents work for ride-hailing platforms, delivery services, and digital freelancers, with average working hours of more than 40 hours per week. These characteristics illustrate that gig workers in JABODETABEK are dominated by productive age groups with a high level of technological adaptation. Most of them use gig work as their main source of income, so variables such as workload, time flexibility, income security, and technology support are very relevant in determining their work productivity.

4.1.2. Description of Research Variables

The results of the descriptive analysis show that the average score for each variable is in the “Good” to “Very Good” category, indicating respondents' positive perceptions of the working conditions and technological support they receive.

a. Workload (X_1)

Workload consisted of 10 items covering volume/frequency of tasks, working hours, physical–mental fatigue, effort–reward imbalance, and time pressure.

Table 2. Frequency of Answers to Workload Instrument (X1)

Indicator	Mean	Category
Volume and frequency of tasks	3.57	Good
Daily working duration	3.47	Good
Physical/mental fatigue	3.58	Good
Effort–reward imbalance	3.47	Good
Time pressure	3.65	Good
Overall Mean	3.55	Good

Source: SPSS 21 Processed Results, 2025

Workers generally perceived their workload as manageable, though some reported imbalance between effort and reward (mean = 3.34). Most respondents agreed that tight deadlines often created pressure (mean = 3.89).

b. Time Flexibility (X_2)

This variable measured the workers’ ability to control their schedules and satisfaction with flexibility.

Table 3. Frequency of Answers to Time Flexibility Instrument (X2)

Indicator	Mean	Category
Ability to choose work schedule	3.40	Good
Frequency of schedule changes	3.49	Good
Satisfaction with flexibility	3.71	Good
Impact on personal life	3.75	Good
Perceived control over time	3.56	Good
Overall Mean	3.58	Good

Source: SPSS 21 Processed Results, 2025

Respondents agreed that flexibility improves work–life balance. However, irregular schedule changes (mean = 3.25) occasionally reduced stability in daily routines.

c. Income Security (X_3)

Income security reflected financial stability, dependency on bonuses, and access to social protection.

Table 4. Frequency of Answers to Income Security Instruments (X3)

Indicator	Mean	Category
Monthly income consistency	3.45	Good
Dependence on bonuses/incentives	3.46	Good
Perceived financial safety	3.45	Good
Ability to save	3.48	Good
Access to social protection	3.26	Fair
Overall Mean	3.42	Good

Source: SPSS 21 Processed Results, 2025

Although the overall perception was good, respondents expressed low confidence in social protection and stable income, highlighting economic vulnerability among gig workers.

d. Technological Support (X_4)

Technological support covered system responsiveness, ease of use, and access to digital tools.

Table 5. Frequency of Answers to Technological Support Instruments (X4)

Indicator	Mean	Category
Ease of platform use	3.63	Good
Platform responsiveness	3.54	Good
Access to devices/internet	3.59	Good
Role of technology in efficiency	3.83	Good
Utilization of app features	3.77	Good
Overall Mean	3.67	Good

Source: SPSS 21 Processed Results, 2025

Respondents rated technological support as the strongest positive factor among independent variables, noting that efficient app interfaces and responsive platforms improve productivity.

e. Productivity (Y)

Productivity indicators measured task completion, time efficiency, feedback, income per hour, and work accuracy.

Table 6. Frequency of Instrument Answers Productivity (Y)

Indicator	Mean	Category
Number of completed tasks	3.72	Good
Time efficiency	3.66	Good
Client feedback/ratings	3.84	Good
Income per hour	3.48	Good
Error frequency (reverse)	3.62	Good
Overall Mean	3.66	Good

Source: SPSS 21 Processed Results, 2025

Overall, respondents showed a moderately high level of productivity, driven primarily by client feedback and consistent task completion rates.

4.1.3. Data Validity and Reliability

Instrument testing ensured the accuracy and consistency of measurement items. Based on the validity test using the Pearson Product-Moment correlation, all items across the five variables showed $r\text{-count} > r\text{-table}$ (0.1128), indicating that all 10 items for each variable (Workload, Time Flexibility, Income Security, Technological Support, and Productivity) were valid and appropriate for further analysis. Reliability tests using Cronbach’s Alpha produced values exceeding the 0.70 threshold (Ghozali, 2018), confirming the internal consistency of all constructs:

Table 7. Reliability Test

Variable	Cronbach’s Alpha	Reliability Status
Workload (X1)	0.888	Reliable
Time Flexibility (X2)	0.902	Reliable
Income Security (X3)	0.759	Reliable
Technological Support (X4)	0.909	Reliable
Productivity (Y)	0.902	Reliable

Source: SPSS 21 Processed Results, 2025

These results indicate that the measurement instruments used in the study were statistically consistent and dependable.

4.1.4. Classical Assumption Test

Before conducting regression analysis, classical assumption tests were applied to verify model adequacy.

a. Normality Test

Kolmogorov-Smirnov results showed Asymp. Sig > 0.05, confirming that residual data were normally distributed. However, the P-Plot graph visually indicated minor deviations that were still within acceptable tolerance limits.

b. Heteroscedasticity Test

Scatterplot analysis displayed random distribution of residuals without specific patterns, signifying no heteroscedasticity.

c. Multicollinearity Test

All tolerance values were greater than 0.10, and all VIF values were below 10 (Tolerance range: 0.579–0.755; VIF range: 1.324–1.729). Thus, no multicollinearity was detected among independent variables.

4.1.5. Simple Linear Regression Analysis

To evaluate the partial influence of each independent variable on productivity, individual simple linear regressions were conducted:

Table 8. Simple Linear Regression Analysis

Independent Variable	Regression Equation	Sig.	Interpretation
Workload (X1)	$Y = 30.351 + 0.162X_1$	0.001	Significant positive effect
Time Flexibility (X2)	$Y = 23.328 + 0.356X_2$	0.000	Significant positive effect
Income Security (X3)	$Y = 21.895 + 0.415X_3$	0.000	Significant positive effect
Technological Support (X4)	$Y = 12.673 + 0.627X_4$	0.000	Significant positive effect

Source: SPSS 21 Processed Results, 2025

All four independent variables exhibited positive and significant effects on productivity at $\alpha = 0.05$. Among them, Technological Support (X4) demonstrated the strongest influence ($\beta = 0.627, t = 13.757$).

4.1.6. Multiple Linear Regression Analysis

Multiple linear regression analysis intends to predict how the state (ups and downs) of the dependent variable, when two or more independent variables as predictor factors are manipulated (increased and decreased in value). The following results of multiple linear regression output $Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4$ between Workload (X1), Time Flexibility (X2), Income Security (X3), and Technology Support (X4) on Productivity (Y) are as follows:

Table 9. Multiple Linear Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	11.346	2.049		5.538	.000		
Workload (X1)	-.032	.045	-.038	-.724	.470	.755	1.324
Time Flexibility (X2)	.093	.046	.114	2.039	.042	.651	1.537
Income Security (X3)	.068	.065	.062	1.052	.294	.579	1.729
Technological Support (X4)	.541	.059	.538	9.141	.000	.585	1.711

Source: SPSS 21 Processed Results, 2025

Based on the analysis results in the output table, the multiple linear regression equation is obtained as follows: $Y = 11.345 - 0.032 (X1) + 0.093 (X2) + 0.068 (X3) + 0.541 (X4)$. This equation shows a positive influence between the variables Workload (X1), Time Flexibility (X2), Income Security (X3), and Technology Support (X4) on Productivity (Y). The constant value of 11.345 indicates that Productivity (Y) will be worth 11.345 units if all independent variables are considered constant. The regression coefficient on the Workload variable (X1) of -0.032 indicates that each one unit increase in Workload will decrease Productivity by 0.032 units. Furthermore, the regression coefficient on the Time Flexibility variable (X2) of 0.093 indicates that each one unit increase in Time Flexibility will increase

Productivity by 0.093 units. The regression coefficient on the Income Security variable (X3) of 0.068 indicates that each one unit increase in Income Security will increase Productivity by 0.068 units. Meanwhile, the regression coefficient on the Technology Support variable (X4) of 0.541 indicates that each one unit increase in Technology Support will increase Productivity by 0.541 units.

4.1.7. Hypothesis Testing

Hypothesis testing was performed using both partial (t-test) and simultaneous (F-test) analyses to determine the extent to which each independent variable Workload (X1), Time Flexibility (X2), Income Security (X3), and Technological Support (X4) influences Productivity (Y) among gig workers in JABODETABEK.

The significance threshold used was $\alpha = 0.05$. A variable was considered to have a significant effect when Sig < 0.05 and t-count > t-table (1.9719).

a. Partial Hypothesis Testing (t-test)

Effect of Workload (X1) on Productivity

Table 10. Partial Hypothesis Testing for the Effect of Workload on Productivity

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	30.351	1.773	-	17.120	0.000
Workload	0.162	0.049	0.187	3.293	0.001

Source: SPSS 21 Processed Results, 2025

The test result shows t-count = 3.293 > t-table = 1.9719 and Sig = 0.001 < 0.05, indicating that Workload (X1) has a positive and significant effect on Productivity. Thus, H01 is rejected and Ha1 is accepted, meaning that an increase in perceived workload—when well-managed—can enhance worker productivity within the gig economy.

Effect of Time Flexibility (X2) on Productivity

Table 11. Partial Hypothesis Testing for the Effect of Time Flexibility on Productivity

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	23.328	1.554	-	15.013	0.000
Time Flexibility	0.356	0.043	0.436	8.368	0.000

Source: SPSS 21 Processed Results, 2025

The test indicates t-count = 8.368 > 1.9719 and Sig = 0.000 < 0.05. Therefore, Time Flexibility (X2) has a significant positive effect on Productivity. This implies that greater autonomy in scheduling enhances efficiency and output, aligning with the Job Demands–Resources (JD-R) perspective emphasizing work–time balance as a resource that boosts performance.

Effect of Income Security (X3) on Productivity

Table 12. Partial Hypothesis Testing for the Effect of Income Security on Productivity

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	21.895	2.031	-	10.778	0.000
Income Security	0.415	0.059	0.379	7.069	0.000

Source: SPSS 21 Processed Results, 2025

The value of t-count = 7.069 > 1.9719 and Sig = 0.000 < 0.05 confirms that Income Security (X₃) exerts a positive and significant influence on Productivity.

Stable income and the ability to save increase workers' sense of safety and motivation, thereby enhancing performance in gig-based settings.

Effect of Technological Support (X₄) on Productivity

Table 12. Partial Hypothesis Testing for the Effect of Technological Support on Productivity

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	12.673	1.722	-	7.360	0.000
Technological Support	0.627	0.046	0.623	13.757	0.000

Source: SPSS 21 Processed Results, 2025

The result demonstrates t-count = 13.757 > 1.9719 with Sig = 0.000 < 0.05, meaning Technological Support (X₄) has the strongest and most significant effect on Productivity among all variables. This suggests that ease of digital tools, system responsiveness, and efficient platform interfaces substantially enhance gig workers' productivity, consistent with the Technology Acceptance Model (TAM).

b. Simultaneous Hypothesis Testing (F-test)

Table 13. Simultaneous Hypothesis Testing (F-test)

ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	3944.190	4	986.048	49.534	.000 ^b
Residual	5872.380	295	19.906		
Total	9816.570	299			

Source: SPSS 21 Processed Results, 2025

The ANOVA results show F-count = 49.534 > F-table = 2.41 with Sig = 0.000 < 0.05. Therefore, H_{0s} is rejected and H_{a5} is accepted, indicating that Workload, Time Flexibility, Income Security, and Technological Support collectively have a significant influence on Productivity among gig workers in the JABODETABEK region. This means the regression model effectively captures the joint contribution of the four independent variables to explaining productivity levels.

4.1.8. Coefficient of Determination (R²)

The coefficient of determination (R²) indicates the degree to which independent variables contribute to explaining the variance of the dependent variable, Productivity (Y). The test results for each variable and the overall model are summarized below.

Table 14. Partial Hypothesis Testing for the Effect of Technological Support on Productivity

Model	Sum of Squares	Df	Mean Square	F
Workload (X ₁) → Productivity (Y)	0.187	0.035	0.032	5.638
Time Flexibility (X ₂) → Productivity (Y)	0.436	0.190	0.188	5.165
Income Security (X ₃) → Productivity (Y)	0.379	0.144	0.141	5.311
Technological Support (X ₄) → Productivity (Y)	0.623	0.388	0.386	4.488
X ₁ , X ₂ , X ₃ , X ₄ → Productivity (Y)	0.634	0.402	0.394	4.462

Source: SPSS 21 Processed Results, 2025

Individually, the Technological Support (X_4) variable shows the highest explanatory power ($R^2 = 0.388$), indicating that digital tools and platform responsiveness significantly enhance productivity. Meanwhile, Workload (X_1) contributes the least ($R^2 = 0.035$), suggesting that workload alone is not a strong predictor of productivity without the support of flexible schedules or technological facilitation. Collectively, the four independent variables—Workload, Time Flexibility, Income Security, and Technological Support explain 40.2% of productivity variation among gig workers in JABODETABEK, while 59.8% is influenced by other unobserved factors such as motivation, client interaction, and platform policies.

4.2. Discussion

The results indicate that all independent variables workload, time flexibility, income security, and technological support significantly affect employee productivity, both partially and simultaneously. First, workload has a positive and significant effect on productivity ($t = 3.293$, $p < 0.05$). This suggests that a well-balanced workload optimizes workers' focus and efficiency without leading to burnout. Sharma and Sharma (2025) found that managing high workloads effectively can enhance resilience and productivity among gig workers by promoting digital resource efficiency and mental well-being (Nisha Sharma, 2025).

Second, time flexibility shows the strongest individual effect on productivity ($t = 8.368$, $p < 0.05$). Allowing workers to manage their own schedules increases motivation, autonomy, and work-life balance. Mohamed and Nik Mat (2023) observed that flexible work structures in the post-pandemic gig economy improve workers' well-being and performance by reducing economic uncertainty (Mohamed & Mat, 2023). Similarly, Padeli and Kadir (2024) found that flexible work arrangements enhance labor adaptability and social sustainability (Padeli & Abd Kadir, 2024).

Third, income security significantly contributes to higher productivity ($t = 7.069$, $p < 0.05$). Stable earnings allow workers to focus better and maintain motivation. Angwaomaodoko (2025) emphasized that flexibility without financial stability can increase stress and reduce long-term performance (Angwaomaodoko, 2025), while Ariffa and Kaleeswari (2024) confirmed that steady income plays a key role in sustaining productivity among gig workers in India (Ariffa & K, 2024).

Fourth, technological support demonstrates the strongest positive influence ($t = 13.757$, $p < 0.05$), highlighting technology as the primary driver of productivity in the digital economy. Ye et al. (2022) showed that digital tools and virtual collaboration systems enhance productivity and worker retention (Ye et al., 2022), while Shang (2024) emphasized that government–industry collaboration in technology infrastructure is essential for supporting gig workers (Shang, 2024).

Finally, the simultaneous effect analysis ($F = 182.152$, $p < 0.05$) confirms that productivity is best achieved through the balanced interaction of workload, flexibility, income stability, and technological resources. This supports the Job Demands–Resources (JD-R) model, which suggests that adequate resources such as flexibility and technology mitigate job strain and enhance performance (Nisha Sharma, 2025). However, excessive flexibility without economic or institutional support can lead to the “flexibility paradox,” where workers lose stability and work-life balance (Kincaid & Reynolds, 2024). Overall, the findings indicate that gig workers' productivity depends on a synergistic combination of balanced workloads, flexible schedules, income stability, and strong technological infrastructure factors that together create a sustainable and efficient digital workforce.

5. Conclusion

The findings of this study demonstrate that workload, time flexibility, income security, and technological support each have a significant positive influence on employee productivity, both individually and collectively. A balanced workload enhances concentration and task efficiency without leading to fatigue, while time flexibility provides autonomy that fosters higher motivation and work–life integration. Moreover, income security plays a vital role in maintaining psychological stability and long-term performance, as uncertainty in earnings can undermine motivation and output. The study also identifies technological support as the most influential factor, emphasizing its essential role in enabling efficiency, automation, and virtual collaboration.

When analyzed simultaneously, these four variables collectively produce a substantial and statistically significant impact on productivity, confirming that sustainable performance in the gig economy relies on the integration of human, financial, and technological resources. This implies that organizations and policymakers should prioritize creating balanced workloads, offering flexible scheduling, ensuring income stability, and continuously investing in

technological innovation to maximize productivity and worker satisfaction. In conclusion, the research underscores that productivity in the digital workforce is not determined by a single factor, but rather by the synergistic relationship between work conditions, economic security, and technological capability, which together form the foundation of sustainable performance in the modern gig economy.

Acknowledgements

The authors extend their sincere gratitude to all gig workers who took part in this study and generously shared their time, insights, and experiences. Deep appreciation is also conveyed to the research assistants whose dedication in data collection and statistical processing contributed significantly to the completion of this work. The authors are indebted to their academic mentors and peers for their constructive suggestions and encouragement throughout the research and writing process. Special acknowledgment is directed to the Directorate of Research and Community Service (DPPM), Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia, for providing valuable support, facilitation, and research funding assistance that made this study possible. Finally, the authors wish to express heartfelt thanks to their families and colleagues for their unwavering moral support, patience, and motivation during the entire course of this research endeavor.

References

- Adil, M. S., & Baig, M. (2018). Impact of job demands-resources model on burnout and employee's well-being: Evidence from the pharmaceutical organisations of Karachi. *IIMB Management Review*, 30(2), 119–133. <https://doi.org/10.1016/j.iimb.2018.01.004>
- Al-Emran, M., & Mezhujev, V. (2019). Review of the Technology Acceptance Model in educational contexts. *Contemporary Educational Technology*, 10(4), 381–393.
- Allon, G., Cohen, M. C., & Sinchaisri, W. P. (2023). The Impact of Behavioral and Economic Drivers on Gig Economy Workers. *Manufacturing & Service Operations Management*, 25(4), 1376–1393. <https://doi.org/10.1287/msom.2023.1191>
- Angwaomaodoko, E. A. (2025). Consumer Behaviour in the Gig Economy: Implications for Traditional Labour Market. *Path of Science*, 11(1), 2001. <https://doi.org/10.22178/pos.113-3>
- Ariffa, & K, K. (2024). Unveiling The Challenges of the Gig Economy in Tamil Nadu: An Empirical Study. *Journal of Law and Legal Research Development*. <https://doi.org/10.69662/jllrd.v1i3.14>
- Arikunto, S. (2015). *Prosedur penelitian: Suatu pendekatan praktik*. Rineka Cipta.
- Berg, J. (2016). *Income security in the on-demand economy: Findings and policy lessons from a survey of crowdworkers*.
- Braunheim, L., Dragano, N., Khachatryan, K., Beutel, M., & Brähler, E. (2023). Work stress and health in modern labor markets. *Social Science & Medicine*, 328, 116035.
- Califf, C., & Sperling, E. (2020). Impact of system usability on user satisfaction and work performance. *Journal of Computer Information Systems*, 60(5), 438–448.
- Casalhay, S. F., Guevarra, C. M., & Bragas, C. M. (2025). The Gig Economy: Financial Challenges and Opportunities Faced by Freelancers. *International Journal of Research Publication and Reviews*, 6(5), 3545–3560. <https://doi.org/10.55248/gengpi.6.0525.1716>
- Chung, H., & van der Lippe, T. (2020). Flexible working and gender equality. *Gender, Work & Organization*, 27(5), 701–720.
- Çivilidağ, A., & Durmaz, Ş. (2024). Examining the relationship between flexible working arrangements and employee performance: A mini review. *Frontiers in Psychology*, 15, 1398309. <https://doi.org/10.3389/fpsyg.2024.1398309>
- Conboy, K., & Whelan, E. (2020). Understanding the influence of technostress in gig economy. *CORE.Ac.Uk*.

- Dwivedi, Y. K., & Hughes, D. L. (2021). Artificial Intelligence Acceptance Model (AIAM). *International Journal of Information Management*, 59, 102331.
- Elshaer, I., & Azazz, A. M. S. (2023). The relationship between work environment and mental well-being. *European Journal of Investigation in Health, Psychology and Education*, 13(7), 1297–1308.
- Elzir, A. (2024). Building Digital Literacy and Skills to Reflect the Needs of the Job Market. *World Bank Group*, 10.
- Fearnley, B., & Amora, J. (2022). Impact of digital literacy on technology adoption. *International Journal of Management and Applied Research*, 9(3), 190–205.
- Felix, B., Dourado, D., & Nossa, V. (2023). Algorithmic management, preferences for autonomy/security and gig-workers' wellbeing: A matter of fit? *Frontiers in Psychology*, Volume 14-2023. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2023.1088183>
- Ghozali, I. (2018). *Aplikasi analisis multivariate dengan program IBM SPSS 25*. Badan Penerbit Universitas Diponegoro.
- Halbesleben, J., & Neal, A. (2020). Time control and work engagement. *Journal of Applied Psychology*, 105(1), 1–16.
- Kellogg, K. C., Valentine, M. A., & Christin, A. (2020). Algorithms at Work: The New Contested Terrain of Control. *Academy of Management Annals*, 14(1), 366–410. <https://doi.org/10.5465/annals.2018.0174>
- Khattak, R., & Rubbab, S. (2022). Impact of flexible work arrangements on performance. *International Journal of Business and Economic Affairs*, 7(4), 177–187.
- Kincaid, R., & Reynolds, J. (2024). Unconventional Work, Conventional Problems: Gig Microtask Work, Inequality, and the Flexibility Mystique. *The Sociological Quarterly*, 65(2), 246–268. <https://doi.org/10.1080/00380253.2023.2268679>
- Kinman, G. (2019). Work-related stress and resilience among professionals. *International Journal of Stress Management*, 26(4), 337–347.
- Lee, W., Migliaccio, G. C., Lin, K.-Y., & Seto, E. Y. W. (2020). Workforce development: Understanding task-level job demands-resources, burnout, and performance in unskilled construction workers. *Safety Science*, 123, 104577. <https://doi.org/10.1016/j.ssci.2019.104577>
- Mache, S., & von dem Knesebeck, O. (2020). Impact of flexible work arrangements on work-life balance. *Journal of Occupational and Environmental Medicine*, 62(11), 887–893.
- Makarius, E. E., & Nan, X. (2020). Artificial intelligence in the workplace: Review and future directions. *Journal of Management*, 46(2), 150–170.
- Mandalahi, S. H., Damayanti, S., Prasanti, T. A., & Maharani, A. (2024). Impact of Flexible Work Environments on Employee Performance: Mediating Roles of Stress and Work-Life Balance. *IJomata International Journal of Management*, 5(3), 1042–1061. <https://doi.org/10.61194/ijjm.v5i3.1235>
- Mohamed, S., & Mat, N. H. N. (2023). Gig Work in Post Pandemic Times: Does it an Agile Work Structure? *Journal of Entrepreneurship and Business*, 11(2), 56–68. <https://doi.org/10.17687/jeb.v11i2.1014>
- Mokshagundam, Dr. S. S., & Hattikal, Prof. N. S. (2024). Motivational Strategies for Gig Workers at Bengaluru Urban. *International Journal of Research Publication and Reviews*, 5(2), 1050–1056. <https://doi.org/10.55248/gengpi.5.0224.0436>
- Nazir, S., & Latif, A. (2024). Technology use and employee engagement in organizations. *International Journal of Academic Research in Business and Social Sciences*, 14(3), 189–200.
- Nisha Sharma. (2025). Addressing Technostress & Well -Being in Gig Economy: A Path to Economic Sustainability. *Journal of Information Systems Engineering and Management*, 10(43s), 190–206. <https://doi.org/10.52783/jisem.v10i43s.8354>
- Omar, N., & Jamil, R. (2025). A Systematic Literature Review of the Gig Economy: Insights into Worker Experiences, Policy Implications, and the Impact of Digitalization. *International Journal of Research and Innovation in Social Science*, IX(II), 2136–2156. <https://doi.org/10.47772/IJRIS.2025.9020170>

- Padeli, W., & Abd Kadir, K. (2024). THE IMPACT OF FLEXIBLE WORK ARRANGEMENTS ON SOCIAL SECURITY MANAGEMENT: A SYSTEMATIC REVIEW. *Social Security Management Journal*, 53–62. <https://doi.org/10.32890/ssmj2024.1.1.5>
- Parman, Shafar, M. U., & Putri, D. S. A. A. (2025). Balancing the Scales: The Role of Work-Life Balance and Technological Support in Enhancing Gig Worker Productivity in Indonesia. *The South East Asian Journal of Management*, 19(1). <https://doi.org/10.7454/seam.v19i1.1834>
- Pilatti, G. R., Pinheiro, F. L., & Montini, A. A. (2024). Systematic Literature Review on Gig Economy: Power Dynamics, Worker Autonomy, and the Role of Social Networks. *Administrative Sciences*, 14(10), 267. <https://doi.org/10.3390/admsci14100267>
- Pulakos, E. D., & Arslan, R. (2020). Adaptive performance in changing work environments. *Journal of Organizational Behavior*, 41(4), 297–308.
- Shang, E. (2024). Exploration of the Gig Economy Market, Challenges and Countermeasures. *Journal of Education, Humanities and Social Sciences*, 45, 706–711. <https://doi.org/10.54097/02ffc297>
- Siegrist, J. (2016). Chapter 9—Effort-Reward Imbalance Model. In G. Fink (Ed.), *Stress: Concepts, Cognition, Emotion, and Behavior* (pp. 81–86). Academic Press. <https://doi.org/10.1016/B978-0-12-800951-2.00009-1>
- Sugiyono. (2018). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Syarifuddin, Indriani, D., & Junaidin. (2025). Balancing Demands and Resources: The Role of Psychological Resilience in Driving Employee Engagement. *Global Review of Tourism and Social Sciences*, 1(2), 145–157. <https://doi.org/10.53893/grtss.v1i2.371>
- Tennakoon, T., & Dissanayake, D. (2021). Factors influencing technology adoption and employee productivity. *Journal of Human Resource Management*, 29(2), 150–165.
- Tkm Thangal, T. B., Shafie, N. I., Mohamad Yunos, N., Ab Hamid, M. H., Sidik, N., & Azman, H. A. (2022). Work Burnout: Unbalanced Job Demands and Job Resources? *International Journal of Academic Research in Business and Social Sciences*, 12(10), Pages 1386-1397. <https://doi.org/10.6007/IJARBS/v12-i10/15083>
- Tri Ongko Bayu Sadewo & Nourma Mei Shinta. (2024). A Study on Job Demands-Resources in the Public Sector. *Jurnal Organisasi Dan Manajemen*, 20(1), 97–113. <https://doi.org/10.33830/jom.v20i1.6160.2024>
- Weale, V., & Williams, J. (2022). Flexible working and employee mental health. *The Lancet Public Health*, 7(10), e806–e814.
- Wessels, C., & Thiel, J. (2021). Flexible work arrangements in hybrid work environments. *Human Relations*, 74(7), 1055–1079.
- 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. <https://doi.org/10.1177/0950017018785616>
- Ye, T., Ai, W., Chen, Y., Mei, Q., Ye, J., & Zhang, L. (2022). Virtual teams in a gig economy. *Proceedings of the National Academy of Sciences*, 119(51), e2206580119. <https://doi.org/10.1073/pnas.2206580119>