



WORKING CONDITIONS AND GIG WORKERS' PARTICIPATION: THE ROLE OF EMPLOYMENT STATUS AND LITERACY

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Abstract

This study examines how working conditions influence gig workers' participation in employment social security programs. Using a quantitative explanatory survey, it analyzes the effects of income level, working hours, and order stability on participation, with employment relationship status as a mediating variable and financial literacy and social security literacy as moderating variables. Data were collected from 300 gig workers engaged in ride-hailing, food delivery, and logistics platforms through purposive sampling. Structural Equation Modeling–Partial Least Squares (SEM-PLS) was used to test direct, indirect, and moderating effects simultaneously. The findings show that income, working hours, and order stability significantly affect employment relationship status, which in turn positively influences social security participation. Financial literacy strengthens this relationship, whereas social security literacy does not show a moderating effect. Overall, the results highlight the importance of employment clarity and financial capability in expanding gig workers' social protection inclusion.

Keywords: gig workers; employment relationship status; social security participation; financial literacy; working conditions

Article Info

History of Article
Received: 23/12/2025
Revised: 12/1/2026
Accepted: 16/1/2026
Published: 16/2/2026

Jurnal Riset Bisnis dan Manajemen
Volume 19, No. 1, February 2026,
Page 1-16
ISSN 1979-0600 (Print)
ISSN 2580-9539 (Online)

INTRODUCTION

The rapid expansion of the digital economy in Southeast Asia (ASEAN) has significantly accelerated the growth of platform-based work, referring to labor activities mediated by digital platforms that algorithmically match workers with clients or tasks. From the perspective of labor market segmentation theory, platform-based gig work tends to be positioned within the secondary labor market, characterized by low employment security, limited career mobility, and weak access to social protection. Gig work in this study is understood as short-term, task-based income-generating activities performed by independent workers, while platform labor emphasizes the governance role of digital platforms in organizing and controlling work processes. Crowdwork, as a sub-type of platform labor, involves online tasks that can be performed remotely without geographical constraints (Berg et al., 2018; ILO, 2021; OECD/ILO/EC, 2023). This study focuses on location-based and service-oriented gig work, including ride-hailing, food and logistics delivery, and selected online freelance activities.

In ASEAN countries such as Indonesia, the Philippines, Malaysia, Thailand, Vietnam, and Singapore, digital labor platforms have become a major source of income for a substantial segment of the workforce. Drawing on institutional theory, the rapid diffusion of platform-based work has outpaced the adaptation of labor regulations and social security institutions, resulting in ambiguous employment relationships. According to the ILO (2021), digital labor platforms engage tens of millions of workers globally, with Southeast Asia representing one of the fastest-growing regions. The World Bank (2023) further notes that platform work has expanded particularly within urban informal labor markets due to flexible working hours, low entry barriers, and simplified registration processes, reinforcing the blurred boundaries between formal and informal employment.

Despite its employment-generating potential, the expansion of the gig economy has intensified concerns related to precarious employment and disguised employment relationships, where workers perform economically dependent labor without being formally recognized as employees. Empirical evidence indicates that a large proportion of platform workers remain excluded from employment-based social security systems (ILO, 2021; World Bank, 2023; OECD, 2023). This institutional gap contributes to heightened social and economic vulnerability among gig workers, reflecting a broader mismatch between labor market transformation and the design of social protection systems. Consequently, the sustainability and inclusiveness of digital labor markets in developing ASEAN economies remain contingent upon clearer employment classification and stronger institutional integration of gig workers into social protection frameworks.

Recent studies identify income uncertainty as a core source of precarity in platform-based employment, yet the magnitude of income volatility varies across countries depending on platform regulation and social security regimes. Empirical evidence indicates that gig workers' earnings fluctuate substantially due to demand volatility, incentive-based pay, and customer rating systems. For instance, survey data reported by the ILO (2021) show that in Indonesia and the Philippines, more than 60 percent of ride-hailing and delivery workers experience weekly income fluctuations exceeding 30 percent, whereas comparable figures are lower in countries with stronger earnings guarantees or minimum pay regulations, such as parts of the European Union. In developing economies, platform income is often concentrated during peak hours and promotional periods, resulting in unstable monthly earnings that limit workers' ability to make regular social security contributions. The World Bank (2023) estimates that fewer than one-third of platform workers in Southeast Asia contribute consistently to national social security schemes, highlighting the direct link between income volatility and low participation rates.

The impact of algorithmic management on gig workers' vulnerability also varies across institutional contexts. In countries with limited platform oversight, such as Indonesia and India, opaque algorithms govern task allocation, performance evaluation, and access to future work, creating high economic dependence on platforms. Evidence from Fairwork assessments (2020–2024) indicates that platform workers in Southeast Asia frequently extend their working hours beyond 10–12 hours per day to secure sufficient earnings under algorithm-driven incentive structures. By contrast, countries that impose transparency or working-time safeguards on platforms exhibit lower levels of work intensification. These cross-country differences suggest that algorithmic control interacts with national regulatory frameworks to shape the intensity of precarity experienced by gig workers.

Employment relationship status constitutes a central institutional mechanism translating working conditions into social protection exclusion, yet its consequences differ across national social security systems. In most developing countries, platforms classify gig workers as independent contractors, excluding them from employer-sponsored social insurance. In Indonesia and India, this classification obliges workers to self-enroll and fully finance contributions, resulting in coverage rates below 20 percent among platform workers (ILO, 2021; World Bank, 2023). In contrast, countries that allow partial inclusion of platform workers into employment-based schemes or mandate platform contributions report substantially higher coverage. This evidence demonstrates that ambiguous employment status, combined with weak institutional integration, amplifies protection gaps and reinforces precarity in developing-country gig economies.

Beyond institutional arrangements, individual capabilities moderate how gig workers navigate income volatility and social protection systems. Financial literacy influences workers' capacity to smooth volatile earnings and prioritize risk protection, while social security literacy shapes awareness of eligibility,

contribution requirements, and benefit entitlements. Empirical studies indicate that even within the same regulatory context, workers with higher financial literacy are significantly more likely to participate in voluntary social insurance schemes, suggesting that individual-level capabilities interact with institutional constraints rather than substituting for them (OECD/ILO/EC, 2023).

Evidence from the broader behavioral finance literature further supports the role of financial literacy in shaping financial behavior and long-term decision-making. Studies focusing on individual and Generation Z populations consistently show that financial literacy, financial attitudes, and financial efficacy significantly influence financial management behavior, saving habits, and investment decisions (Sukma & Pradana, 2022; Pangestika & Rusliati, 2019; Hidayat & Hermawan, 2025; Imro'ah & Safitri, 2024). Although these studies are primarily situated in student and personal finance contexts, they provide an important behavioral foundation for understanding how financial literacy operates as a capability that conditions economic decision-making under uncertainty. In the context of gig work, similar behavioral mechanisms are likely to shape how workers evaluate the relevance of contribution-based social security schemes when facing income volatility and weak institutional attachment.

Evidence from business and entrepreneurship research further suggests that individual competencies play a critical role in shaping economic decision-making under uncertainty. Studies in the Indonesian context indicate that entrepreneurial competencies influence individuals' ability to manage risk, evaluate long-term outcomes, and sustain economic engagement (Yuldinawati & Yellianty, 2024). Although situated in a business performance context, this literature reinforces the argument that individual-level capabilities condition how actors respond to income instability and institutional constraints.

In the Indonesian context, this study focuses on Employment Injury Insurance (Jaminan Kecelakaan Kerja/JKK) and Death Benefits (Jaminan Kematian/JKM) as core employment social security programs regulated under Government Regulation No. 44 of 2015. These schemes are selected because, unlike long-term savings-based programs such as Old-Age Security (Jaminan Hari Tua/JHT) or health insurance schemes such as National Health Insurance (JKN), JKK and JKM are directly linked to work-related risks and employment attachment. For gig workers engaged in high-risk, location-based activities such as ride-hailing and delivery services, JKK and JKM represent the most immediate and relevant forms of labor protection. Moreover, these programs are explicitly designed to accommodate non-wage and informal workers through voluntary enrollment mechanisms, making them analytically suitable for examining participation behavior among platform-based gig workers with ambiguous employment status.

Although Indonesian regulations do not explicitly define formal literacy thresholds for participation in JKK and JKM, these programs entail de facto minimum financial and social security literacy requirements. Participation requires workers to independently register, select contribution categories, make regular payments, understand eligibility criteria, and navigate administrative claim procedures particularly for non-wage and platform workers who are not automatically enrolled by employers. In practice, these procedural and informational demands create implicit literacy barriers, whereby limited understanding of contribution mechanisms and benefit entitlements reduces effective access to social protection. For gig workers facing irregular income streams and uncertain employment relationships, insufficient financial and social security literacy therefore translates into non-enrollment or intermittent participation, despite the formal availability of protection schemes.

Empirical evidence supports the relevance of literacy-related constraints in voluntary social security participation. The World Bank (2023) identifies low awareness of benefit entitlements and limited understanding of contribution mechanisms as major barriers to enrollment among gig and informal workers in developing economies. Complementing this perspective, qualitative findings by Au-Yeung et al. (2024) show that platform workers with higher social protection awareness demonstrate stronger intentions to obtain insurance coverage; however, actual participation remains constrained by financial capacity and administrative complexity. These findings indicate that literacy-related factors do not operate as independent determinants but rather condition how employment relationship status and income conditions translate into social security participation.

Despite the growing literature on platform workers' social protection, existing studies remain theoretically and empirically fragmented. Prior research tends to examine working conditions such as income volatility and working hours, employment status classification and legal access to protection, or individual literacy factors in isolation. Limited attention has been given to the indirect pathways through which working conditions influence social security participation via employment relationship status, as well as to the moderating role of financial and social security literacy in this relationship. As Gundert (2024) argues, quantitative approaches such as Structural Equation Modeling (SEM) are particularly suited to capturing these interrelated mechanisms. However, SEM-based studies that simultaneously test mediation and moderation effects in the context of gig workers' social security participation especially in developing ASEAN economies remain scarce, thereby motivating the present study.

Against this backdrop, the present study seeks to address this research gap by developing an integrated empirical model that examines the effects of income level, working hours, and order stability on gig workers' participation in employment social security programs. The model explicitly incorporates employment relationship status as a mediating variable, while financial literacy and social security literacy are positioned as moderating variables. By adopting a Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach, this study is able to simultaneously assess direct, indirect, and interaction effects within a single analytical framework.

The novelty of this study lies in the explicit development and empirical testing of an integrated causal model that links working conditions, employment relationship status, and individual literacy-related capabilities to gig workers' participation in employment social security programs. Rather than treating these factors as isolated determinants, this study models their interrelationships within a unified mediation–moderation framework, an approach that remains rare in the literature on platform-based work, particularly in developing economies.

This study contributes to the literature in three key ways. First, it reconceptualizes employment relationship status as a dynamic mediating mechanism through which working conditions namely income level, working hours, and order stability indirectly shape social security participation. This moves beyond prior research that has predominantly treated employment status as a fixed legal classification or a control variable. Second, the study empirically distinguishes between financial literacy and social security literacy as conceptually and functionally distinct moderating capabilities, demonstrating that they operate through different behavioral channels in influencing participation outcomes. Third, it provides systematic quantitative evidence from developing ASEAN economies, where platform work expansion coincides with high informality and persistent social protection gaps.

From a theoretical perspective, employment relationship status serves as a central transmission mechanism linking structural working conditions to social security participation. In platform-based work, working conditions do not directly translate into participation decisions; instead, they shape workers' perceptions of job continuity, dependency, and institutional attachment to the platform. When income flows are sustained, working hours are intensive, and access to tasks is predictable, gig workers increasingly perceive their relationship with the platform as resembling *de facto* employment, even in the absence of formal employee status. This perceived attachment heightens awareness of long-term risk exposure and increases the perceived relevance of employment-based social protection.

Conversely, unstable working conditions weaken perceived employment attachment and reduce incentives to commit to regular social security contributions. In this sense, employment relationship status mediates the effects of working conditions by translating objective labor market characteristics into subjective employment attachment, which ultimately shapes participation behavior. Building on this mediation logic, the study further argues that individual literacy-related capabilities condition this transmission process. Financial literacy enhances workers' ability to manage income volatility and evaluate long-term risk, thereby strengthening the effect of perceived employment attachment on participation, while social security literacy primarily improves awareness without necessarily alleviating financial constraints. Accordingly, the study tests an integrated set of mediation and moderation hypotheses within a single causal framework of gig workers' social security participatio.

METHOD

This study employed an empirical quantitative approach using an explanatory survey design to examine theoretically driven causal relationships among working conditions, employment relationship status, financial literacy, social security literacy, and gig workers' participation in employment social security programs. Given the cross-sectional nature of the survey, the causal relationships tested in this study should be understood as theoretically grounded and statistically inferred within a causal framework, rather than as definitive evidence of temporal causation. The explanatory design was therefore selected to assess direct effects, indirect effects through mediation, and interaction effects through moderation within a single structural model, consistent with established applications of PLS-SEM in social and behavioral research (Hair et al., 2022).

The population in this study consisted of gig workers operating on application-based digital platforms in Indonesia, which is treated as a representative case of developing ASEAN economies characterized by rapid platform work expansion and limited social protection coverage. The study focused on workers engaged in ride-hailing, food delivery, logistics services, and other platform-mediated activities. A non-probability sampling method with purposive sampling technique was applied to ensure the relevance of respondents to the research objectives. The inclusion criteria were: (1) active registration as a gig worker on a digital platform, (2) a minimum of three months of platform work experience, (3) receipt of at least one work order within the last seven days, and (4) willingness to complete the survey questionnaire.

Primary data were collected through an online self-administered survey distributed to gig workers via digital communication channels and platform-related communities in Indonesia. Following the 10-times rule for Partial Least Squares Structural Equation Modeling (PLS-SEM), and considering the presence of mediation and moderation constructs, a target sample size of 300 respondents was deemed sufficient to achieve stable parameter estimates and adequate statistical power (Hair et al., 2019; Kock & Hadaya, 2018).

The research instrument was a structured questionnaire developed based on established literature and prior empirical studies. Working conditions were measured using indicators of income level, working hours, and order stability adapted from Berg (2016) and Eurofound (2019). Employment relationship status reflected the degree of employment clarity and perceived contractual positioning (Behrendt et al., 2019). Financial literacy and social security literacy items were adapted from OECD/ILO/EC (2023) and World Bank (2023), while participation in employment social security focused on enrollment and contribution behavior related to employment injury and death benefit schemes. All constructs were measured using Likert-scale items, and content validity was assessed through expert review.

Data analysis in this research was conducted using Structural Equation Modeling–Partial Least Squares (SEM-PLS). SEM-PLS was selected due to its suitability for predictive and explanatory research, its robustness to non-normal data distributions, and its ability to handle complex models involving mediation and moderation simultaneously (Hair et al., 2022; Sarstedt et al., 2021). The analysis followed a two-stage approach, comprising assessment of the measurement model (reliability and validity) and evaluation of the structural model (path coefficients, mediation, and moderation effects).

RESULTS

The respondents consisted of gig workers from various age groups, genders, types of platform-based work, and lengths of work experience. The sample reflects the heterogeneity of the gig economy, covering online transportation workers, digital freelancers, content creators, and other service-based occupations as shown at Table 1.

Table 1. Profil of Respondents

Characteristic	Category	f (n)	%
Age	< 20 years	6	2.0
	21–30 years	96	32.0
	31–40 years	120	40.0
	41–50 years	54	18.0
	> 50 years	24	8.0
Gender	Male	210	70.0
	Female	90	30.0
Type of Gig Work	Online Transportation	195	65.0
	Content Creator / Influencer	48	16.0
	Digital Freelance	27	9.0
	E-Commerce / Merchant	12	4.0
	Household & Daily Services	9	3.0
	Accommodation Provider	3	1.0
	Others	6	2.0
Length of Work Experience	< 6 months	18	6.0
	6 months – 1 year	42	14.0
	1 – 3 years	90	30.0
	> 3 years	150	50.0
Total Respondents		300	100.0

Based on the simulated respondent profile (N = 300), the majority of respondents were aged between 31 and 40 years, followed by those aged 21–30 years, indicating that the sample was dominated by individuals in their productive working age. Most respondents were male, reflecting the gender composition commonly observed in platform-based work, particularly in online transportation services. In terms of occupation, online transportation workers constituted the largest proportion of the sample, followed by content creators and digital freelancers, highlighting the diversity of gig work activities. Regarding work experience, more than half of the respondents had been engaged in gig work for over three years, suggesting a relatively high level of familiarity and long-term involvement in platform-based employment.

Table 2. Statistics Descriptive of Research Variables

Variable	Mean Range	Revised Implication (Descriptive)
Employment Relationship Status	3.50 – 4.20	Reflects respondents' reported perceptions regarding the continuity and stability of their relationship with the platform, without implying formal employment classification.
Working Hours	3.60 – 4.40	Describes relatively high levels of reported working time and engagement intensity in platform-based activities.
Income Level	3.20 – 4.00	Reflects respondents' self-assessed income adequacy, with variations across individuals and time periods.
Order Stability	3.30 – 4.10	Indicates respondents' perceived consistency in receiving work orders over time.
Financial Literacy	3.70 – 4.50	Describes respondents' self-reported ability to manage income, plan expenses, and make financial decisions.
Social Security Literacy	3.10 – 3.90	Reflects respondents' reported level of understanding of employment social security programs, including benefits and procedures.
Gig Workers' Participation	3.40 – 4.20	Describes the reported level of engagement in work-related and protection-related activities among respondents.

The descriptive statistics presented in Table 2 reveal several noteworthy patterns relevant to the proposed research framework. Overall, the mean values across variables fall within moderate to relatively high ranges, indicating substantial variation in gig workers' reported working conditions, perceived employment relationship status, and individual capabilities.

Among the working condition variables, working hours and order stability exhibit relatively higher mean ranges compared to income level, suggesting that work intensity and access to tasks are more consistently reported than income adequacy. This pattern is particularly relevant for hypotheses H1–H3, which posit that different dimensions of working conditions may influence participation through perceived employment relationship status.

In addition, financial literacy shows the highest mean range among individual-level variables, whereas social security literacy exhibits comparatively lower mean values. This contrast highlights potential heterogeneity in individual capabilities, which is central to the moderation hypotheses (H5–H6). Finally, the moderate-to-high mean range observed for gig workers' participation indicates variation in engagement levels that warrants further examination through the structural model analysis rather than descriptive inference alone. Table 3 show the result of outer model test.

Table 3. Outer Model Test

Construct	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability	AVE
Employment Relationship Status	ERS1	0,951	0,933	0,950	0,791
	ERS2	0,882			
	ERS3	0,884			
	ERS4	0,878			
	ERS5	0,848			
Working Hours	WH1	0,940	0,925	0,944	0,771
	WH2	0,820			
	WH3	0,882			
	WH4	0,882			
	WH5	0,862			
Income Level	IL1	0,956	0,930	0,947	0,783
	IL2	0,862			
	IL3	0,876			
	IL4	0,831			
	IL5	0,895			
Order Stability	OS1	0,954	0,932	0,949	0,788
	OS2	0,878			
	OS3	0,863			
	OS4	0,873			
	OS5	0,868			
Financial Literacy	FL1	0,953	0,943	0,957	0,815
	FL2	0,879			
	FL3	0,886			
	FL4	0,889			
	FL5	0,904			
Social Security Literacy	SSL1	0,968	0,953	0,964	0,842
	SSL2	0,907			
	SSL3	0,892			
	SSL4	0,910			
	SSL5	0,908			
Gig Workers' Participation	GWP1	0,959	0,944	0,957	0,818
	GWP2	0,884			
	GWP3	0,901			
	GWP4	0,880			
	GWP5	0,894			

As presented in Table 4, the measurement model demonstrates satisfactory convergent validity and reliability. All indicators exhibit outer loading values above the recommended threshold of 0.70, indicating strong indicator reliability. In addition, Cronbach's Alpha and Composite Reliability values for all constructs exceed 0.70, confirming high internal consistency. The Average Variance Extracted (AVE) values are also above 0.50 for all constructs, suggesting that each latent variable explains more than half of the variance of its indicators. However, beyond convergent validity and reliability, discriminant validity must also be assessed to ensure that each construct is empirically distinct from the others. Therefore, Table 4 reports the results of discriminant validity testing to confirm the adequacy of the measurement model.

Table 4. HTMT (Discriminant validity)

	ERS	FL	GWP	IL	OS	SSL	WH	SSL x ERS	FL x ERS
ERS									
FL	0,160								
GWP	0,215	0,406							
IL	0,842	0,110	0,126						
OS	0,803	0,125	0,091	0,704					
SSL	0,192	0,279	0,286	0,089	0,128				
WH	0,866	0,168	0,159	0,708	0,713	0,148			
SSL x ERS	0,084	0,104	0,108	0,062	0,037	0,133	0,069		
FL x ERS	0,082	0,090	0,172	0,053	0,047	0,102	0,067	0,287	

Discriminant validity was assessed using the Heterotrait–Monotrait ratio (HTMT), as presented in Table 4. The results indicate that all HTMT values are below the recommended threshold of 0.90, with most values also below the more conservative criterion of 0.85. This finding confirms that each construct is empirically distinct and captures a unique concept within the model. Therefore, the discriminant validity requirement of the measurement model is satisfactorily met, supporting the adequacy of the constructs for subsequent structural model analysis (Henseler et al., 2015; Hair et al., 2019).

After completing all assessments of the outer model, the analysis proceeded to the evaluation of the inner model. The first step in the inner model assessment focused on examining the model’s goodness of fit (GoF) to determine the overall explanatory and predictive capability of the structural model. This evaluation provides an initial indication of whether the proposed relationships among constructs are adequately supported by the data before further analysis of direct, indirect, and moderating effects is conducted. Table 5 show the goodness of fit model of SEM PLS model in this research.

Table 5. Goodness of fit model

Endogenous Construct	R Square	Q Square	srmr
Employment Relationship Status	0.791	0.623	0.043
Gig Workers’ Participation	0.209	0.165	

The evaluation of goodness of fit model on Table 5 indicates satisfactory explanatory power, predictive relevance, and overall model fit. The R² value of 0.791 for employment relationship status demonstrates substantial explanatory power, indicating that income level, working hours, and order stability jointly explain a large proportion of variance in this construct. Meanwhile, gig workers’ participation shows a moderate R² value of 0.209, which is acceptable in social and behavioral research contexts where participation behavior is influenced by multiple factors. The Q² values for both endogenous constructs exceed zero (0.165 and 0.623), confirming strong predictive relevance of the model. In addition, the SRMR value of 0.043 is well below the recommended threshold of 0.08, indicating a good overall model fit and supporting the adequacy of the proposed structural relationships.

Table 6. Colinearity Diagnostics

	VIF	Multicollinearity Issue
ERS → GWP	1.052	No Multicollinearity Issue
FL → GWP	1.096	No Multicollinearity Issue
IL → ERS	2.095	No Multicollinearity Issue
OS → ERS	2.127	No Multicollinearity Issue
SSL → GWP	1.114	No Multicollinearity Issue
WH → ERS	2.123	No Multicollinearity Issue
SSL x ERS → GWP	1.107	No Multicollinearity Issue
FL x ERS → GWP	1.099	No Multicollinearity Issue

As shown in Table 6, the collinearity diagnostics indicate that all predictor variables have variance inflation factor (VIF) values well below the recommended threshold of 3.3, suggesting the absence of multicollinearity issues in the structural model. Specifically, the VIF values for predictors of gig workers’

participation including employment relationship status, financial literacy, social security literacy, and their interaction terms range from 1.052 to 2.127, indicating low collinearity. Similarly, working hours, income level, and order stability, which predict employment relationship status, exhibit VIF values below 2.2. These results confirm that the estimated path coefficients are not distorted by multicollinearity and that the structural relationships can be interpreted reliably.

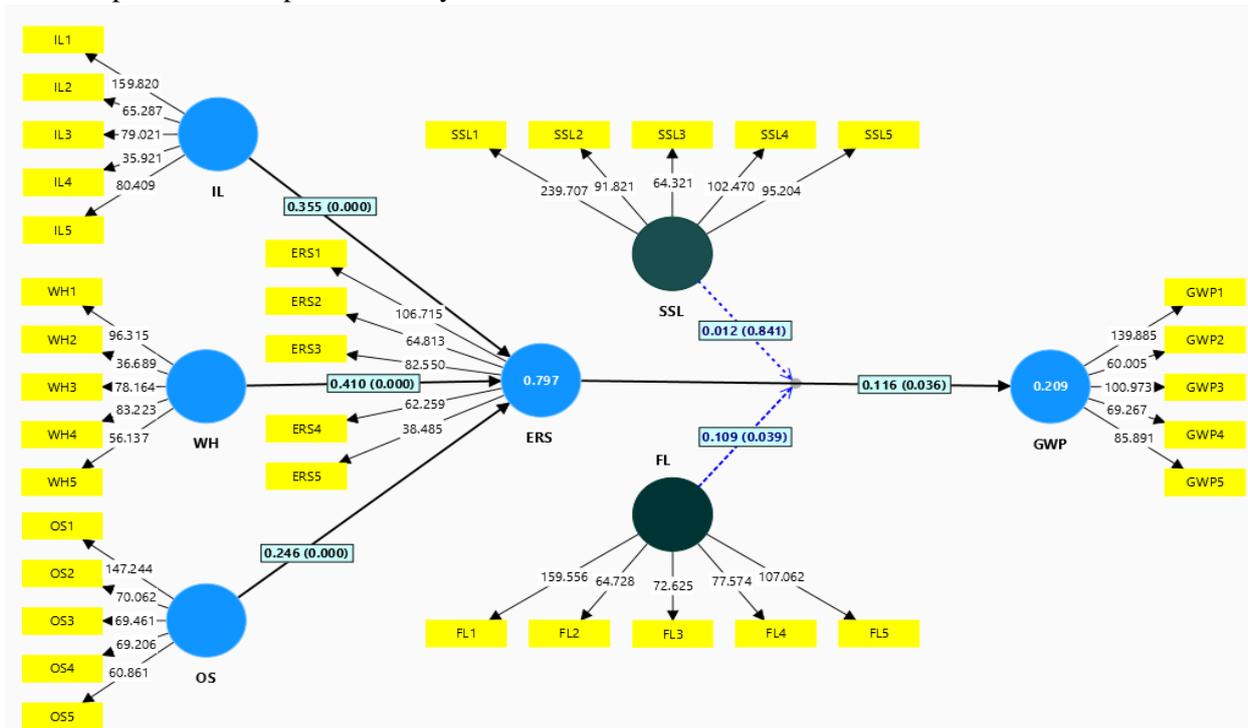


Figure 1. Structural Model Results of Gig Workers' Participation in Employment Social Security Using SEM-PLS (solid lines : direct effect; dashes line : moderation effect)

After confirming the absence of multicollinearity issues, the analysis proceeded to the inner model assessment. Figure 2 presents the results of the SEM-PLS structural model estimation based on a bootstrapping procedure with 5,000 subsamples, illustrating the magnitude and significance of the hypothesized relationships among constructs. This approach ensures robust statistical inference and allows for reliable evaluation of direct, indirect, and moderating effects within the proposed research model.

Figure 1 shows that not all hypothesized paths in the structural model are statistically significant. While several key relationships exhibit significant path coefficients, some paths do not reach the required significance level, indicating that certain proposed effects are not empirically supported. To provide a more detailed and comprehensive explanation of these findings, Table 7 presents the complete results of the path coefficient analysis, including effect sizes, t-values, and significance levels for each relationship.

Table 7. Result of Direct Effect Test

No	Relationship	Results	Conclusion
1	Employment Relationship Status → Gig Workers' Participation	$\beta = 0.116$; $t = 2.103$; $p = 0.036$	Significant
2	Working Hours → Employment Relationship Status	$\beta = 0.410$; $t = 9.659$; $p = 0.000$	Significant
3	Income Level → Employment Relationship Status	$\beta = 0.355$; $t = 9.949$; $p = 0.000$	Significant
4	Order Stability → Employment Relationship Status	$\beta = 0.246$; $t = 6.079$; $p = 0.000$	Significant

The direct effect test results indicate that Employment Relationship Status has a positive and significant effect on Gig Workers' Participation ($\beta = 0.116$; $t = 2.103$; $p = 0.036$), suggesting that clearer and stronger perceived employment relationships are associated with higher participation in employment social security programs. In addition, all working condition variables significantly influence Employment Relationship Status. Working Hours exhibit the strongest effect ($\beta = 0.410$; $t = 9.659$; $p < 0.001$), followed by Income Level ($\beta = 0.355$; $t = 9.949$; $p < 0.001$) and Order Stability ($\beta = 0.246$; $t = 6.079$; $p < 0.001$). These findings confirm that work intensity, income adequacy, and task stability play a crucial role in shaping gig workers' perceptions of their employment relationship, which in turn supports greater engagement with social security participation.

Table 8. Result of Indirect Effect Test

No	Relationship	Results	Conclusion
1	Income Level → Employment Relationship Status → Participation	$\beta = 0.041$; $t = 2.091$; $p = 0.037$	Significant (Partial Mediation)
2	Working Hours → Employment Relationship Status → Participation	$\beta = 0.048$; $t = 2.007$; $p = 0.045$	Significant (Partial Mediation)
3	Order Stability → Employment Relationship Status → Participation	$\beta = 0.029$; $t = 1.972$; $p = 0.049$	Significant (Partial Mediation)

The results of the indirect effect analysis demonstrate that Employment Relationship Status partially mediates the relationship between working conditions and Gig Workers' Participation in employment social security programs. Specifically, Income Level exerts a significant indirect effect on participation through employment relationship status ($\beta = 0.041$; $t = 2.091$; $p = 0.037$). Similarly, Working Hours ($\beta = 0.048$; $t = 2.007$; $p = 0.045$) and Order Stability ($\beta = 0.029$; $t = 1.972$; $p = 0.049$) also show significant indirect effects. These findings indicate that working conditions do not influence participation directly alone but operate partly through the formation of clearer and more sustained perceived employment relationships, thereby reinforcing gig workers' engagement with social security schemes.

Table 9. Result of Moderation Effect Test

No	Relationship	Results (β ; t-value; p-value)	Conclusion
1	Financial Literacy × Employment Relationship Status → Participation	$\beta = 0.109$; $t = 2.061$; $p = 0.039$	Significant
2	Social Security Literacy × Employment Relationship Status → Participation	$\beta = 0.023$; $t = 0.201$; $p = 0.841$	Not Significant

The moderating effect analysis reveals that Financial Literacy significantly strengthens the relationship between Employment Relationship Status and Gig Workers' Participation in employment social security programs ($\beta = 0.109$; $t = 2.061$; $p = 0.039$). This finding indicates that gig workers with higher levels of financial literacy are better able to translate clearer employment relationships into actual participation decisions, as they possess greater capacity to manage income volatility and evaluate long-term financial risks. In contrast, Social Security Literacy does not exhibit a significant moderating effect on the relationship between employment relationship status and participation ($\beta = 0.023$; $t = 0.201$; $p = 0.841$), suggesting that procedural awareness alone is insufficient to influence participation behavior in the absence of adequate financial capability. The simple slope analysis shows that the positive effect of employment relationship status on participation is stronger at higher levels of financial literacy and remains flat across different levels of social security literacy.

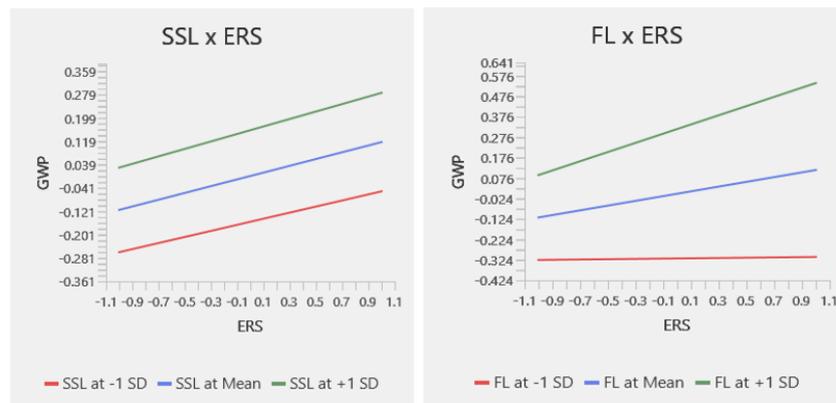


Figure 2. Simple Slope Analysis of Financial Literacy and Social Security Literacy as Moderators in the Relationship Between Employment Relationship Status and Gig Workers' Participation

Overall, these results highlight the differentiated roles of literacy-related capabilities in shaping gig workers' participation behavior. While financial literacy enhances the behavioral translation of perceived employment attachment into sustained social security participation, social security literacy appears to play a more overall, the results demonstrate the differentiated roles of literacy-related capabilities in shaping gig workers' participation in employment social security programs. Financial literacy significantly amplifies the effect of employment relationship status on participation, indicating that gig workers with higher financial literacy are better able to translate perceived employment attachment into sustained participation decisions. In contrast, social security literacy does not exhibit a meaningful moderating effect, as variations in employment relationship status are associated with only marginal and statistically insignificant changes in participation across different levels of social security literacy. The simple slope analysis on Figure 2 shows that the positive association between employment relationship status and participation becomes substantially steeper at higher levels of financial literacy, while the slopes for social security literacy remain relatively flat, confirming the absence of a significant moderating effect.

Based on the SEM-PLS results, five hypotheses are supported, while one hypothesis is rejected, as shown in Table 10. The indirect effect analysis confirms that income level (H1), working hours (H2), and order stability (H3) have significant effects on gig workers' participation through employment relationship status, indicating partial mediation. Furthermore, employment relationship status is confirmed as a mediating mechanism linking working conditions to participation (H4). The moderation analysis shows that financial literacy significantly moderates the relationship between employment relationship status and participation (H5), whereas social security literacy does not demonstrate a significant moderating effect (H6). These findings underscore the central role of employment relationship status as a transmission mechanism and highlight financial literacy as a key capability shaping gig workers' participation in employment social security programs.

Table 10. Result of Hypothesis Testing

No	Hypothesis	Results	Conclusion
H1	Income level has a significant effect on gig workers' participation through employment relationship status	Indirect effect: $\beta = 0.041$; $t = 2.091$; $p = 0.037$	Supported (Partial Mediation)
H2	Working hours have a significant effect on gig workers' participation through employment relationship status	Indirect effect: $\beta = 0.048$; $t = 2.091$; $p = 0.037$	Supported (Partial Mediation)
H3	Order stability has a significant effect on gig workers' participation through employment relationship status	Indirect effect: $\beta = 0.028$; $t = 1,972$; $p = 0.045$	Supported (Partial Mediation)
H4	Employment relationship status mediates the effects of income level, working hours, and order stability on participation	Mediation confirmed ($p < 0.05$)	Supported
H5	Financial literacy moderates the relationship between employment relationship status and participation	$\beta = 0.109$; $t = 2.061$; $p = 0.039$	Supported
H6	Social security literacy moderates the relationship between employment relationship status and participation	$\beta = 0.012$; $t = 0.201$; $p = 0.841$	Not Supported

DISCUSSION

This study provides empirical evidence on the mechanisms through which working conditions shape gig workers' participation by integrating structural, institutional, and individual-level factors within a single explanatory model. The central finding that income level, working hours, and order stability influence participation primarily through employment relationship status can be theoretically interpreted through a reinterpretation of labor market segmentation theory, rather than a direct application of its original formal–informal dichotomy. Classical segmentation theory, as developed by Doeringer and Piore (1971), conceptualizes labor markets as divided into primary and secondary segments distinguished by stability, security, and institutional attachment. While originally formulated in the context of standard employment relationships, its core logic remains relevant for understanding contemporary non-standard work arrangements.

In the context of platform-based work, segmentation does not operate strictly through formal employment contracts but through economic dependence, work continuity, and platform-mediated control. Gig workers who are formally positioned within the secondary segment may nonetheless exhibit characteristics associated with primary employment when working conditions generate sustained income flows, intensive work engagement, and predictable access to tasks. From this perspective, employment relationship status functions not merely as a legal classification but as an institutionalized perception of labor attachment, reflecting workers' subjective assessment of continuity, dependency, and long-term engagement with the platform.

Accordingly, employment relationship status mediates the relationship between working conditions and participation behavior by translating objective labor market characteristics into perceived institutional attachment. Higher income adequacy, extended working hours, and order stability strengthen perceptions of job continuity and platform dependence, effectively shifting workers' position along a segmentation continuum defined by economic security and institutional embeddedness. This finding aligns with contemporary extensions of segmentation theory, which emphasize that labor market stratification is increasingly shaped by organizational control mechanisms and economic dependency rather than formal contractual status alone (Berg, 2016; Wood et al., 2021).

The mediating role of employment relationship status can be further explained through psychological and institutional mechanisms. Psychologically, sustained engagement with a platform fosters a sense of attachment, perceived obligation, and expectations of reciprocity, whereby workers view participation in employment social security as relevant to protecting an ongoing work relationship. Institutionally, perceived employment attachment increases the salience of work-related risks and future income security, making social protection mechanisms more meaningful despite the absence of formal employee status. In this sense, employment relationship status operates as a cognitive and institutional bridge that translates objective working conditions into participation decisions.

These findings extend prior qualitative research by demonstrating quantitatively that employment relationship status acts as a transmission mechanism, rather than a background condition, through which working conditions influence participation. This mechanism has often remained implicit in earlier studies that examined income volatility, working hours, or legal employment classification in isolation. By empirically modeling this pathway, the present study provides stronger theoretical and empirical grounding for understanding how structural precarity is internalized by workers and converted into behavioral outcomes.

Importantly, the relevance of this mediation mechanism is particularly pronounced in developing ASEAN economies, where labor markets are characterized by high levels of informality and social protection systems remain closely tied to employment status. In countries such as Indonesia and the Philippines, access to employment social security typically depends on self-enrollment and regular contributions by workers who lack formal employee recognition. Under these conditions, perceived employment attachment becomes a critical determinant of whether gig workers view social security participation as necessary or feasible. The findings thus highlight how employment relationship status serves as an institutional substitute for formal contracts in shaping protection-related behavior in highly informalized labor markets.

Overall, by embedding the empirical results within labor market segmentation theory and explicating the psychological and institutional mechanisms underlying mediation, this study advances theoretical understanding of gig work participation beyond descriptive accounts. It demonstrates that gig workers'

engagement with social protection systems is not solely a function of individual choice or legal classification, but is structurally embedded in evolving employment relationships shaped by platform-based work arrangements in developing ASEAN contexts.

Similarly, working hours emerge as a significant indicator of de facto subordination. While flexibility is often promoted as a defining feature of gig work, the results suggest that extended and intensive working hours reflect growing dependence on platform-mediated labor. This supports the argument that algorithmic management subtly transforms flexibility into work intensification (Eurofound, 2019; Jarrahi, 2021). Longer working hours, therefore, signal a deeper structural integration into the platform's labor process, reinforcing perceived employment ties.

Order stability also plays a critical role in reducing perceived labor market uncertainty. Stable access to orders provides short- and medium-term income predictability, enabling workers to organize their labor supply and financial planning more effectively. In contrast to algorithm-driven volatility that exacerbates precarity (Leschke & Scheele, 2024), consistent order flows foster a sense of job continuity, further strengthening perceived employment status. These findings confirm that working conditions actively shape how gig workers interpret their relationship with platforms, rather than merely reflecting external labor market circumstances.

The study also finds that employment relationship status has a direct and positive effect on gig workers' participation. Workers who perceive their relationship with the platform as more structured and continuous are more likely to demonstrate sustained engagement, compliance with platform rules, and long-term participation.

This result is consistent with institutional and behavioral labor theories suggesting that clarity and stability of employment relationships enhance worker commitment (ILO, 2021). Conversely, ambiguous or temporary work arrangements tend to produce opportunistic participation patterns, characterized by low attachment and high turnover. The findings thus reinforce the argument that employment ambiguity is a central factor undermining stable participation in platform work arrangements.

Beyond structural and institutional determinants, this study offers novel insights into the moderating role of individual capabilities. Financial literacy significantly moderates the relationship between employment status and participation. Gig workers with higher financial literacy exhibit greater resilience in managing income volatility and making long-term economic decisions, thereby reducing their reliance on formal employment clarity.

This finding extends prior research by positioning financial literacy as an adaptive capability rather than merely a background characteristic. In line with Lusardi and Mitchell (2014) and Kolev and Robalino (2022), financially literate workers are better equipped to smooth consumption, allocate resources for protection, and sustain participation even under uncertain employment conditions. In the context of the gig economy, financial literacy functions as a form of individual-level risk management that partially compensates for institutional deficiencies.

In contrast, social security literacy demonstrates a weaker yet meaningful moderating effect. Gig workers with higher awareness of social protection systems appear less dependent on employment status clarity when deciding to participate. This suggests that social security literacy may act as a substitute institutional mechanism, enabling workers to navigate protection options independently of platform-provided employment status.

Consistent with OECD/ILO/EC (2023) and World Bank (2023), awareness of rights, benefits, and procedures can reduce informational barriers that often discourage social security participation among non-standard workers. However, the present findings indicate that social security literacy does not function as a statistically significant moderator in the quantitative model. Its role should therefore be interpreted as contextual and complementary, rather than as a direct behavioral driver comparable to financial literacy. In this sense, social security literacy facilitates understanding of available protection options but does not, by itself, overcome economic constraints or administrative burdens faced by gig workers.

Conceptually, social security literacy may operate as a substitutive mechanism in contexts where formal institutional support is weak or absent. That is, knowledge of rights and procedures can partially compensate for the lack of employer-provided guidance or automatic enrollment by enabling workers to navigate social

protection systems independently. Nevertheless, the effectiveness of this substitutive function remains limited when contribution affordability, income volatility, and procedural complexity persist, which helps explain its weaker empirical effect relative to financial literacy in this study.

This study contributes to the gig economy literature in several important ways. First, it integrates working conditions, employment relationship status, and individual literacy-related capabilities into a single causal framework, moving beyond fragmented analyses. Second, it empirically demonstrates a mediation–moderation structure that explains how structural precarity is translated into participation behavior through perceived employment attachment. Third, it differentiates the functional roles of financial literacy and social security literacy, identifying the former as an adaptive capability that directly conditions participation behavior and the latter as a complementary and partially substitutive capability whose impact is contingent on broader institutional and economic conditions.

From a policy perspective, the findings suggest that improving gig workers' participation in employment social security requires targeted and context-specific interventions. On the structural side, regulators and platform companies could introduce flexible contribution mechanisms that adjust payment amounts and timing to income volatility, thereby lowering affordability barriers. On the capability side, integrating social security literacy modules into platform onboarding processes, combined with simplified digital registration and claim procedures, could reduce informational and administrative frictions. In addition, algorithm-based contribution incentives, such as contribution matching during high-income periods or automatic micro-contributions linked to completed tasks, may encourage sustained participation without necessitating immediate legal reclassification of employment status. Together, these measures acknowledge that gig worker vulnerability is rooted not only in individual behavior but also in platform governance structures and institutional design, offering more actionable pathways for policy development in developing ASEAN economies.

CONCLUSION

This study demonstrates that gig workers' participation in employment social security is shaped by a dynamic interaction between working conditions, perceived employment relationship status, and individual capabilities. Using a mediation–moderation framework, the findings confirm that income level, working hours, and order stability influence participation primarily indirectly through employment relationship status, which operates as an institutionalized mechanism rather than a purely legal classification. Financial literacy strengthens this mediated relationship by enabling workers to manage income uncertainty and evaluate long-term risk, while social security literacy primarily enhances awareness without consistently translating into participation. Together, these results suggest that gig workers' participation is neither fully voluntary nor entirely constrained, but structurally embedded and capability-dependent.

Several limitations should be acknowledged. First, the study focuses on selected platform-based activities within developing ASEAN economies, which may limit the generalizability of findings to other institutional contexts or welfare regimes. Second, the cross-sectional design restricts causal inference regarding changes in employment attachment and participation over time. Third, the analysis concentrates on location-based and service-oriented gig work, and future research could extend this framework to crowdwork or other digital labor arrangements. Despite these limitations, the integrated mediation–moderation approach provides a coherent theoretical and empirical foundation for understanding how structural precarity and individual capabilities jointly shape social security participation among gig workers.

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