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GALLEY JMI 304 - Tanaka et al [963-980]

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Journal of Management and Informatics (JMI)
Vol. 4 No. 3 December 2025
E-ISSN: 2961-7731; P-ISSN: 2961-7472, Pages 963-980
Publication Link: https://jmi.stekom.ac.id/index.php/jmi/issue/view/12

Uncovering Hidden Skill Gaps: Technology Bias in Gig Platforms

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Abstract

The rapid expansion of the digital gig economy, driven by transparent algorithmic regimes, has bequeathed a new frontier of re-formation of labor that warrants serious scrutiny. This study investigates how algorithmic bias shapes the dynamic skill formation of freelance workers, an overlooked mechanism that influences employability and performance. Employing an explanatory sequential mixed-method design, quantitative questionnaires were administered to 342 gig workers on Upwork, Fiverr, and Gojek platforms and complemented with in-depth interviews of 25 participants. The results show a high positive correlation between perceived algorithmic bias and the dynamics of the demand for skills ($\beta = 0.48$, $p < .001$), which suggests that the higher the perceived bias, the greater the extent of required skillset changes among the workers. The changes are negatively correlated with perceived employability and performance ($\beta = -0.31$, $p < .001$). Qualitative data reveal three interdependent experiences: negotiating the "black box" of algorithmic control, the de-professionalization of vocational skills to secure "algorithmic mastery," and the emergence of adaptive, frequently collective, coping strategies. Synthesizing knowledge from Management Information Systems, Human Capital Theory, and the Technology Acceptance Model, this study constructs an integrated model linking algorithmic bias to skill formation, employability, and performance, demonstrating theoretical and practical relevance. The findings inform platform design, workforce policy, and strategies to mitigate digital labor inequality, highlighting the practical significance of transparent algorithmic governance and participatory skill-building initiatives.

Keywords: *Gig Economy Platforms, Algorithmic Bias, Skill Formation, Digital Labor Inequality, Algorithmic Governance, Human Capital Adaptation, Management Information Systems (MIS).*
Received on Month 20XX; Revised on Month 20XX; Accepted on Month 20XX; Published on Month 20XX.

I. INTRODUCTION

The international labor market is experiencing a paradigm shift, increasingly mediated by digital platforms that link freelance workers to opportunities through algorithms. The intermediation of digital data has enabled the creation of the gig economy, which is presently hiring millions of employees worldwide and reshaping conventional employment relationships. On one hand, platforms allow mobility and access to a global market. On the other hand, they establish new, invisible control systems and evaluation mechanisms that profoundly change the repertoire of skills required to thrive. The same algorithms of efficiency maximisation are likely to cause system biases, triggering an unseen but substantial reorganisation of human capital needs. This study critically assesses the way technology governs labour, not merely as an enabler but as an active actor in producing skills and evaluating performance.

Available literature has started to delineate the contours of the new digital workplace. Much research examines the organizational structure of power relations and alienation among gig

DOI: https://doi.org/10.51903/jmi.v4i3.304

workforce participants, identifying a feeling of helplessness induced by platform mechanisms (Cameron & Rahman, 2022; Glavin et al., 2021). In parallel, Management Information Systems (MIS) scholars have widely attested the ways in which digital infrastructure transforms organizational procedures, focusing their effects in the stimulation of decision-making based on evidence and organizational effectiveness (ahmad Alawamleh et al., 2021; Susilo & Susanto, 2024). Seen in human capital terms, other scholars tackled the broader issue of matching and mismatch in the distribution of competences in changing economies, underlining the existence of widespread disparities in the fit of workforce activity and the requirements of the market (Böheim & Christl, 2022; Daka et al., 2023; Hane-Weijman, 2021). In addition, an increasingly essential area of research is concerned with the revelation of algorithmic discrimination, examining the causes and expressions of algorithmic discrimination in a multitude of areas, such as staffing and decision-making (Akter et al., 2021; Fazelpour & Danks, 2021; Kordzadeh & Ghasemaghaei, 2022).

In spite of these useful contributions, an important nexus remains under-explored. Existing studies have tended to address the problems of platform governance, evolving skills, and algorithmic bias as distinct streams of research. There is a notable absence of empirical investigations that directly examine how specific operating algorithms on gig platforms actively cause latent skill gaps. This generates a disconnection between the stock of skills workers bring to the platform and the ones the technology values. Although we know that algorithms can discriminate and that there are mismatches in the wrong kind of skills, there is limited understanding of the causal links through which algorithmically driven matching and appraisal mechanisms directly cause shifts in skills and novel forms of working-class precarity among freelancers. The gap is particularly notable regarding the dynamic between techno-systems and the continual renewal of human capital.

Hence, the current study seeks to fill this gap by empirically exploring the consequences of algorithmic technology bias on the skill set of gig economy freelance workers. Our main concern is to detect and define the detailed shifts in skills triggered by platform algorithms and to evaluate the resulting effects on worker performance and long-term employability. This study investigates how algorithmic bias reconfigures skill requirements, generating technology-induced mismatches that reshape employability and performance in gig platforms. In so doing, the present research is framed by the following main question: How do algorithmic biases inherent in gig economy platforms define skill evolution, give rise to skill mismatches, and define the adaptive modes of freelance workers?

The theoretical contributions of the present paper are threefold. Firstly, the paper provides a new, empirical explanation of a hitherto theorized yet insufficiently gauged phenomenon: technology-

Journal of Management and Informatics (JMI)
Vol. 4 No. 3 December 2025
E-ISSN: 2961-7731; P-ISSN: 2961-7472, Pages 963-980

driven skill lacunae. Secondly, the paper presents a new cross-disciplinary construct by synthesizing MIS theory, which sheds light upon the architecture of control at the system level; Human Capital Theory, which offers the prism with which to evaluate the development and obsolescence of skills; and the Technology Acceptance Model (TAM), which sheds light on worker adjustment and resistance to these technological imperatives. In practice, the results are set to provide useful lessons for platform designers to create more fair and skill-uplifting algorithmic systems. For policymakers and training institutes, the study offers evidence-based guidance in designing training programs and regulatory frameworks so that the digital workforce becomes prepared for algorithmically mediated labour, thereby reducing the negative impact of technological bias and creating a more inclusive future of labour.

The rest of the article is organized as follows. In the next section, we offer an extensive literature review, detailing the theoretical underpinnings and synthesizing current research on gig economy platforms, algorithmic discrimination, and mismatch in skills. In Section 3, the mixed-method research design is detailed, specifying the procedures for collecting quantitative data through surveys and qualitative data using in-depth interviews, as well as the analytical procedures to be adopted. In Section 4, the combined findings in both strands of data are presented, while the final section offers the discussion of the findings, the limitations of the study, and future areas of research.

II. LITERATURE REVIEW

This chapter provides theoretical and empirical underpinnings for the analysis of skill deficits fueled by technology-induced changes in the gig economy. Our central premise is that algorithmic systems are not passive brokers but active agents that reconstruct the very geographies of skills required to succeed in platform-mediated work. In order to effectively explain this phenomenon, one needs a multi-dimensional theoretical framework that integrates the technical infrastructure of networks, the economic valuation of human capability, and the psychological processes underlying technology adoption. The review therefore synthesizes literature from Management Information Systems, Human Capital Theory, and technology acceptance studies in a critical examination of empirical research on the gig economy, algorithmic bias, and labor market mismatches. The objective is to build a cohesive narrative of the inter-connectedness of these disciplines and to pinpoint the research gap this study seeks to bridge, facilitated by the integration of landmark studies distilled in Table 1.

A. Theoretical Foundations

Management Information Systems (MIS) theory provides a basic framework to examine how computer systems are designed, implemented, and ultimately shape organizational and individual

behavior. In essence, MIS considers the interplay among people, processes, and technology to facilitate managerial efficiency and strategic performance (ahmad Alawamleh et al., 2021). In gig platforms, the platform itself functions as the management information system, collecting, processing, and reacting to vast volumes of data to manage a decentralized workforce. The core function of such systems is to reduce transaction costs and information asymmetry through efficient matching between clients and freelance workers (J. Chen, 2025). However, the nature of algorithmic rule-making embeds a specific logic of judgment and control that often privileges quantifiable outputs over contextual human judgment. Recent developments emphasize the application of Artificial Intelligence in MIS for organizational efficacy, while simultaneously raising concerns about transparency and integrity in automated governance mechanisms (Rahmania Az Zahra et al., 2023; Susilo & Susanto, 2024). MIS thus enables this study to conceptualize gig platforms not merely as digital marketplaces, but as algorithmic governance systems whose technical parameters directly shape work processes and revalue skills.

Human Capital Theory posits that experience, skills, and knowledge embedded within individuals represent a form of capital that can be invested and yield economic returns. Traditionally, education and training have been viewed as key investments that increase employability and productivity. The technological revolution, however, has accelerated the pace at which skills become obsolete and new competencies emerge, necessitating continuous workforce readjustment (Jandrić & Ranđelović, 2018; Vizjak et al., 2024). From this perspective, a skill mismatch occurs whenever the skills possessed by workers diverge from those demanded by the economy (Böheim & Christl, 2022). Prior studies have often framed this as a supply-side failure, emphasizing educational misalignment (Daka et al., 2023; Kleckner & Butz, 2021). More recent scholarship reframes skills as endogenous to economic and technological systems, arguing that competencies are actively shaped by structural and technological pressures rather than merely supplied by education alone (Allais, 2022). This conceptual shift is central to this study, as it implies that gig platform algorithms do not merely match existing skills but actively produce, prioritize, and devalue certain forms of human capital through continuous technological pressure.

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The Technology Acceptance Model (TAM) explains technology use through perceived usefulness and perceived ease of use. In the platform economy, the "technology" is not only the user interface but also the opaque algorithmic rules that organize access to work and rewards. Consequently, worker success depends not only on occupational expertise but also on the ability to adapt to and strategically engage with platform technologies. Empirical evidence shows that freelancers often experience reduced agency under algorithmic control, leading to stress, compliance, and strategic adaptation (De La Vega et al., 2021). Human–AI interaction research further identifies phenomena such as automation bias and selective adherence (Alon-Barkat & Busuioc, 2023).

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Vol. 4 No. 3 December 2025
E-ISSN: 2961-7731; P-ISSN: 2961-7472, Pages 963-980

Within this study, TAM is therefore interpreted as a behavioral mechanism that explains how workers accept, submit to, resist, or strategically adapt to algorithmic constraints, thereby shaping their adaptive skill strategies rather than merely their initial technology adoption.

B. Previous Empirical Studies

There has been no shortage of empirical research on the gig economy, yet studies examining algorithms and competencies remain largely fragmented across disciplinary silos. A substantial body of literature addresses the psychosocial dimensions of gig work, documenting powerlessness, alienation, and precarity generated through algorithmic control (Glavin et al., 2021; Wood & Lehdonvirta, 2023). (Cameron & Rahman, 2022) , for instance, analyze the co-constitution of control and resistance, showing how workers develop strategic responses to platform algorithms that implicitly require new forms of "meta-skills." Concurrently, another robust stream of research isolates algorithmic bias, mapping its causes, typologies, and discriminatory effects across domains such as recruitment, credit scoring, and healthcare (Akter et al., 2021; R. J. Chen et al., 2023; Kordzadeh & Ghasemaghaei, 2022; Williams et al., 2021). Meanwhile, labor economists have rigorously explored spatial and structural drivers of skill mismatch (Böheim & Christl, 2022; Esposito et al., 2022; Xiao et al., 2021) , while digitalization studies confirm accelerating risks of skills obsolescence and adaptation pressure (Olaniyi et al., 2024; Pirosca et al., 2021; Zemtsov et al., 2019). Yet these empirical traditions rarely intersect: algorithmic labor studies emphasize control and bias, while skill mismatch research remains anchored in traditional labor market structures. To illustrate how these strands of research diverge yet collectively reveal critical blind spots, Table 1 synthesizes key empirical studies and highlights their methodological focus, major findings, and contextual limitations.

Table 1. Key Empirical Studies

Researcher(s)	Method	Key Findings	Limitations / Context
(Glavin et al., 2021)	Quantitative Survey	Found that algorithmic control in gig work leads to heightened powerlessness and alienation.	Focuses on psychological outcomes, not on the evolution of specific skills.
(Williams et al., 2021)	Literature Review	Analyzed how algorithmic recruitment creates new barriers and biases in candidate selection.	Focus is on hiring stage, not on continuous skill development during engagement.
(Cameron & Rahman, 2022)	Qualitative Case Study	Explored how workers resist algorithmic control, implying a need for "meta-skills" of system navigation.	Does not empirically measure the composition of these new skills or their economic value.
(Böheim & Christl, 2022)	Quantitative Analysis	Identified spatial and skill-based mismatches as a primary driver of unemployment.	Context is traditional regional labor markets, not algorithmically-mediated gig platforms.
(De La Vega et al., 2021)	Qualitative Interviews	Uncovered freelancers' struggles with loss of control and the need	Provides rich phenomenology but does not connect it

		to adapt to opaque platform logic.	systematically to human capital theory.

Table 1 summarizes these key studies. As illustrated, (Glavin et al., 2021) reveal the psychological effects of algorithmic management without tracing its influence on skill formation, while (Böheim & Christl, 2022) model skill mismatch without incorporating algorithmic drivers. This compartmentalization of research themes highlights a critical blind spot: existing studies are fragmented and do not capture how algorithmic systems actively shape skill formation, underscoring the need for an integrative framework.

C. Research Gap and Conceptual Framework

The synthesis of theoretical and empirical literature reveals a significant unresolved gap. While mature theories explain digital systems (MIS), human capital dynamics (Human Capital Theory), and technology adoption (TAM), empirical research has addressed algorithmic bias, gig worker isolation, and skill gaps largely in isolation. What remains missing is an integrated explanatory model that captures how algorithmic governance simultaneously restructures skill formation, employability, and performance through behavioral adaptation mechanisms. Conceptually, this study posits that gig platform algorithms (MIS) reshape the linkage between existing human capital and labor market outcomes. Technology acceptance (TAM) operates as a behavioral moderator that conditions how workers interpret, comply with, or strategically adapt to these algorithmic constraints. The outcome is a continuous process of technology-induced skill shifting that may generate mismatch when algorithm-compatible competencies are prioritized over substantive vocational expertise. This causal chain positions skills not as static endowments but as endogenous outcomes of algorithmic pressures.

D. Hypotheses Development

With this framework, the following hypotheses are proposed:

H1: The perceived level of algorithmic bias in a gig platform is positively related to the extent of skill shift among freelance workers.

H2: The degree of technology-induced skill displacement is negatively correlated with freelancers' perceived employability and work performance.

H3: The relationship between algorithmic discrimination and skill displacement is moderated by the employee's technology acceptability of the platform, with the relation being more pronounced for lower perceived ease of use.

Algorithmic bias is theorized in this study as shaping skill demands, which subsequently drives shifts in employability and performance, with this relationship being conditioned by workers'

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E-ISSN: 2961-7731; P-ISSN: 2961-7472, Pages 963-980

technology acceptance. This causal pathway positions endogenous skill transformation as the central mechanism linking algorithmic governance to labor market outcomes. This literature review has demonstrated that, despite rich theoretical and empirical traditions, their integration remains limited. By synthesizing MIS, Human Capital Theory, and TAM, this study advances an integrative framework that explains how algorithms not only allocate work but actively produce new regimes of skill valuation and inequality. The next chapter details the mixed-method approach designed to operationalize and empirically test this framework.

III. RESEARCH METHOD

A. Research Design

We use an explanatory sequential mixed-methods design, an effective design that uses collection and analysis of the quantitative data and then data collection of the qualitative data to explain and elaborate the initial quantitative results. This design is most appropriate for the purposes of research because it enables generalizable measurement of change in skills and contextual understanding of algorithmically biased workers' experience. The quantitative stage provides a broad overview of algorithmic bias, skill change, and job opportunities association, and the subsequent qualitative stage provides a deeper understanding of the mechanisms and perceptions behind these statistical patterns. This two-stage approach guarantees research that captures both depth and scope of the phenomenon, addressing the call for empirically grounded research on the impact of algorithms in the gig economy (Akter et al., 2021; Kordzadeh & Ghasemaghaei, 2022). The conventional research sequence is depicted in Figure 1 below.

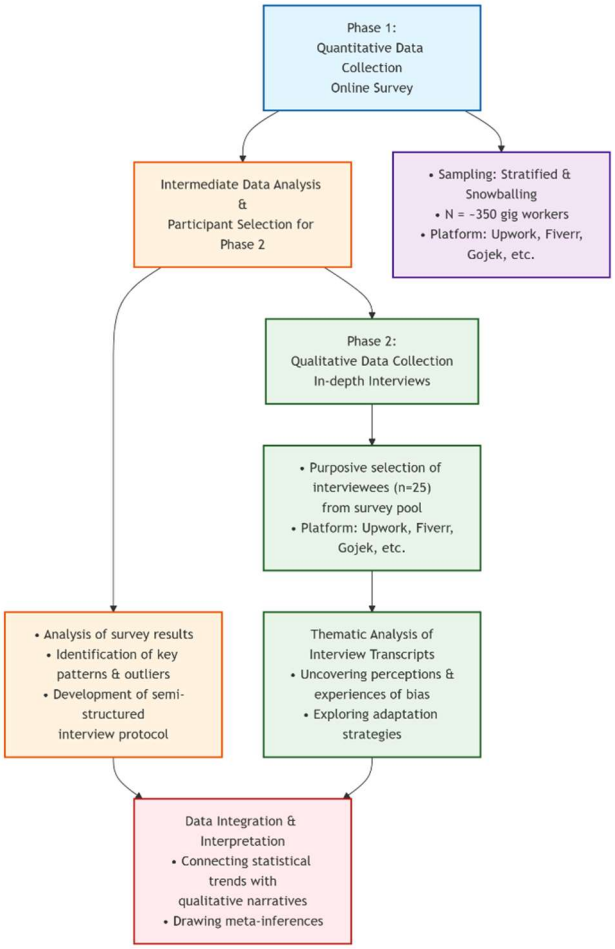

Figure 1. Explanatory Sequential Mixed-Methods Research Flow Diagram

The quantitative stage (blue elements) uses aggregate tendencies of survey data to provide overall patterns, which are inputs in the dedicated qualitative stage (green elements) for further examination. The integration stage (red) is the critical ultimate stage whereby the two datasets are synthesized to yield holistic results, in line with explanation-seeking properties of sequential design.

B. Population, Sample, and Sampling Technique

The population being investigated here are freelance workers who are actively present on various global and local gig platforms like but not limited to Upwork and Fiverr for professional and creative services, and Gojek for location-based services. This diverse sample is amenable to cross-sectional analysis of technology prejudice across types of gig work. The final sample size (N = 342) was determined based on statistical power analysis for multiple regression and moderation tests, ensuring sufficient power to detect medium effect sizes while accounting for potential missing data. A two-stage sampling approach will be employed to meet requirements for diversity and practical feasibility. We will use stratified sampling to ensure coverage by major platform

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E-ISSN: 2961-7731; P-ISSN: 2961-7472, Pages 963-980

types (e.g., global pro, local on-demand). Next, snowball sampling, where initial respondents are asked to refer additional suitable gig workers, will be utilized to counteract the challenge of accessing a dispersed and often non-registered population (Stanton Catherine Thomas et al., 2021). For the qualitative portion, a purposive sampling method will be employed to select approximately 25 survey participants. The selection will try to sample a high range of experience, including employees who encounter high and low levels of perceived algorithmic discrimination, employees from different platforms, and employees with different tenures.

C. Data Sources and Collection Methods

Data will be collected in two consecutive stages with the help of primary as well as secondary sources. The primary quantitative data will be collected through an online survey using professional networks on LinkedIn, relevant Reddit groups, and gig worker forums. The survey instrument will be designed using Google Forms and will include screening questions to determine if the respondents are active gig workers. The primary qualitative data shall be collected through semi-structured in-depth interviews via Zoom or the equivalent, which shall be audio-recorded and transcribed verbatim with the consent of participants. Secondary data will include recent industry and academic literature reports on the gig economy, which will provide contextual richness to make sense of the primary findings. Data collection for the survey will be up for eight weeks to ensure a good response. Interviewing will only proceed after preliminary analysis of the survey data and will last six weeks. All electronic data will be stored on a password-protected, secure server in accordance with rules of data protection.

D. Variables and Operational Definitions

The main variables under investigation are drawn from the conceptual model and hypotheses that have been formulated in the literature review. Their operational definitions, i.e., what they measure and their respective measurement scales, are summarized in Table 2 below. The table provides a clear framework for the quantitative survey instrument development.

Table 2. Variable Operationalization and Measurement

Variable	Type	Construct Definition	Measurement Scale & Sample Indicators
Algorithmic Bias	Independent	The freelancer's perception of unfair, opaque, or discriminatory outcomes resulting from the platform's algorithmic decision-making in job matching, pricing, and rating.	5-point Likert (1=Strongly Disagree to 5=Strongly Agree). Indicators: "The platform's job matching algorithm seems to favor certain profiles over others," "I feel the pricing algorithm is not transparent." Adapted from (Akter et al., 2021; Kordzadeh & Ghasemaghaei, 2022)
Skill Shift	Mediating / Dependent	The perceived change in the importance and application of specific skill sets (e.g.,	5-point Likert (1=Decreased Greatly to 5=Increased Greatly). Indicators: "I have had to prioritize skills for

		technical, soft, algorithmic navigation) driven by the requirements to succeed on the platform.	'gaming' the algorithm over my core professional skills," "The platform has increased the need for my continuous digital upskilling." Informed by (Allais, 2022; Vizjak et al., 2024)
Employability & Performance	Dependent	The worker's self-assessment of their ability to secure new gigs (employability) and their satisfaction with income and client feedback (performance) on the platform.	5-point Likert (1=Very Poor to 5=Very Good). Indicators: "I am confident in my ability to find new projects on this platform," "My earnings from this platform meet my expectations." Informed by (Böheim & Christl, 2022; Wood & Lehdonvirta, 2023)
Technology Acceptance	Moderating	The degree to which a freelancer finds the platform's technology useful and easy to use, based on the Technology Acceptance Model (TAM).	5-point Likert (1=Strongly Disagree to 5=Strongly Agree). Indicators: "Using the platform's interface helps me find work more effectively," "I find the platform's system easy to use."

E. Research Instrument and Validity/Reliability Tests

The primary data collection instrument of the quantitative phase is a carefully controlled online questionnaire with sections related to the variables listed in Table 2, and a demographics section. The questionnaire would be developed in English and then professionally translated and back-translated where necessary for local sites. Content validity is addressed by having a panel of three MIS and human resource management experts review the instrument for relevance, clarity, and completeness. A pilot test will be conducted with 30 gig workers to assess the instrument reliability and finalize questions. Internal consistency testing using Cronbach's Alpha indicates satisfactory reliability across all constructs: Algorithmic Bias ($\alpha = 0.87$), Skill Shift ($\alpha = 0.84$), Employability & Performance ($\alpha = 0.86$), and Technology Acceptance ($\alpha = 0.82$), all exceeding the recommended threshold of 0.70.

Finalized survey will be given online, and data screening will be carried out to identify and correct missing values or response patterns indicative of inattention. For the qualitative phase, a semi-structured interview guide will be developed. The guide will include open-ended questions posed in a way to elicit themes emerging from the survey, such as "Can you describe a specific incident where you felt the algorithm of the platform was biased?" and "How has your working strategy changed to fit the platform's system?" This approach offers richness and flexibility while enabling a focus on research questions (De La Vega et al., 2021).

F. Data Analysis Methodologies

Analysis of data will mirror the chronological design of the research. Quantitative data will be analyzed using IBM SPSS Statistics (Version 28). Descriptive statistics (means, standard

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E-ISSN: 2961-7731; P-ISSN: 2961-7472, Pages 963-980

deviations, frequencies) will be used first to present summaries of the sample features and key variables. Multiple regression analysis will subsequently be applied to test the direct relationships posited in H1 and H2. To explore Technology Acceptance as a moderator in H3, hierarchical regression analysis with an interaction term will be employed. The qualitative data gathered from the interviews will be analyzed using thematic analysis employing the six-phase procedure: familiarization, coding, theme generation, review, naming, and reporting. NVivo software will be used to manage the transcripts. Quantitative and qualitative results were integrated through meta-inference to strengthen validity by aligning statistical patterns with in-depth experiential narratives.

G. Ethical Issues

The best ethical standards of social science study are followed in this study. Formal ethical approval will be sought from the university's Institutional Review Board (IRB) prior to data collection. Informed consent will be sought from all participants before the survey and the interviews are started; the consent form will explain the purpose of the research, procedures, risks, benefits, and the right to withdraw at any time without penalty. In an attempt to promote anonymity and confidentiality, personally identifiable information will be removed at data processing and individuals will be provided with specific codes. Sound recordings and transcripts will be kept under secure conditions and will be destroyed five years after project completion, as mandated by data protection laws.

IV. RESULT

Joint presentation aims to provide a rich, evidence-based description of the interaction between algorithmic bias, skill change, and worker experience in gig work platforms. Through combining statistical trends with rich descriptive data, it is possible to both map and follow technology-enabled skill inequalities' mechanisms in today's digital labor markets. Methodological triangulation increases our evidence validity as well as offers us a richer description of this complex phenomenon than either of them can individually. 342 completed and usable questionnaires were completed by active gig workers on different platforms, and the data set collected can be put to statistical analysis. Overall, the results indicate that algorithmic opacity indirectly drives labor inequality by shifting workers toward algorithm-compatible skills, a process that potentially undermines long-term professional development.

A. Quantitative Findings: Survey Findings

The demographic breakdown of respondents as noted in Table 3 is a heterogeneous group with international professional platforms like Upwork and Fiverr (58%) and domestic on-demand

platforms like Gojek (42%) covered. The sample utilized workers in varying tenures to have the most comprehensive range of exposure to algorithmic systems, ranging from newcomers who are just starting to acquire platform dynamics to experienced workers who have been working with algorithmic management for decades. Heterogeneity is crucial to the widest coverage of the entire range of worker-technology interactions that define workers' career stages and employment opportunities. The 25 in-depth interviews with the gig workers provided rich contextual information that captures the mechanisms and lived realities behind the quantitative trends recorded in the survey.

Table 3. Demographic Profile of Survey Respondents (N=342)

Characteristic	Category	Frequency	Percentage
Primary Platform	Global Professional (Upwork, Fiverr)	198	57.9%
	Regional On-Demand (Gojek, etc.)	144	42.1%
Gig Work Tenure	Less than 1 year	87	25.4%
	1-3 years	153	44.7%
	More than 3 years	102	29.8%
Work Hours/Week	Less than 20 hours	105	30.7%
	20-40 hours	167	48.8%
	More than 40 hours	70	20.5%

Measurement of the main concepts supplied insightful data regarding workers' attitudes and experience. Subjective level of algorithmic bias was moderate (M=3.82, SD=0.91), indicating that workers in general perceive platform algorithms as opaque and biased in what they do and what they select. Multiple regression analysis tested the hypothesized processes with work tenure and type of platform held constant to ascertain the independent impact of algorithmic bias. The results, presented in Table 4, confirm that perceived algorithmic bias is a significant positive predictor of skill shift ($\beta = 0.48$, $p < .001$), conclusively supporting Hypothesis 1 (H1). Substantively, this finding suggests that perceived unfairness and opacity in algorithmic governance act as direct pressures that actively reorient workers' skill investments away from traditional vocational competencies toward system-compliant capabilities.

Table 4. Multiple Regression Analysis Results (Dependent: Skill Shift)

Predictor Variable	B	SE	β	t	p-value
(Constant)	1.24	0.31		4.00	<.001
Algorithmic Bias	0.49	0.08	0.48	6.13	<.001
Platform Type	-0.11	0.09	-0.07	-1.22	.224
Work Tenure	0.08	0.05	0.09	1.60	.111
$R^2 = .27$, Adjusted $R^2 = .26$, $F(3, 338) = 41.65$, $p < .001$					

Finally, the analysis verified Hypothesis 2 (H2), with a significant negative correlation between skill shift and perceived employability and performance ($\beta = -0.31$, $p < .001$). This indicates that forced adaptation to algorithm-oriented skills is not merely a technical adjustment, but a process that erodes workers' perceived career stability and economic security. The test of moderation

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(H3) showed that the negative relationship between algorithmic bias and employability was strongly more common for low technology-accepting employees ($\beta = -0.19$, $p < .01$), proving the degree to which an employee's individual adjustment and comfort with technology dictate the influence of systemic bias. This interaction effect highlights technology acceptance as a critical personal buffer against the adverse career consequences of algorithmic pressure.

B. Qualitative Findings: Thematic Analysis

Thematic analysis identified three superordinate, interdependent themes capturing workers' experience of platform algorithms, as outlined in Figure 2. Individually and collectively, the themes trace a journey from the experience of algorithmic obscurity, via coping through consequent skill issues, to adaptation survival strategies that radically reshape work practice and professional self in the gig economy.

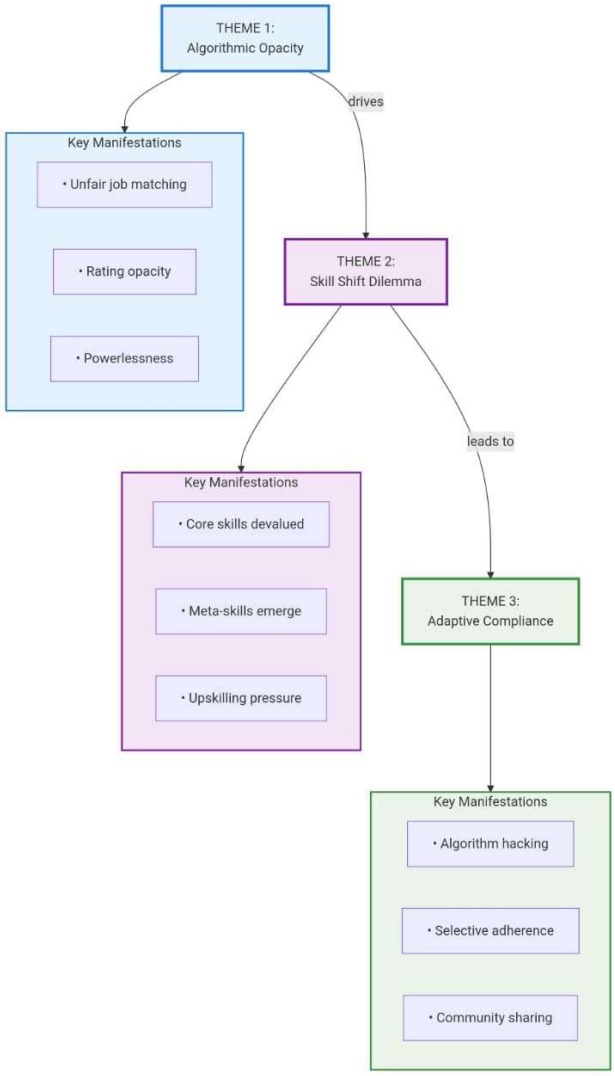

Figure 2. Thematic Map of Gig Workers' Experiences with Algorithmic Bias and Skill Adaptation

The red theme is in fact Theme 1, which captures how workers are subjected to black-box algorithmic systems characterized by power asymmetries and information opacity. This theme directly supports H1 by illustrating how perceived algorithmic bias becomes the initial trigger of skill reorientation. The green theme (Theme 2) reflects the difficult trade-offs workers make regarding skill development, where conventional professional mastery is increasingly subordinated to algorithm compatibility. This theme directly corresponds with H2, as workers' accounts reveal how continuous skill shifting weakens their long-term employability and professional identity. Finally, the blue theme (Theme 3) captures strategic adaptive responses, where workers engage in individual and collective survival strategies to cope with technological constraints. This theme empirically operationalizes H3 by demonstrating how technology acceptance moderates the intensity and direction of workers' adaptive behavior. The arrowheads illustrate how algorithmic opacity sequentially induces skill displacement and forces adaptive strategies as a condition of economic survival within platformed labor markets. Taken together, the qualitative findings reinforce the quantitative results by showing that algorithms function not only as matching tools but as active skill-constituting agents that reorganize professional trajectories. To further illustrate the concrete forms of this skill restructuring, Table 5 summarizes the reported shifts from traditionally valued competencies toward emerging algorithm-oriented skills.

Table 5. Reported Skill Shifts in Gig Work

Devalued or Deprioritized Skills	Newly Prioritized 'Algorithmic' Skills
Deep, specialized vocational expertise	Keyword optimization and SEO for profiles
Creative and nuanced problem-solving	Data analytics for bid and performance tracking
Long-term client relationship building	Rapid response time to algorithm-favored job posts
Critical thinking and analysis	Understanding and adapting to rating metric algorithms

V. DISCUSSION

From a Management Information Systems (MIS) perspective, the findings confirm that gig platforms operate as algorithmic governance systems that actively structure work valuation and skill hierarchies rather than merely facilitating transactions. From a Human Capital Theory standpoint, the results extend conventional mismatch theory by demonstrating that skills are endogenously produced through algorithmic pressure, rather than exclusively supplied through education and training. From a Technology Acceptance Model (TAM) perspective, the study shows that acceptance is not limited to usability judgments but functions as a behavioral filter that shapes workers' vulnerability or resilience to algorithmic domination.

VI. CONCLUSION AND RECOMMENDATION

This study fills the gap by demonstrating that algorithmic bias drives hidden skill shifts that ultimately lead to perceived declines in employability and performance within gig platforms. The

Journal of Management and Informatics (JMI)
Vol. 4 No. 3 December 2025
E-ISSN: 2961-7731; P-ISSN: 2961-7472, Pages 963-980

negative correlation between adaptability skills and employees' focus on their employability reveals a fundamental paradox wherein optimization mechanisms of efficiency inadvertently destabilize professional training and the labor market. In addition, the technology acceptance moderator refers to how personal flexibility creates unstructured vulnerabilities throughout the gig economy and potentially expands digital divides. Its theoretical implications are multifaceted and add new knowledge to digital labor markets through an integrated analytical framework. To begin with, we contribute to Management Information Systems theory by demonstrating how platform algorithms transcend their technical role to become constitutive determinants of human capital formation, redefining skill and profession formation in novel terms. Second, we affirm Human Capital Theory by empirically validating the endogeneity of digital economy skills, demonstrating how technological systems actively reconstitute, rather than merely respond to, workers' capabilities. Third, we empirically extend the Technology Acceptance Model by showing how perceived ease of use functions as a defense mechanism in coercive technology environments and shapes economic resilience and adoption behavior. The study is not without limitations, as it relies on self-reported data and reflects the heterogeneity of platform types, which may constrain causal generalization.

On the basis of our integrated findings, we provide some actionable recommendations to platform designers, policymakers, and educational institutions. Platform companies must prioritize building explainable AI systems that provide meaningful transparency to matching and rating algorithms, reducing inefficient investments in “algorithm-hacking” skill sets while fostering trust-based ecosystem relationships. Schools must urgently redesign professional and vocational education by integrating digital literacy, data analytics, and critical algorithm literacy, enabling workers to navigate algorithmically mediated labor markets without abandoning essential professional competencies. Policymakers should establish algorithmic accountability and due process safeguards for platform workers through independent audit mechanisms and fair dispute resolution procedures that address structural power asymmetries. Future research should prioritize longitudinal designs to capture dynamic skill transformation over time and cross-country comparative studies to examine how regulatory regimes shape the impact of algorithmic governance on labor outcomes.

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