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Review Article

A Review on the Role of Digital Technology in Creating Employment for Youth in Indonesia

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Abstract

This article examines the role of digital technology in creating employment opportunities for youth in Indonesia using a qualitative literature review. Indonesia faces persistent challenges with youth unemployment and high rates of Not in Education, Employment, or Training (NEET) status among young people, even as it experiences rapid growth in the digital economy. The review synthesizes existing literature to explore the mechanisms by which digital technologies—including e-commerce platforms, gig economy applications, and digital entrepreneurship—create employment opportunities for Indonesian youth. The analysis identifies key enablers, such as human capital development, digital infrastructure expansion, and supportive policy frameworks, while also examining barriers, including skills gaps, the digital divide, gender inequalities, and inadequate worker protections. The findings suggest that while digital technology offers substantial potential for employment creation, realizing inclusive benefits requires coordinated multi-stakeholder efforts to address skills development, equitable access, and appropriate regulatory frameworks. This review contributes to the understanding of digital employment dynamics in emerging economies and provides insights for policymakers, practitioners, and researchers engaged in youth employment and digital development.

Introduction

Background

Indonesia stands at a critical juncture where demographic potential meets digital transformation. As the world's fourth most populous nation, Indonesia is home to 64.16 million individuals aged 16 to 30, comprising 23.18% of its population. This substantial youth population represents both a demographic dividend and a significant employment challenge, particularly as the nation navigates the complexities of digital economic transformation [1].

The country's digital economy has experienced remarkable growth, emerging as the largest in Southeast Asia. According to the e-Conomy SEA 2024 report by Google, Temasek, and Bain & Company, Indonesia's digital economy reached a Gross Merchandise Value (GMV) of USD 90 billion in 2024, up 13% from the previous year. The e-commerce sector, contributing USD 65 billion, remains the dominant force driving this digital expansion. Projections indicate that the digital sector's contribution could range from USD 210 to USD 360 billion by 2030, positioning digital technology as central to Indonesia's economic future [2,3].

The global context of digital transformation has fundamentally altered labor market dynamics. Digital technologies have reshaped employment structures, creating new occupational categories while rendering others obsolete. The World Bank has emphasized that digital technologies can enable economic transformation and boost jobs, particularly in developing economies where traditional employment pathways may be constrained. However, these opportunities come with complexities regarding skills requirements, access disparities, and the quality of employment generated [4].

Indonesia's position in this global digital transformation presents both unique opportunities and challenges. The country has cultivated a robust digital ecosystem, hosting multiple technology unicorns, including GoTo (the merged entity of Gojek and Tokopedia), Bukalapak, and various fintech companies. These platforms have created extensive economic ecosystems that generate direct and indirect employment opportunities. Research by the University of Indonesia's Institute for Economic and Social Research (LPEM FEB UI) found that GoTo contributed approximately IDR 349-428 trillion to Indonesia's economy in 2022, equivalent to 1.8-2.2% of the country's GDP, while creating additional job opportunities for 1.1 to 1.7 million people [5].

Urgency of the Issue

Despite the promising growth of the digital economy, Indonesia faces a persistent youth employment crisis that demands urgent attention. According to data from Statistics Indonesia (BPS), the youth NEET rate stood at 20.31% in August 2024, indicating that approximately 9 million of 44 million young Indonesians aged 15-24 were not engaged in education, employment, or training. While this represents a decline from 25.80% in 2023 and 23.22% in 2022, the figures remain concerningly high [6].

The gender dimension of youth unemployment is particularly urgent. Female youth face double the unemployment rate compared to their male counterparts. Data from February 2024 reveal that the female NEET rate stood at 22.77% compared to 16.04% for males, with the disparity most pronounced in the 20-24 age group, where the female NEET rate reached 34.06% versus 20.07% for males. This gender gap reflects structural barriers that limit women's access to employment opportunities, including digital employment [7,8].

The skills mismatch between youth competencies and employer expectations compounds the unemployment challenge. Research indicates that Generation Z, born between 1997 and 2012 and accounting for 27.94% of Indonesia's population, faces significant unemployment due to limited work experience, skill mismatches, and age-related hiring restrictions. The Indonesian government has recognized this challenge and aims to produce 9 million digital talents by 2030, or an average of 600,000 digital workers annually. Current projections indicate a digital talent shortage of 3 to 6 million people by 2030 if current trends continue [9].

Regional inequities in employment opportunities further complicate the youth employment landscape. The digital divide between urban and rural areas affects youth access to digital employment pathways. While urban NEET rates stood at 18.48%, rural areas recorded rates of 20.45%, reflecting disparities in digital infrastructure and access to opportunities. The Diagnostic Report on the Digital Skills Landscape in Indonesia found that individuals without digital connectivity are less likely to pursue upskilling or join digital literacy programs because they have not experienced the benefits of internet connectivity [10].

The post-pandemic employment landscape has accelerated shifts toward digital and flexible work arrangements. The COVID-19 pandemic catalyzed digital transformation, driving rapid adoption of digital technologies across sectors of the economy. This transformation created new employment modalities while displacing traditional jobs, leaving youth particularly vulnerable to economic and technological changes. Research examining the impact of digitalization and the COVID-19 pandemic on youth unemployment in Indonesia found that both factors had significant positive effects on youth unemployment rates, suggesting that Indonesian youth remain vulnerable to rapid technological changes [11].

Research Objectives

This qualitative literature review aims to comprehensively examine how digital technology creates employment opportunities for youth in Indonesia. The primary objective is to synthesize existing research and evidence to develop an integrated understanding of the mechanisms, enablers, and barriers to creating digital employment in the Indonesian context.

The secondary objectives of this review are: (1) to identify and analyze the specific digital platforms, mechanisms, and sectors that enable youth employment in Indonesia; (2) to explore the facilitating factors and enablers that support digital employment creation for youth; (3) to investigate the barriers and challenges that impede youth access to digital employment opportunities; (4) to examine gender dimensions and disparities in digital employment; and (5) to analyze policy frameworks and initiatives supporting digital employment creation. Through addressing these objectives, this review seeks to provide actionable insights for policymakers, practitioners, and researchers working to enhance youth employment outcomes through digital technology.

Literature Review

Theoretical Concepts and Frameworks of Digital Technology

Digital Technology Definition and Scope

Digital technology encompasses a broad range of technological tools, platforms, and infrastructure that enable digital communication, commerce, and service delivery. In the employment context, digital technology encompasses e-commerce platforms, digital labor platforms, mobile applications, digital financial services, and the underlying infrastructure that supports these systems. The conceptualization of digital technology relevant to employment extends beyond mere digitalization—the conversion of analog processes to digital formats—to encompass digital transformation, which involves radical organizational and social changes driven by digital technologies [12].

The distinction between digitalization and digital transformation is crucial for understanding employment impacts. While digitalization may automate existing processes, digital transformation fundamentally restructures economic activities, creating new business models, occupational categories, and employment relationships. This transformation has given rise to what scholars term the "platform economy" or "gig economy," characterized by digital intermediation between service providers and consumers [13].

Human Capital Theory and Digital Skills

Human capital theory provides a foundational framework for understanding the relationship between digital technology and employment. According to this theory, investments in education, training, and skills development enhance individual productivity and labor market outcomes. In the digital era, this investment increasingly encompasses digital competencies alongside traditional educational credentials [14].

Human capital in the digital context comprises multiple dimensions: knowledge (understanding of digital systems, rights, and risks), skills (the ability to use technology effectively for productive purposes), and attitudes (a disposition toward learning and adaptation). Research has demonstrated that investment in human capital through education, training, and learning is essential for sustaining organizational performance and individual competitiveness in digitally transformed labor markets [15].

The concept of digital skills has evolved to encompass a hierarchy of competencies. Basic digital literacy involves fundamental technology use, while intermediate skills include professional applications and specialized software. Advanced digital skills encompass programming, data analytics, artificial intelligence, and other technical competencies required for high-skilled positions in the digital economy. The Indonesian government has set ambitious targets for skills development, aiming for 50% of workers to possess intermediate and advanced digital skills by 2024 [16].

Human capital theory suggests that individuals with greater investments in digital skills should experience superior labor market outcomes. Research examining youth transitions to the digital sector in Indonesia supports this proposition, finding that young, higher-educated graduates have a 1.491-fold higher likelihood of transitioning to digital-sector employment. At the same time, participation in training increases this likelihood by 1.525-fold for secondary-education graduates [17].

Skill-Biased Technological Change Theory

The theory of skill-biased technological change (SBTC) provides important insights into how digital technology reshapes employment structures. SBTC theory posits that technological change increases the demand for highly skilled and educated workers while substituting for the work of relatively low-skilled workers. This framework explains how technological progress has historically increased wage premiums for educated workers and contributed to employment polarization [18].

In the context of the digital economy, SBTC manifests as the automation of routine tasks while complementing non-routine cognitive activities. This creates a pattern where middle-skilled routine jobs face displacement, while both high-skilled cognitive occupations and low-skilled service jobs that resist automation may experience growth. For Indonesian youth, this implies that educational investments in advanced digital skills should enhance employment prospects, whereas those with only basic competencies may face greater vulnerability [19].

Recent scholarship has extended the SBTC theory to examine the effects of digital platforms. Research on online gig platforms suggests that these technologies may not simply be skill-biased but rather redistribute workers across occupational categories. Specifically, platforms may automate middle-skilled managerial tasks using sorting and matching algorithms while creating new self-employment opportunities for workers. This redistribution is particularly relevant to understanding how digital platforms affect youth employment pathways [20].

Digital Platforms and Gig Economy Framework

Digital labor platforms have emerged as significant employment intermediaries in developing countries. These platforms use technology to match workers with tasks or jobs, creating what is known as the "gig economy"—characterized by short-term, task- or project-based work arrangements. The gig economy in Southeast Asia is experiencing rapid growth, with the market projected to reach USD 8.9 billion in 2024 and growing at a compound annual growth rate of 20.2% [21].

Digital platforms create employment through multiple mechanisms. Location-based platforms such as Gojek and Grab connect workers with locally delivered services, including transportation, delivery, and domestic services. Online labor platforms enable remote work, including programming, translation, design, and other tasks that can be performed digitally. The proliferation of these platforms has made gig work increasingly accessible, with the World Bank finding that the gig economy accounts for up to 12% of the global labor market—higher than previously estimated—and holds particular promise for women and youth in developing countries [4].

The platform economy framework highlights both opportunities and challenges. Platforms lower barriers to labor market participation, enabling individuals without formal employment credentials or networks to access income-generating opportunities. They provide flexibility valued by workers with caregiving responsibilities or those seeking supplementary income. However, platforms also raise concerns regarding employment classification, income stability, social protection coverage, and working conditions [22].

Inclusive Development and Digital Inclusion Framework

The inclusive development framework emphasizes that the benefits of digital technology should extend across all segments of society, rather than concentrating on already-advantaged groups. Digital inclusion encompasses multiple dimensions: access to digital infrastructure and devices, affordability of connectivity and services, digital literacy enabling effective technology use, and meaningful participation in digital economic activities [16].

Gender dimensions are central to digital inclusion analysis. Research has documented persistent gender gaps in digital access and usage in Indonesia. The gender gap score for internet access was 8.1 points, indicating that men have 8.1 percent more internet access than women. The latest Indonesian Internet Providers Association (APJII) survey reports internet penetration rates of 48% among women, compared to 52% among men. These access disparities lead to unequal employment opportunities, as individuals without digital connectivity face significant barriers to digital employment pathways [23].

The framework draws attention to intersecting inequalities based on geography, socioeconomic status, and gender. Rural residents and those from economically disadvantaged backgrounds are disproportionately affected by limited access to computers and the internet. Even among those with access to technology, digital literacy may remain insufficient to leverage these tools effectively for employment. Inclusive digital employment creation, therefore, requires addressing multiple dimensions of exclusion simultaneously [1].

Digital Technology and Employment in the Indonesian Context

Digital Economy Landscape in Indonesia

Indonesia has developed the largest digital economy in Southeast Asia, contributing approximately 40% of the region's digital economic value. The country's digital sector GMV of USD 90 billion in 2024 represents sustained growth despite global economic uncertainties. The digital economy contributed IDR 1,860 trillion, or 8.4% of GDP, in 2024, with annual growth of 7% outpacing the national economy's 5-6% growth rate [24].

The e-commerce sector dominates Indonesia's digital economy, valued at USD 32 billion in 2023 and expected to grow to USD 83 billion by 2025. Major platforms, including Tokopedia, Shopee, Bukalapak, and Lazada, have created extensive commercial ecosystems. The e-commerce market is projected to grow by 30.5% in 2024, the highest globally. This growth has been accompanied by the rise of social commerce, with platforms like TikTok Shop, Instagram Live, and Facebook Marketplace creating new commercial and employment opportunities, particularly for content creators and live sellers [25].

Indonesia has cultivated a robust startup ecosystem, having produced multiple technology unicorns. The GoTo ecosystem, resulting from the merger of Gojek and Tokopedia, represents the country's largest digital platform, combining e-commerce, on-demand services, and financial services. Research has documented GoTo's substantial economic contribution and employment generation, with businesses in its ecosystem creating additional job opportunities for 1.1 to 1.7 million people, equivalent to 0.8-1.2% of the total working population [26].

The fintech sector has also experienced significant growth, with digital financial services expanding access to financial products and creating employment in technology and financial services roles. Digital payment services grew 19% in 2024, with Gross Transaction Value reaching USD 404 billion—the largest digital payments market in Southeast Asia. This growth has implications for employment both within fintech companies and through the enabling effects of financial inclusion on broader economic participation [2].

Youth Employment Challenges in Indonesia

Indonesia's youth employment challenges reflect both structural economic factors and specific barriers facing young labor market entrants. The youth NEET rate, while declining, remains substantial at 20.31% as of August 2024. This translates to approximately 9 million young people not engaged in employment, education, or training—a significant waste of human capital potential [6].

Youth unemployment differs from overall NEET status. While NEET encompasses all young people not in education, employment, or training, youth unemployment refers explicitly to those actively seeking work but unable to find it. Research indicates that 42.62% of Generation Z aged 15-24 are unemployed due to limited work experience, skill mismatches, and age-related hiring restrictions. This situation creates an imbalance between workforce supply and demand, particularly in sectors requiring adaptive and resilient employees [9].

The skills mismatch between youth competencies and employer expectations represents a critical barrier. Although Generation Z is recognized for digital literacy and entrepreneurial mindset, many face challenges adjusting to work environments and meeting employer expectations. The gap between educational outcomes and industry requirements has led to situations where even educated youth struggle to secure appropriate employment. Notably, the university-educated NEET rate is higher than secondary education rates, at 31.32%, suggesting that higher education alone does not guarantee employment outcomes [7,8].

Regional disparities compound youth employment challenges. Employment opportunities concentrate in urban areas and developed regions, while youth in rural and peripheral areas face limited options. This geographic inequality interacts with digital infrastructure disparities, as less connected regions offer fewer digital employment pathways. The concentration of digital economy activities in major urban centers risks exacerbating rather than reducing regional employment inequalities.

Digital Skills Landscape in Indonesia

The digital skills landscape in Indonesia reveals significant gaps between current workforce competencies and the demands of a digital economy. A diagnostic study on Indonesia's digital skills landscape identified that while the government has set ambitious targets for digital skills development, comprehensive policy frameworks specifically for digital skills remain underdeveloped. Despite preparing the 2020-2024 Indonesia Digital National Roadmap, there is no detailed policy framework dedicated to digital skills development [10,16].

Current digital skills levels among the Indonesian workforce remain insufficient to meet the demands of the digital economy. Research indicates that approximately 50% of the labor force has only basic digital skills, with individuals lacking secondary education and not exposed to the internet in their main jobs being less likely to initiate upskilling. The government's target of 50% of workers having intermediate and advanced digital skills by 2024 represents a substantial gap from the current reality [10].

Digital literacy varies significantly across demographic groups. A study investigating digital literacy across generations in Indonesia found pronounced gender gaps, with women demonstrating lower levels of digital literacy than men. Education level strongly predicts digital skills, creating a cycle where less-educated individuals lack the skills to access digital employment and the digital employment that might enhance their economic outcomes [27].

The skills required for digital employment span multiple categories. Technical skills include programming, data analysis, digital marketing, and platform-specific competencies. Soft skills, including communication, problem-solving, creativity, and adaptability, are equally crucial to success in digital work. Research on employability skills among vocational graduates emphasizes that both technical competencies and transversal skills are essential for workforce readiness in digitalized contexts [28].

Employment Creation Mechanisms Through Digital Technology

E-commerce and Platform-Based Employment

E-commerce platforms have emerged as significant generators of employment in Indonesia. The sector creates jobs across multiple categories, including logistics, customer service, digital marketing, content creation, and platform operations. As e-commerce platforms expand, the demand for workers in these supporting functions has increased substantially [3].

Research indicates that e-commerce has become a significant driver of job creation in Indonesia. The industry is estimated to create 1.2 million jobs by 2025. These jobs span the e-commerce value chain, from platform technical operations to last-mile delivery services. The growth of video commerce and the creator economy has created new employment categories, with Indonesia being the second-fastest-growing market for creator uploads [29].

Social commerce represents an evolving frontier in employment. Platforms enabling direct sales through social media have created opportunities for individuals to establish micro-enterprises with minimal capital requirements. Content creators, brand ambassadors, and live sellers engage consumers through interactive selling methods, representing new occupational categories enabled by digital technology. This shift has led to increases in freelance and gig-based employment, with individuals specializing in digital marketing, content creation, and customer engagement [25].

The platform economy extends beyond e-commerce to encompass service-based applications. Ride-hailing and delivery platforms such as Gojek and Grab have created substantial employment for driver-partners and delivery workers. Research on GoTo's economic impact found that 46 percent of driver-partners did not earn income prior to working on its platform, demonstrating the livelihood-creation potential of platform-based employment [22].

Gig Economy and Flexible Work

The gig economy has fundamentally reshaped employment relationships in Indonesia, offering flexibility and accessibility while raising concerns about the quality of work and protections. Gig work is characterized by short-term, task-based engagements facilitated through digital platforms, where workers are typically classified as independent contractors rather than employees [17].

Indonesia's gig economy has grown substantially, driven by major platforms such as Gojek and Grab, as well as various freelance marketplaces. The rapid advancement of digital technologies has reshaped the labor market, with the gig economy emerging as a significant component of Indonesia's employment landscape. Platform workers include ride-hailing drivers, delivery couriers, freelance professionals, and task-based service providers across diverse sectors [30].

Gig work offers valued flexibility for workers seeking control over their schedules and work arrangements. Research indicates that flexible work arrangements make freelance work attractive to young individuals. For youth with caregiving responsibilities, educational commitments, or other constraints on traditional employment, gig work provides accessible income opportunities. Platforms remove traditional barriers to employment such as formal credentials, professional networks, and geographic proximity to employers [31].

However, the gig economy presents significant challenges regarding employment quality. Research has documented concerns about income instability, the lack of social protection, algorithmic arbitrariness, and weak bargaining positions vis-à-vis platform companies. Studies examining gig worker welfare in Indonesia have found that workers face risks, including inadequate safety protections, unpredictable earnings, and limited access to benefits enjoyed by formal-sector workers. The Fairwork initiative has given Indonesia's gig economy notably poor grades for fairness, despite its economic contributions [32].

Digital Entrepreneurship

Digital technology has lowered barriers to entrepreneurship, enabling youth to establish businesses with reduced capital requirements and expanded market access. Digital platforms provide tools, infrastructure, and market connections that support micro-entrepreneurship among young people. This entrepreneurship pathway offers an alternative to traditional employment for youth facing constrained opportunities in the formal sector [33].

Research on youth entrepreneurs in South and Southeast Asia found that digital platforms are primarily used for marketing, sales, and business operations. Youth enterprises leverage digital financial services for transactions and increasingly utilize sophisticated digital solutions for business management. The accessibility of digital tools has democratized entrepreneurship, enabling individuals without traditional business resources to establish and scale ventures [34,35].

Social commerce has emerged as a particularly accessible entrepreneurship pathway. Young Indonesians use platforms like Instagram, TikTok, and Facebook to launch e-commerce businesses, reaching customers without the overhead costs of physical retail. Research indicates that youth demonstrate strong entrepreneurial interest and actively leverage digital technologies to generate income. The success of platforms like Tokopedia in supporting small-merchant businesses reflects the potential for digitally enabled micro-entrepreneurship [36].

However, digital entrepreneurship faces barriers that limit its accessibility and sustainability. Access to capital remains challenging for youth entrepreneurs, as limited credit history and limited collateral constrain financing options. The absence of robust entrepreneurial ecosystems in developing countries continues to hinder youth entrepreneurship from achieving scalable and sustainable growth. Skills gaps in business management, financial literacy, and digital marketing further constrain entrepreneurial success [37-39].

Barriers and Challenges

Skills Gaps and Education-Employment Mismatch

The gap between industry skill demands and workforce supply represents a fundamental barrier to creating digital employment for youth. Research has consistently documented a misalignment between educational outcomes and employer expectations, leaving graduates inadequately prepared for roles in the digital economy. This mismatch manifests as high unemployment rates among educated youth and difficulty filling positions in the digital economy [9].

The rapid pace of technological change compounds skills challenges. Digital technologies evolve faster than educational curricula can adapt, creating persistent gaps between what is taught and what is demanded. Skills that are relevant today may become obsolete quickly, requiring continuous learning and adaptation that educational systems may not adequately support. Research on human capital strategies in the digital era emphasizes the necessity of upskilling and reskilling initiatives to address these dynamics(Setyanti, Faliza and Rustandy, 2025).

Educational quality and relevance present additional concerns. While Indonesia has expanded educational access, questions remain about the quality of instruction and its alignment with industry needs. Vocational and technical education, which should prepare students for practical employment, may not adequately incorporate digital competencies. The disconnect between academic preparation and workplace requirements contributes to extended job search periods and underemployment among youth [25].

Digital Divide and Infrastructure Barriers

The digital divide—disparities in access to and use of digital technologies—constitutes a significant barrier to the inclusive creation of digital employment. While Indonesia has made progress in expanding internet connectivity, substantial gaps persist across geographic, socioeconomic, and demographic dimensions [40].

Internet penetration remains uneven, with rural areas experiencing lower connectivity than urban centers. Research indicates that individuals without digital connections are less likely to initiate upskilling or join digital literacy programs because they have not experienced the benefits of connectivity. This creates a self-reinforcing cycle in which those most in need of digital skills development lack the connectivity needed to access training opportunities [10].

Device ownership and affordability present additional barriers. Even where connectivity exists, cost barriers may prevent youth from lower socioeconomic backgrounds from acquiring the devices necessary for digital employment. The quality of connections also matters; slow or unreliable internet limits participation in activities

requiring stable bandwidth, such as video-based commerce or real-time service delivery [40].

Infrastructure gaps are particularly pronounced in eastern Indonesia and other peripheral regions. Digital economy activities and employment opportunities concentrate in Java and major urban centers, leaving youth in other areas with limited pathways to digital employment. Addressing this geographic inequality requires substantial infrastructure investment alongside skills development initiatives [16].

Gender Inequalities in Digital Employment

Gender disparities pervade Indonesia's digital employment landscape, limiting women's access to opportunities and perpetuating broader inequalities. Research documents multiple dimensions of gender inequality in digital contexts: lower internet access among women, reduced digital literacy levels, occupational segregation in digital sectors, and structural barriers, including caregiving responsibilities and cultural norms [41].

The gender gap in internet access translates directly into disparities in employment opportunities. With women having 8.1 percentage points lower internet access than men, female youth face immediate barriers to digital employment pathways. This access gap reflects and reinforces broader gender inequalities in educational and economic participation [42].

Women's participation in digital employment follows patterns of occupational segregation observed in traditional labor markets. While women may engage in digital commerce and social selling, they remain underrepresented in higher-paying technical roles in software development, data analysis, and platform operations. Research examining women's employment in the digital economy era found persistent challenges in accessing quality employment despite increased digital opportunities [43].

Structural factors, including domestic responsibilities, unpaid care work, and cultural norms, constrain women's participation in digital employment. The high female NEET rate, with economic inactivity as the primary category for women, reflects how caregiving responsibilities limit labor force participation. Digital employment's flexibility offers potential benefits for women managing multiple responsibilities, but realizing these benefits requires addressing underlying structural barriers [7,8].

Employment Quality and Worker Protection Concerns

Digital employment, particularly in the gig economy, raises substantial concerns about job quality and worker protections. Research has documented how platform work often falls outside traditional labor law protections, leaving workers vulnerable to income instability, lack of benefits, and limited recourse for grievances [44].

Employment classification represents a central challenge. Gig workers are typically classified as independent contractors or "partners" rather than employees, exempting platforms from obligations regarding minimum wage, working hours, social security contributions, and other protections. Research examining legal protection for gig workers in Indonesia concluded that the current legal framework is insufficient to address the unique characteristics of platform-mediated work, resulting in legal uncertainty and limited access to social protection [45].

Income instability affects many digital workers. Platform algorithms determine work allocation, pricing, and performance evaluation in ways that may be opaque to workers. Research indicates that gig workers experience unpredictable earnings, with income varying based on factors outside their control, including algorithm changes, platform policies, and competitive dynamics. This instability is particularly problematic for workers relying on gig income as their primary source of livelihood [46].

Social security coverage gaps leave digital workers exposed to risks. Without employer contributions to health insurance, pension schemes, or workplace injury protection, platform workers bear these risks individually. The DPR RI (Indonesian House of Representatives) has identified the need to revise the manpower law to incorporate protections for informal workers, including gig workers, and to address current inadequacies through regulatory recognition [47].

Policy Frameworks and Institutional Responses

Government Digital Initiatives

The Indonesian government has implemented multiple initiatives to support digital skills development and employment. The Kartu Prakerja (Pre-Employment Card) Program represents the flagship initiative, providing training subsidies to job seekers, workers, and entrepreneurs. Launched in 2020, the program has benefited 17.5 million participants across all districts/cities throughout Indonesia [48].

Prakerja has demonstrated commitment to inclusive access, with 51% of participants being women, 48% from indigent districts/cities, 2% from disadvantaged areas, and 3% persons with disabilities. In 2024, the program targeted 1.148 million participants, offering training in digital skills, artificial intelligence, and green skills. Research suggests that participation in Prakerja increases the likelihood of youth transitioning into the digital sector by 1.314, indicating positive employment effects [49].

The Skill Our Future program, a regional initiative led by UNDP and Microsoft, aims to democratize access to digital skills, artificial intelligence, and employment opportunities for young people, including those from underserved communities. The program provides comprehensive digital skills development, job placement assistance, and career guidance, targeting youth who face barriers to accessing essential technology skills [1].

The government has also articulated digital transformation roadmaps guiding national development. The Indonesia Digital Roadmap 2021-2024 addresses four strategic sectors: digital infrastructure, digital administration, digital economy, and digital community. However, research indicates that despite these high-level frameworks, detailed policies specifically for digital skills development remain underdeveloped [50].

The AI Talent Factory program, announced in 2025, represents emerging efforts to develop artificial intelligence capabilities within the workforce. This initiative aims to train talent for direct involvement in national strategic projects across health, education, financial services, and agriculture sectors. The government projects a need for 12 million digital talents by 2030, with current capacity at 9.3 million [51].

Private Sector and Corporate Initiatives

Private sector actors contribute significantly to digital skills development and employment creation. Technology companies implement training programs, internships, and partnership initiatives that complement government efforts. Major platforms have developed merchant and partner support programs that build capacity within their ecosystems.

The GoTo ecosystem exemplifies private sector employment impact. Research documented that businesses operating on the GoTo platform created additional employment opportunities and that the platform's presence in cities correlated with reduced income inequality. Platform companies have also implemented various welfare initiatives for driver-partners and merchants, including training programs, insurance options, and business support services [5].

Corporate social responsibility initiatives by technology companies contribute to the development of digital skills. Microsoft's partnership with UNDP on the Skill Our Future program demonstrates corporate engagement with youth employment challenges. Similarly, the Skills for Jobs Indonesia Program represents collaboration between the government and Microsoft, targeting 1 million people by 2024 [52].

Industry partnerships with educational institutions aim to align curricula with employment demands. Companies collaborate with universities and vocational institutions to develop relevant training programs, provide internship opportunities, and inform curriculum development. These partnerships represent attempts to address the education-employment mismatch through direct industry engagement [53].

Regulatory Frameworks and Gaps

Indonesia's regulatory framework for digital employment remains underdeveloped, creating uncertainty for workers and platforms alike. The existing manpower law (Law No. 13 of 2003) predates the digital economy transformation and does not explicitly address platform-based work arrangements. This gap leaves gig workers without explicit legal protections and platforms without defined obligations [54].

The Omnibus Law on Job Creation (Cipta Kerja), introduced in 2020, attempted to streamline business regulations but did not comprehensively address platform work. Research examining legal protections for gig economy workers found that the law's approach favors economic liberalization over the protection of labor rights. The binary classification between employees and independent contractors fails to accommodate the hybrid nature of platform work relationships [45].

Proposed regulatory approaches include introducing hybrid employment categories, extending mandatory social protection coverage, recognizing gig worker associations, and establishing specialized dispute resolution mechanisms. Some scholars recommend revising the manpower law to strengthen protections for informal workers, including mandatory social security enrollment, protections for working hours, information transparency requirements, and rights to association.

International comparison provides useful models. Singapore's Platform Worker Act, effective in 2025, provides platform workers with enhanced protections while preserving work flexibility. This hybrid regulatory approach offers potential lessons for Indonesia's regulatory development. The International Labour Organization (ILO) has also developed frameworks and recommendations for extending decent work principles to platform workers [55].

Method

Research Design and Approach

This study employs a qualitative literature review methodology to examine the role of digital technology in creating employment for youth in Indonesia. Unlike systematic literature reviews that follow rigid protocols with predetermined search strategies and replicable procedures, qualitative literature reviews adopt a more flexible, interpretive approach that emphasizes understanding context, meanings, and processes [56].

Qualitative research methods are distinguished by their focus on exploring real-world problems through open-ended inquiry, gathering experiences, perceptions, and behaviors, and on understanding 'how' and 'why' rather than merely 'what'. This approach is particularly suited to the present study's objectives of synthesizing diverse research perspectives and developing an integrated understanding of digital employment dynamics in Indonesia [57].

The qualitative literature review approach allows for iterative refinement of research questions during the review process, purposive rather than exhaustive source coverage, and holistic interpretation of findings. Rather than aggregating statistical findings through meta-analysis, this review aims to identify patterns, themes, and relationships across the literature to illuminate the research questions [56].

Distinctions from Systematic Literature Review

This qualitative literature review differs from a systematic literature review (SLR) in several important respects. Systematic reviews follow standardized protocols, including comprehensive search strategies, explicit inclusion/exclusion criteria, quality assessment procedures, and, often, quantitative synthesis of findings. They prioritize replicability and aim to minimize researcher subjectivity [58].

The present qualitative review instead embraces interpretive flexibility as an analytical strength. Research questions have been refined through engagement with the literature rather than being predetermined in advance. Source selection is purposive rather than exhaustive, focusing on relevance and contribution to understanding rather than comprehensiveness per se. Researcher interpretation is acknowledged as central to the analytical process, with trustworthiness ensured through methodological transparency rather than procedural replication [56].

The qualitative approach is appropriate given the study's objectives of developing contextual understanding rather than measuring effect sizes. The literature on digital technology and youth employment in Indonesia spans multiple disciplines, methodologies, and source types, including academic research, policy reports, and institutional analyses. A qualitative review can synthesize across these diverse sources more effectively than systematic approaches optimized for homogeneous study designs.

Literature Identification and Selection

Literature identification was conducted using multiple complementary strategies. Database searches utilized Scopus, Google Scholar, and institutional repositories to identify relevant peer-reviewed publications. Search terms included combinations of keywords: digital technology, digital economy, digital platforms, e-commerce, gig economy, employment, labor market, youth, young workers, Indonesia, skills, and related terms.

The temporal scope prioritized recent publications (primarily 2020-2025) to capture current developments in a rapidly evolving field, while incorporating foundational literature from earlier periods where necessary for theoretical grounding. The geographic focus centered on Indonesia while incorporating comparative research from Southeast Asia and global contexts that illuminate broader patterns relevant to the Indonesian case.

Source types included peer-reviewed journal articles from reputable outlets, government reports and policy documents, institutional research from organizations including the World Bank, ILO, UNDP, and SMERU Research Institute, and industry analyses. Priority was given to empirically grounded studies and analyses by recognized experts and institutions.

Inclusion criteria emphasized relevance to the research questions: focus on digital technology and employment, attention to youth populations, and applicability to the Indonesian context. Sources were excluded if they lacked empirical grounding, offered purely theoretical speculation without application, or focused on contexts too dissimilar to Indonesia for meaningful comparison.

Data Extraction and Critical Evaluation

Source screening involved title and abstract review for relevance, followed by full-text examination of potentially relevant materials. Key information was extracted, including research objectives, methodology, main findings, and implications for the present review's questions.

The critical evaluation assessed each source's research quality, including methodological rigor, evidence quality, and analytical soundness. Author credibility and institutional affiliation were considered, with higher weight given to peer-reviewed publications and reports from recognized research institutions. Potential biases and limitations were identified, and alternative perspectives were sought to ensure balanced coverage [56].

Data organization proceeded thematically, categorizing findings by research themes including employment mechanisms, platforms, skills, gender, policy, and barriers. Cross-referencing enabled the identification of patterns of agreement, contradiction, and complementarity across sources. This organization supported the thematic synthesis approach to analysis.

Synthesis and Analysis Approach

Analysis employed thematic synthesis to identify recurring patterns and themes across the literature. Analytical categories emerged through iterative engagement with sources, with initial categories refined as additional materials were incorporated. Relationships among themes were mapped to develop an integrated understanding of digital employment-creation dynamics [56].

Narrative analysis examined how different sources framed digital employment, identifying underlying assumptions, emphasized factors, and implied causal mechanisms. Attention was paid to stakeholder perspectives—youth, policymakers, and private-sector actors—and to how these perspectives shaped the research framing and findings.

Inductive interpretation allowed insights to emerge from the literature rather than imposing predetermined frameworks. While theoretical perspectives informed the analysis, the review remained open to patterns not anticipated by existing theory. Contradictions and gaps in the literature were noted as findings, identifying areas requiring further research.

Trustworthiness and Quality Assurance

Trustworthiness in qualitative research is established through credibility, dependability, confirmability, and transferability rather than through the validity and reliability criteria applied to quantitative research. This review addressed each dimension through appropriate strategies [59].

Credibility was enhanced through comprehensive coverage of the literature, sustained engagement with the material, and triangulation across source types and methodologies. Multiple perspectives were incorporated to ensure that conclusions reflect the weight of evidence rather than selective reading.

Dependability was supported through transparent documentation of search and selection processes. The methodology section provides sufficient detail for readers to understand how the review was conducted and to assess the appropriateness of procedures for the research objectives.

Confirmability was addressed by grounding interpretations in literature evidence. The results section extensively cites sources supporting each claim, enabling readers to assess whether the underlying evidence warrants interpretations. Researcher positioning and potential biases are acknowledged.

Transferability considerations recognize that findings are context-specific to Indonesia's digital employment landscape. However, the conceptual insights into digital employment mechanisms, barriers, and enablers may be relevant to other developing-country contexts facing similar dynamics.

Results and Analysis

Digital Platforms and Employment Opportunities for Youth

E-Commerce Platforms as Primary Employment Generators

The reviewed literature consistently identifies e-commerce as a primary driver of digital employment creation in Indonesia. The sector's growth trajectory—from USD 32 billion in 2023 to a projected USD 83 billion by 2025—has generated extensive employment across platform operations, logistics, customer service, and digital marketing. The e-commerce sector's contribution of USD 65 billion to Indonesia's 2024 digital economy GMV underscores its dominance [24].

Employment creation through e-commerce operates through multiple channels. Direct employment encompasses positions within platform companies themselves, including technical roles (software development, data analysis), operational roles (customer service, content moderation), and business functions (marketing, business development). As platforms expand operations and user bases, these employment categories grow correspondingly [3].

Ecosystem employment extends beyond platform companies to encompass businesses operating on or through platforms. Research on the GoTo ecosystem found that businesses run by merchants created an additional 1.1 to 1.7 million jobs. Small and medium enterprises using e-commerce platforms expand their operations, creating employment in production, fulfillment, and customer engagement. The multiplier effects of e-commerce growth thus extend throughout connected economic activities [5].

The rise of video commerce and social commerce has created new employment categories. Content creators, live sellers, brand ambassadors, and affiliate marketers engage consumers through interactive selling methods enabled by platform features. Indonesia ranks as the second-fastest-growing market for creator video uploads, with a 16% compound annual growth rate from 2022 to 2024. These developments suggest continued employment creation in creative and marketing roles within the e-commerce ecosystem [25].

Gig Economy and Platform-Based Work

Gig platforms have created substantial, if contested, employment opportunities for Indonesian youth. Ride-hailing and delivery platforms—notably Gojek and Grab—provide income opportunities for millions of driver-partners, many of whom previously lacked income. The accessibility of gig work, which requires minimal credentials and offers flexible schedules, has particular appeal to youth facing barriers to formal employment [22].

The literature reveals essential dimensions of gig work characteristics. Regarding employment access, research found that 46% of Grab's driver-partners had not earned income before accessing platform work. This suggests gig platforms create opportunities for individuals outside the formal labor market, potentially including NEET youth who can transition into earning activities [22].

Regarding work characteristics, gig work offers flexibility valued by workers but also entails instability and uncertainty. Workers determine their own schedules and workload, but face unpredictable demand, algorithmic rating systems, and platform policy changes that affect their earning potential. Research examining young digital workers found both the appeal of flexibility and the vulnerabilities associated with informal employment status [21].

Regarding income potential, findings are mixed. Some research suggests that gig work provides income comparable to or exceeding that of available alternatives for workers with limited credentials. However, other studies document income instability, with earnings varying unpredictably based on demand fluctuations, algorithm changes, and competitive dynamics [17,30].

Digital Entrepreneurship Pathways

Digital technology has enabled entrepreneurship pathways with fewer barriers than traditional business establishment. The literature identifies multiple mechanisms through which digital platforms support youth entrepreneurship, including lowered capital requirements, expanded market access, and provision of business tools and infrastructure [60].

E-commerce platforms enable micro-entrepreneurship by providing marketplace infrastructure, payment processing, and customer access without requiring physical retail premises or extensive startup capital. Research on Tokopedia's impact documented support for the expansion of small merchants and enterprise development. Youth can establish seller businesses with minimal investment, accessing national or even international customer bases [61].

Social commerce is a remarkably accessible channel for entrepreneurship. Platforms that enable direct sales through social media allow youth to leverage their existing social networks for commercial purposes. Content creation skills that youth often possess naturally translate into commercial applications through social selling, affiliate marketing, and influencer activities [25].

However, the literature also identifies constraints on the potential of digital entrepreneurship. Capital access remains challenging, with youth lacking credit histories and collateral, and with difficulty securing business financing. Skills gaps in business management, financial planning, and advanced digital marketing limit enterprise sustainability and growth. Ecosystem limitations, including inadequate mentorship, limited networking opportunities, and insufficient support services, constrain the scalability of youth digital enterprises [62-64].

Facilitating Factors and Enablers

Human Capital Development and Skills Training

The literature identifies human capital development as essential for youth to access and succeed in digital employment. Research consistently demonstrates positive relationships between education, training participation, and digital sector employment outcomes. The mechanism operates through skill acquisition, enabling youth to meet employer requirements and participate effectively in digital economic activities [17].

Formal education provides foundational competencies, and higher education correlates with a higher probability of digital-sector employment. Research on youth transitions to the digital sector found that fresh graduates with higher education had a 1.491 times greater tendency to transition to digital-sector work. However, the relationship between education and employment is not automatic, with quality and relevance of education moderating outcomes [17].

Training programs demonstrate positive employment effects. Research found that participation in training increased the likelihood of transitioning to the digital sector by 1.525 times for secondary education graduates and 1.239 times for higher education graduates. The Prakerja program has trained 17.5 million participants, with evidence suggesting positive impacts on employment opportunities. Training effectiveness

depends on content relevance, instructional quality, and alignment with actual employment pathways [65].

Digital skills are specifically critical for employment in the digital economy. Research indicates that workers with digital competencies are more likely to secure better jobs with higher compensation. Skills spanning basic digital literacy to advanced technical competencies are required across different segments of the digital economy. The government's target of 9 million digital talents by 2030 reflects recognition of skills as a binding constraint on digital employment growth [66,67].

Digital Infrastructure and Connectivity

Digital infrastructure constitutes a foundational enabler for digital employment creation. The literature documents positive relationships between internet access, mobile connectivity, and employment outcomes in developing countries. Infrastructure provides the foundation for digital platforms, e-commerce, and gig work [4].

Research on Sub-Saharan Africa found substantial employment effects from internet access, with the probability of employment increasing by 3.1-13.2 percent, depending on the country context. Effects were driven primarily by increases in moderately skilled employment, suggesting that infrastructure enables access to jobs that require some, but not necessarily advanced, education. Similar dynamics likely operate in Indonesia, where infrastructure expansion enables employment in e-commerce, gig platforms, and digital services [12].

Indonesia's infrastructure expansion has supported the growth of the digital economy. Internet penetration reached 220 million users, representing 73% of the population by 2023. Mobile connectivity has expanded further, with 365 million mobile users. This infrastructure enables the platform economy, which generates employment opportunities [29].

However, infrastructure gaps persist and constrain the creation of inclusive employment. Rural-urban disparities in connectivity limit youth's access to employment outside urban centers. The quality of the connection matters alongside availability; slow or unreliable internet limits participation in activities that require stable bandwidth. Addressing these gaps requires continued investment in infrastructure, particularly in underserved regions [40].

Policy and Institutional Support

Government policy and institutional frameworks shape the environment for the creation of digital employment. The literature identifies multiple policy domains relevant to digital employment, including digital infrastructure investment, skills development programs, regulatory frameworks, and support for digital entrepreneurship.

Indonesia's policy initiatives have contributed to the growth of the digital economy and employment. The Prakerja program represents a substantial commitment to skills development, with evidence suggesting positive employment effects. Digital infrastructure investments have expanded connectivity. The Indonesia Digital Roadmap articulates a strategic direction for digital transformation [50].

Public-private partnerships emerge as important mechanisms for skills development and employment facilitation. The Skills for Jobs Indonesia Program, partnering with the government and Microsoft, targets digital skills development at scale. The Skill Our Future initiative demonstrates collaboration among UNDP, Microsoft, and Indonesian institutions to address gaps in youth digital skills [52].

The literature identifies policy gaps constraining more effective employment outcomes. Comprehensive policy frameworks specifically for digital skills development remain underdeveloped. Coordination gaps exist between initiatives implemented by different ministries and institutions. Regulatory frameworks for digital employment, particularly gig work, remain inadequate. These gaps represent opportunities for policy enhancement [47].

Barriers and Challenges to Digital Employment

Skills Gaps as Employment Barriers

Skills gaps between youth competencies and employer requirements constitute a primary barrier to digital employment. The literature documents misalignment between what educational systems produce and what digital economy employers demand. This mismatch manifests in youth unemployment despite available positions and in the quality limitations of employment secured [9].

The education-employment disconnect reflects multiple factors. Curricula may not incorporate current digital skills requirements. Teaching methods may emphasize theoretical knowledge over practical competencies. Educational institutions may lack resources to provide technology-intensive training. Research indicates that even among technology adopters, digital literacy skills often remain insufficient for employment [1].

Rapid technological change exacerbates skills challenges. Digital technologies evolve faster than educational curricula can adapt, creating persistent gaps between the content taught and the competencies demanded. Skills relevant today may become obsolete as technology advances, necessitating continuous learning that current systems may not support [13].

Skills deficits are not uniform across the youth population. Those from disadvantaged backgrounds face compounding barriers: less access to quality education, fewer opportunities for supplementary training, and limited exposure to digital technologies through daily life. This creates patterns where skills gaps reinforce existing socioeconomic inequalities [16].

Digital Divide and Access Barriers

The digital divide—disparities in access to and use of digital technologies—directly constrains youth access to digital employment. The literature documents access gaps across geographic, socioeconomic, and demographic dimensions that exclude segments of the youth population from digital employment pathways [12].

Geographic disparities limit rural youth's access to digital employment. Digital infrastructure concentrates in urban areas, with rural regions experiencing lower connectivity quality and availability. Employment opportunities similarly concentrate in urban centers where digital platforms operate most extensively. Rural youth face barriers both to digital skills acquisition and to accessing digital work opportunities [7,8].

Socioeconomic barriers include affordability constraints on device ownership and connectivity. Youth from lower-income backgrounds may lack smartphones, computers, or data plans needed to participate in digital employment. Even where public access points exist, private device ownership enables fuller participation in flexible digital work arrangements [40].

The digital divide creates reinforcing cycles. Research found that individuals without digital connections are less likely to pursue upskilling because they have not experienced its benefits. Those without digital access cannot access digital training programs, perpetuating skills gaps that, in turn, limit employment opportunities [16].

Gender Barriers in Digital Employment

Gender inequalities pervade Indonesia's digital employment landscape, constraining women's access to opportunities created by digital technology. The literature documents multiple dimensions of gender disadvantage, including lower internet access, reduced digital literacy, occupational segregation, and structural constraints [47].

Access disparities directly affect employment opportunities. Women's internet access is 8.1 percentage points lower than men's in Indonesia. With internet penetration at 48% for women versus 52% for men, female youth face immediate barriers to digital employment pathways. These access gaps reflect broader gender inequalities in resource allocation within households and communities [23].

Digital skills gaps between genders compound access disparities. Research on digital literacy in Indonesia found women demonstrating lower competencies than men. Skills deficits limit women's ability to leverage digital technologies for employment, even when access is available. Addressing gender gaps in digital employment thus requires attention to skills development alongside expanding access [27].

Structural factors, including domestic responsibilities and caregiving obligations, constrain women's labor force participation generally and digital employment specifically. The high female NEET rate—22.77% versus 16.04% for males—reflects how caregiving responsibilities remove women from the labor force. While digital work's flexibility could, in theory, accommodate these constraints, realizing this potential requires addressing underlying structural factors [67].

Occupational segregation persists in digital sectors, with women underrepresented in higher-paying technical roles. Women may cluster in lower-paid digital work categories while men dominate positions in software development, data science, and platform technical operations. Breaking these patterns requires addressing gender biases in education, hiring, and workplace culture [68].

Employment Quality and Protection Deficits

Digital employment, particularly in the gig economy, frequently fails to provide the quality, stability, and protections associated with decent work. The literature documents how platform work structures externalize risks onto workers while limiting access to benefits and protections [17].

Employment classification represents a central challenge. Platforms classify workers as independent contractors or partners rather than employees, exempting themselves from employer obligations. This classification denies workers access to minimum-wage protections, working-hour regulations, social security contributions, and other entitlements associated with formal employment relationships [54].

Income instability characterizes much platform work. Research documents unpredictable earnings driven by algorithmic work allocation, demand fluctuations, and platform policy changes. Workers cannot predict their income from week to week, which complicates financial planning and creates stress. Those relying on gig work as a primary income face particular vulnerability to income volatility [46].

Social protection gaps leave digital workers exposed to health, injury, and retirement risks. Without employer contributions to social security schemes, workers must self-finance protections or go without coverage. Research indicates that gig workers have limited access to health insurance, pension schemes, and workplace injury compensation available to formal sector workers [55].

Algorithmic management introduces distinct challenges. Platform algorithms determine work allocation, performance evaluation, and compensation in ways that may be opaque and arbitrary to workers. Workers may face account deactivation or reduced access to work without a clear explanation or recourse [32].

Gender Dimensions in Digital Employment

The literature reveals complex gender dynamics in Indonesian digital employment that warrant dedicated analysis. While digital technology offers potential to reduce traditional gender barriers to employment, realizing this potential requires addressing deeply embedded inequalities.

Opportunities for women in digital employment include flexibility, the ability to accommodate caregiving responsibilities, a reduced emphasis on physical presence and mobility, and access to micro-entrepreneurship pathways. Research suggests that digital work enables some women to participate in economic activities who would otherwise be constrained by traditional employment. Social commerce, in particular, has enabled women's economic participation through accessible entrepreneurial channels [41].

Persistent disadvantages limit women's benefit from digital employment opportunities. The gender gap in internet access (8.1 percentage points) represents an immediate barrier. Lower levels of digital literacy among women constrain effective use of technology. Cultural norms and family responsibilities limit women's time and mobility for digital work. Occupational segregation channels women toward lower-paying digital work categories [43].

The high female NEET rate—34.06% among women aged 20-24 versus 20.07% among men—indicates how far digital employment still has to go to reach women. Economic inactivity, rather than an active job search, characterizes much of female NEET status, reflecting structural constraints that digital employment has not overcome. Addressing these patterns requires gender-responsive policies that tackle underlying barriers rather than assuming digital technology will automatically benefit women [7].

Policy implications include the need for gender-targeted digital skills programs, infrastructure investments that reach women, and support services that enable women's economic participation, such as childcare. Research emphasizes that achieving gender equality in digital employment requires deliberate interventions rather than relying solely on technology [47].

Policy Analysis and Institutional Responses

The literature enables analysis of policy effectiveness and of gaps in support for digital employment among Indonesian youth. Government initiatives demonstrate commitment but also reveal areas that require improvement.

Prakerja program strengths include substantial reach (17.5 million participants), inclusive access (51% women, attention to disadvantaged regions and persons with disabilities), and relevance of training offerings, including digital skills. Research suggests that program participation has positive employment effects. The program demonstrates the capacity for large-scale delivery of skills development [49].

Prakerja limitations include questions about training quality, alignment with actual employment pathways, and the sustainability of the skills acquired. As a training subsidy program, it relies on external training providers whose quality varies. Follow-up support for employment matching may be limited. Research examining program effectiveness should assess longer-term employment outcomes rather than just training completion [64,65].

Regulatory gaps for digital employment remain substantial. The manpower law does not comprehensively address platform work, leaving gig workers without clear protections. Proposed reforms, including hybrid employment categories, mandatory social protection coverage, and worker association rights, have not been implemented. International examples, such as Singapore's Platform Worker Act, demonstrate possible regulatory approaches that Indonesia has yet to adopt [20].

Coordination challenges affect policy effectiveness. Digital skills development involves multiple ministries and institutions, but lacks clear coordinating mechanisms. The absence of a comprehensive policy framework specifically for digital skills creates fragmentation. Better coordination could enhance efficiency and coverage of digital employment support initiatives [10].

Conclusion

Summary of Key Findings

This qualitative literature review has examined how digital technology creates employment opportunities for youth in Indonesia, synthesizing evidence on mechanisms, enablers, barriers, and policy frameworks. Several key findings emerge from the analysis.

Digital technology creates youth employment through multiple mechanisms. E-commerce platforms generate employment in platform operations, logistics, customer service, and marketing, with ecosystem effects creating additional jobs through merchant businesses and supporting services. The gig economy provides accessible income opportunities for youth facing barriers to formal employment, though with concerning quality dimensions. Digital entrepreneurship pathways enable youth to establish businesses with lower capital requirements by leveraging platforms for market access and business tools.

Human capital development constitutes an essential enabler of digital employment creation. Education and training correlate positively with digital sector employment outcomes. The Prakerja program and similar initiatives demonstrate the capacity to deliver skills development at scale. However, persistent skills gaps between youth competencies and employer demands constrain access to employment, underscoring the need for continued attention to the quality and relevance of education.

Digital infrastructure provides the foundation for digital employment, with internet access and connectivity enabling platform-based work and digital commerce. Indonesia has made substantial progress in infrastructure expansion, but geographic and socioeconomic disparities in access persist, creating barriers for rural youth and those from disadvantaged backgrounds.

Multiple barriers constrain the creation of inclusive digital employment. Skills gaps leave many youth unable to access opportunities in the digital economy. The digital divide excludes those without connectivity or devices. Gender inequalities limit women's participation despite the potential flexibility of digital technology. Employment quality concerns—including income instability, social protection gaps, and algorithmic management challenges—raise questions about whether digital employment provides decent work.

Policy frameworks have achieved partial success but require enhancement. Government initiatives, including Prakerja, demonstrate commitment and capacity for large-scale intervention. However, regulatory frameworks for digital employment remain underdeveloped, coordination challenges fragment efforts across institutions, and a comprehensive digital skills policy is lacking.

Theoretical Contributions

This review contributes to the theoretical understanding of digital technology and employment relationships in developing country contexts. Human capital theory is confirmed as relevant, with investments in skills correlating with digital employment outcomes. However, the review also reveals how structural factors—infrastructure access, gender relations, regulatory frameworks—mediate between human capital and employment outcomes, suggesting the need for more institutionally-embedded theoretical frameworks.

Skill-biased technological change theory receives partial support, with evidence that advanced digital skills enhance employment prospects. However, the review also documents how platform technologies create opportunities for workers without advanced skills through gig work and accessible entrepreneurship pathways, suggesting more complex relationships than straightforward skill bias.

The platform economy and gig work frameworks prove essential for understanding contemporary digital employment dynamics. These frameworks illuminate how digital intermediation creates employment while restructuring work relationships in ways that challenge traditional employment categories and protections.

Implications for Policy and Practice

The findings carry implications for policymakers, practitioners, and stakeholders engaged in youth employment and digital development.

For government policymakers, priorities include: developing comprehensive digital skills policy frameworks that coordinate across institutions; enhancing regulatory frameworks for platform and gig employment to ensure worker protections; continuing infrastructure investment with attention to underserved regions; and maintaining and improving skills development programs like Prakerja with attention to quality and employment linkages.

For private sector actors, responsibilities include: implementing responsible practices regarding worker classification and compensation; supporting skills development through training programs and educational partnerships; ensuring algorithmic transparency and fairness; and contributing to ecosystem development supporting digital entrepreneurship.

For educational institutions, needs include: curriculum modernization incorporating digital competencies; stronger industry partnerships to inform program development; attention to practical skills alongside theoretical knowledge; and lifelong learning pathways supporting continuous skill updating.

For civil society and international organizations, roles include: monitoring employment quality and worker welfare; advocating for worker rights and protections; supporting digital inclusion initiatives that reach marginalized populations; and generating research evidence to inform policy development.

Limitations and Future Research Directions

This review has limitations warranting acknowledgment. As a qualitative literature review, it does not provide a statistical synthesis of effect sizes or definitive causal conclusions. Source coverage, while extensive, cannot claim to be exhaustive. Interpretation reflects the researcher's perspective, despite efforts to ensure trustworthiness.

Future research priorities identified through this review include:

- Longitudinal studies tracking youth through digital employment pathways to understand career trajectories, skills development over time, and long-term outcomes of digital work experiences.
- Quality-focused research examining not just employment access but employment quality—income adequacy, stability, work conditions, satisfaction, and career development potential—in digital employment.
- Gender-disaggregated analysis exploring how women's experiences of digital employment differ from men's and identifying interventions effectively addressing gender gaps.
- Regional studies examining digital employment dynamics in areas outside Java and major urban centers, understanding how geographic peripherality shapes digital employment access and outcomes.
- Policy evaluation research assessing the effectiveness of interventions, including Prakerja, regulatory reforms, and skills development programs, in achieving intended employment outcomes.

Concluding Statement

Digital technology offers substantial opportunities to create employment for Indonesian youth. The country's growing digital economy, expanding platform ecosystem, and large youth population develop conditions for the growth of digital jobs. However, realizing inclusive benefits from these opportunities requires moving beyond technological determinism to address the human capital, institutional, and structural factors that shape employment outcomes.

The evidence reviewed suggests that digital technology alone does not automatically create quality employment for youth. Skills gaps must be addressed through relevant education and training. Infrastructure must be extended to reach all youth, not only urban and advantaged populations. Gender barriers must be confronted through deliberate interventions. Regulatory frameworks must be developed to ensure digital employment provides decent work rather than exploitative arrangements.

Multi-stakeholder collaboration—engaging government, private sector, educational institutions, civil society, and youth themselves—is essential for achieving inclusive digital employment creation. The momentum of Indonesia's digital economy presents an opportunity to harness digital technology for youth employment and development, but seizing this opportunity requires coordinated, comprehensive, and sustained effort across all stakeholders.

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