


The Shadow Economy's Role in Indonesia's Digital Economic Structure

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Article Info	ABSTRACT
<p>Article history: Received Aug, 2025 Revised Aug, 2025 Accepted Aug, 2025</p> <p>Keywords: Digital Economy; Inclusive Development; Indonesia; Informal Economy; Qualitative Analysis</p>	<p>The informal economy continues to play a vital role in Indonesia's socioeconomic landscape, providing livelihoods for millions who remain outside the formal sector. With the rapid expansion of digital technologies, informal workers and entrepreneurs are increasingly adopting digital tools to sustain and expand their economic activities. This study examines the role of the informal economy in Indonesia's digital economy using a qualitative approach. Data were gathered through in-depth interviews with five informants actively engaged in informal sectors, including online retail, food services, digital freelancing, and street vending. The findings reveal that digital platforms enhance market access, promote financial inclusion, and improve livelihood resilience for informal actors. However, challenges remain, such as limited digital literacy, unstable infrastructure, and unclear regulatory frameworks. These factors hinder the ability of informal workers to fully integrate into the digital economy. The study concludes that inclusive policies, digital literacy programs, and infrastructure support are essential to maximize the contributions of the informal economy to Indonesia's digital transformation.</p> <p><i>This is an open access article under the CC BY-SA license.</i></p>
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1. INTRODUCTION

The informal economy has long been a defining feature of Indonesia's economic structure, absorbing a significant portion of the workforce and providing livelihoods for those excluded from formal employment opportunities. According to the International Labour Organization (ILO), the informal sector encompasses a wide range of activities carried out by individuals and micro-enterprises that operate outside formal regulations, taxation, and labor protections. In Indonesia, this sector contributes substantially to employment generation and poverty alleviation, particularly in rural and

urban low-income communities, yet it is often overlooked in formal economic planning and remains vulnerable to instability, lack of social security, and minimal access to financial and technological resources. The informal economy plays a crucial role in employment and poverty alleviation, contributing significantly to the country's GDP and employing a large portion of the workforce, especially in rural and low-income urban areas, but it is characterized by instability, lack of social security, and limited access to resources, challenges that were further exacerbated by the COVID-19 pandemic's impact on global economic structures [1], [2]. Despite accounting for more than half of

Indonesia's GDP, the number of informal workers has shown a decreasing trend [3], while informal employment still constitutes about 70% of total employment in emerging markets and developing economies, with self-employment making up more than half of this figure [2]. However, informal workers often lack social security coverage, with less than 2.5% participating in programs like BPJS Labour [4], a situation worsened by low public literacy about available schemes, irregular incomes, and unstable financial conditions that hinder effective participation in contributory systems [4]. Furthermore, key factors influencing participation in the informal sector include gender, age, education level, and employment type, with being female, over 40 years old, and having lower education identified as significant predictors of informal sector employment [5].

In recent years, Indonesia has witnessed rapid digitalization driven by expanding internet penetration, the rise of e-commerce platforms, and the proliferation of financial technology (fintech) services, with the digital economy increasingly regarded as a catalyst for inclusive growth, entrepreneurship, innovation, and market expansion. For informal workers and entrepreneurs, digital platforms have become an alternative avenue to access broader markets, reduce transaction costs, and enhance visibility, as seen from street vendors utilizing social media for sales promotion to digital freelancers offering services through online marketplaces, reshaping Indonesia's economic dynamics. E-commerce has emerged as a primary driver of this transformation, significantly contributing to economic growth and job creation, fueled by increasing internet penetration, smartphone usage, and changing consumer behavior [6], while also enabling informal workers and entrepreneurs to access wider markets and reduce transaction costs [7]. Alongside this, fintech services are enhancing financial inclusion by providing access to digital financial tools and services [7], enabling informal workers to manage finances more efficiently and access credit facilities [8].

Nevertheless, challenges such as infrastructure limitations, digital skills gaps, and regulatory uncertainty persist [7], requiring collaborative efforts between government, industry players, and society to optimize the potential of the digital economy [6].

Nevertheless, the intersection of the informal and digital economies is complex, as digital platforms provide informal actors with opportunities to formalize aspects of their businesses, such as digital payments and online marketing, while structural barriers—including limited digital literacy, uneven infrastructure, and restrictive regulatory frameworks—continue to hinder their full participation [9], [10]. Digital technologies have facilitated the formalization of informal businesses by providing access to digital payments and online marketing tools, as seen in the case of African traditional spiritualists, where digital uptake through platforms like Facebook and smartphones showed a strong correlation with formalization propensity [11], and in India, where street vendors increasingly adopt mobile payment applications supported by features like audio confirmations to bridge digital literacy gaps [12]. Despite these opportunities, barriers remain significant, as illustrated in Cape Town where informal business owners face technical difficulties, lack of digital literacy, and inadequate technological infrastructure that limit adoption of digital financial technologies [13], and in sub-Saharan Africa where digital platforms often fail to provide affordances suitable for informal sector needs, such as multimodal interfaces and native language content, thereby exacerbating accessibility issues for those with minimal digital literacy [14]. Moreover, socio-cultural and economic challenges persist, as in Gabon where women entrepreneurs in the informal sector encounter restrictive cultural norms and limited access to technology that constrain their economic empowerment through digital means, necessitating adaptive strategies and resilience to navigate the digital transition [15]. This tension raises critical questions about the role and contribution of

the informal economy within Indonesia's digital transformation and how it can be harnessed to promote equitable development [16], [17].

Given this context, this study seeks to explore the role of the informal economy in Indonesia's digital economy by employing a qualitative approach. Through in-depth interviews with five informants representing various informal sectors—ranging from online micro-retailers to digital service providers—this research aims to capture their lived experiences, challenges, and contributions. The findings are expected to provide valuable insights for policymakers, businesses, and development practitioners on how to better integrate informal actors into the digital ecosystem.

2. LITERATURE REVIEW

2.1 *The Informal Economy in Indonesia*

The informal economy in Indonesia plays a crucial role in providing employment and supporting livelihoods, especially for vulnerable groups such as women, youth, and rural populations, contributing to more than half of the country's GDP and remaining a significant source of employment despite a decreasing trend in the number of informal workers over the past five years [3]. Informal employment constitutes about 70% of total employment in emerging markets and developing economies, with self-employment accounting for more than half of this figure [2]. However, the sector faces numerous challenges, including limited access to credit and social security that make workers vulnerable to economic shocks and exploitation [1], [18], compounded by low education levels, underemployment, and lower income compared to formal sector counterparts [3]. These vulnerabilities are further exacerbated by the absence of formal registration or licensing, which restricts informal

workers' access to public services and social safety nets, an issue that was intensified during the COVID-19 pandemic. To address these challenges, policy interventions are needed to support the informal sector and facilitate its transition to formality, with actions focused on promoting access to better public services and social protections [1] and implementing a balanced policy mix tailored to specific economic circumstances to mitigate adverse effects of informality, such as low human capital and weak institutions [19].

2.2 *Digital Economy and Inclusive Growth*

Indonesia's digital economy is rapidly expanding, driven by increased internet penetration, smartphone adoption, and supportive government initiatives, presenting significant opportunities for micro and small businesses to scale operations and access broader markets while also facing challenges that must be addressed to fully realize these opportunities. Digitalization enables businesses to expand their market reach beyond geographical constraints, enhancing revenue potential, while also streamlining operations, reducing transaction costs, and improving customer experiences that boost competitiveness [7]. Moreover, digital payment systems and fintech solutions provide financial inclusion by granting access to services that were previously inaccessible, facilitating smoother transactions and better financial management for micro and small businesses [7]. However, barriers such as inadequate digital infrastructure, particularly in rural areas [7], [20], limited digital skills requiring comprehensive training programs [7], and regulatory uncertainties that hinder business

growth and innovation [7], [20] persist. To address these challenges, government initiatives like the "1000 Startups Movement" and "Making Indonesia 4.0" have been launched to strengthen innovation and entrepreneurship, alongside increasing research and development on digital economy topics, MSME competitiveness, and digital transformation to inform ongoing policy development [21].

2.3 Research Gap and Conceptual Framework

Existing literature has emphasized the potential of digital technologies in empowering informal actors and driving inclusive development. However, there is limited empirical research that specifically explores how individuals within Indonesia's informal economy perceive and engage with digital platforms in their daily economic activities. Most studies adopt a macroeconomic or policy-oriented perspective, leaving a gap in understanding the lived experiences of informal workers navigating digital transitions. This study addresses this gap by applying a qualitative approach, focusing on five informants from different informal economic backgrounds to uncover their challenges, strategies, and contributions to the digital economy.

3. RESEARCH METHODS

3.1. Research Approach

This study employed a qualitative research design to explore the role of the informal economy in Indonesia's digital economy. A qualitative approach was selected because it allows for an in-depth understanding of the lived experiences, perceptions, and strategies of individuals engaged in informal economic activities. Rather than focusing on statistical

generalization, this approach emphasizes the richness of narratives and provides insights into social, cultural, and economic contexts that shape informal actors' engagement with digital platforms.

3.2. Research Setting and Context

The study was conducted in urban and semi-urban areas of Indonesia, where digital technologies such as smartphones, mobile internet, and online marketplaces are increasingly integrated into economic activities. The selection of these settings was based on their dynamic interaction between traditional informal economic practices and emerging digital tools.

3.3. Participants and Sampling

A purposive sampling technique was used to identify informants who actively participate in both informal and digital economic activities, with five informants selected to represent different segments of the informal economy, namely online micro-retailers utilizing social media platforms for sales, street vendors adopting digital payment systems, digital freelancers offering creative services through online platforms, home-based food entrepreneurs using delivery applications, and informal service providers who market their work via online networks. The selection criteria included involvement in informal economic activities without formal business registration, active use of digital tools or platforms for economic purposes, and willingness to share experiences in an interview setting.

3.4. Data Collection

Data were collected through semi-structured, in-depth interviews that provided flexibility for participants to elaborate on their

experiences while ensuring coverage of key themes, with each interview lasting between 45 and 60 minutes and conducted in the local language to enhance comfort and clarity. The interviews explored the nature of participants' informal economic activities, the role of digital tools in supporting their livelihoods, opportunities and benefits gained from digital engagement, barriers and challenges faced in digital adoption, and perceptions of government support and regulatory frameworks. All interviews were audio-recorded with participant consent, transcribed verbatim, and subsequently translated into English for analysis.

3.5. Data Analysis

The data were analyzed using thematic analysis following Braun and Clarke's (2006) six-step framework: (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. NVivo software was utilized to organize and code the qualitative data systematically. Emerging themes were compared across informants to identify similarities and differences in experiences and perspectives.

4. RESULTS AND DISCUSSION

4.1 Descriptive Findings

This study involved five informants representing diverse informal economic activities that intersect with Indonesia's digital economy. The informants included: (1) a micro-retailer selling clothes through Instagram, (2) a street vendor who adopted QR code-based digital payments, (3) a digital freelancer offering graphic design services through online marketplaces, (4) a home-based food entrepreneur

utilizing delivery applications, and (5) an informal service provider marketing handyman services via social media.

The informants varied in terms of educational background, income level, and duration of digital engagement, yet all emphasized that digital platforms provided new opportunities to sustain or expand their livelihoods. While younger participants demonstrated greater digital literacy, older participants required more effort in adapting to digital tools, often learning through peer networks or family support.

4.2 Thematic Analysis Results

a. Digital Platforms as Enablers of Market Access

All informants highlighted that digital tool significantly expanded their customer base beyond immediate geographic areas. For example, the micro-retailer explained:

"Through Instagram, I can sell to customers not only in my neighborhood but across the country. Before, I only sold in the local market."

This finding aligns with studies showing that digital platforms reduce market entry barriers and create opportunities for small entrepreneurs to reach wider audiences, as they lower initial business start-up costs and make entrepreneurship more accessible, including for those in low-income regions [22], [23]. Platforms like Craigslist, for instance, have demonstrated a causal increase in local entrepreneurial activity by reducing resource and customer acquisition costs [23]. In Africa, digital platforms have empowered small businesses by enhancing market access and fostering inclusivity and diversity within the entrepreneurial ecosystem, enabling previously marginalized groups to

participate in the economy and develop sustainable business models that foster innovation [22]. However, challenges remain, as platform-dependent entrepreneurs (PDEs) face issues of power asymmetries and precarity due to platform governance that shapes their market access and opportunities [24], while in regions like Brazil, informal actors continue to experience precarious labor relations, with digital platforms often perpetuating informality and economic instability [25]. Thus, informal actors, despite lacking formal business structures, increasingly become active participants in the digital economy.

b. Digital Payments and Financial Inclusion

Three informants mentioned that adopting digital payment systems (e-wallets and QR codes) increased transaction efficiency and customer trust. The street vendor shared:

“When I started using QR payments, more young customers bought from me because they prefer cashless transactions.”

This reflects the World Bank’s (2020) findings on digital finance as a driver of financial inclusion. However, not all informants had equal access; some still relied on cash due to customer preference or personal unfamiliarity with digital wallets.

c. Challenges of Digital Literacy and Infrastructure

Despite benefits, informants consistently raised challenges in adopting digital tools. The home-based food entrepreneur noted:

“I often find it difficult to manage orders on the delivery app. Sometimes I make mistakes because I don’t fully understand the system.”

Additionally, unstable internet connectivity in semi-urban

areas hindered smooth operations for the handyman service provider, echoing findings that infrastructure gaps and limited digital literacy remain major barriers for informal workers in developing economies. Emerging market and developing economies (EMDEs) with high levels of informality often struggle with inadequate infrastructure, which hampers economic growth and limits access to essential services [26], while in Africa the availability of ICT infrastructure has been shown to correlate positively with digital literacy, underscoring the importance of infrastructure in bridging the digital divide [27]. In Ghana, older informal workers rely heavily on mobile phones for business continuity but face significant gaps in digital skills and training [28], and more broadly, socio-economic and educational barriers continue to impede digital literacy in developing economies [29]. Addressing these issues requires strategies such as expanding mobile-centric digital literacy programs, integrating capacity building into social protection schemes [28], fostering multi-sectoral collaboration between public and private actors to improve literacy rates [29], and implementing policies that promote digital inclusion to overcome barriers related to ICT infrastructure availability and affordability [27].

d. Regulatory and Policy Gaps

Several informants expressed uncertainty about taxation, registration, and government support. The digital freelancer stated:

“I earn through online projects, but I don’t know whether I should register my work or pay taxes. There’s no clear information for small people like me.”

This suggests that existing policies have not fully addressed the

unique position of informal digital workers, as scholars argue that flexible and inclusive regulatory frameworks are necessary to bridge informal practices with formal economic systems. For example, in seed systems, regulatory flexibility can extend market frontiers and liberalize seed quality control, thereby facilitating the participation of informal stakeholders and ensuring the availability of diverse seed varieties while bridging gaps between formal and informal sectors [30]. Similarly, the informal economy plays a vital role in reducing unemployment and fostering innovation, and a flexible regulatory environment can enable the coexistence of informal and formal economies so they complement each other and drive economic growth [31]. Promoting equitable linkages between informal and formal economies requires inclusive policies that ensure informal enterprises and workers are not disadvantaged compared to their formal counterparts, thus fostering a balanced and sustainable economic ecosystem [32]. Moreover, in emerging economies, informal networks help businesses navigate regulatory and market challenges, and integrating these networks into formal structures through flexible policies can strengthen their effectiveness and contribute to long-term growth [33].

4.3 Discussion

The results of this study highlight that Indonesia's informal economy plays a vital role in shaping the digital economy, both as contributors and beneficiaries. Digital platforms provide informal actors with opportunities for market expansion, financial inclusion, and livelihood resilience. At the same time, structural barriers—including

digital literacy gaps, uneven infrastructure, and unclear regulatory frameworks—limit their potential to fully integrate into the digital economy.

These findings contribute to existing literature by offering micro-level perspectives from informal actors themselves. While previous research has emphasized the macroeconomic potential of digitalization (OECD, 2020; World Bank, 2020), this study underscores the lived experiences of individuals navigating opportunities and challenges at the grassroots level. The voices of informal workers demonstrate both the promise and precarity of digital engagement in contexts where formal recognition and support remain limited.

From a policy perspective, the study reinforces the need for inclusive strategies that bridge informal and digital economies. Targeted interventions in digital literacy training, affordable internet infrastructure, and simplified regulatory frameworks could empower informal actors to participate more effectively in Indonesia's digital transformation. Moreover, recognizing the contributions of informal workers within national digital economy strategies is essential for fostering equitable and sustainable development.

5. CONCLUSION

This study highlights the dynamic role of the informal economy in Indonesia's digital transformation. By exploring the lived experiences of five informants from diverse informal sectors, it is evident that digital platforms act as critical enablers, providing new opportunities for market expansion, customer engagement, and financial inclusion. Informal actors are not passive recipients but active participants in shaping

digital economic ecosystems, often developing creative and low-cost strategies to sustain their livelihoods. However, persistent barriers limit the full potential of this transformation. Limited digital literacy, inadequate infrastructure, and regulatory uncertainty create challenges that reinforce existing vulnerabilities in the informal sector. These findings suggest that while digitalization offers significant promise, it cannot automatically ensure inclusivity without deliberate interventions.

For policymakers and stakeholders, this study underscores the need for tailored

strategies that recognize the contributions of informal actors. Efforts should include expanding access to affordable internet, providing targeted digital literacy training, and designing flexible regulatory frameworks that support gradual integration into formal systems without undermining the resilience of informal practices. By addressing these gaps, Indonesia can build a more inclusive and sustainable digital economy, where informal workers are not left behind but are empowered as integral contributors to national development.

REFERENCE

- [1] N. R. Council, D. on Engineering, P. Sciences, B. on Physics, and P. S. O. Committee, "Physics in a new era: An overview," 2001.
- [2] C. Elgin, M. A. Kose, F. Ohnsorge, and S. Yu, "Understanding the informal economy: Concepts and trends," *long Shad. informality Challenges policies*, pp. 35–91, 2021.
- [3] A. A. Noeraini, "Ekonomi Informal di Indonesia, Suatu Tinjauan Pustaka," *Sustain. Compet. Advant.*, vol. 5, no. 1, pp. 16–34, 2015.
- [4] R. G. Prakoso, "Exploring The Low Membership Of Informal Workers In Indonesia's Employment Social Security," 2019, *Universitas Gadjah Mada*.
- [5] W. Syafitri, S. A. Prestianawati, M. Fawwaz, T. L. Imamia, and A. Rasli, "Factors Influencing Individuals to Be Involved in Informal Economic Sectors in Indonesia," *Int. J. Soc. Sci. Bus.*, vol. 8, no. 4, p. press-press, 2024.
- [6] A. A. Fashola and F. Kusuma, "E-Commerce Development for the Digital Economy in Indonesia," *Act. Yuris J. Huk.*, vol. 4, no. 2, 2024.
- [7] F. A. Faj'ri, M. A. Sahban, H. Saragih, and P. J. C. Kojongian, "Digital economy and business transformation in Indonesia: An exploration of opportunities and challenges," *Nomico J.*, vol. 1, no. 6, pp. 108–117, 2024.
- [8] S. Meidyasari, "Analysis of the Impact of Digitalization on MSME Economic Growth in Indonesia," *Adv. Soc. Humanit. Res.*, vol. 2, no. 11, pp. 1231–1238, 2024.
- [9] D. Chusumastuti, C. R. Elisabeth, Nurali, M. Suryadharma, and H. D. E. Sinaga, "Gangguan Digital dan Transformasi Ekonomi: Menganalisis Dampak E-commerce terhadap Industri Tradisional," *J. Ekon. dan Kewirausahaan West Sci.*, vol. 1, no. 03, pp. 173–185, 2023, doi: 10.58812/jekws.v1i03.508.
- [10] H. Brahmana and H. D. E. Sinaga, "Strategi Pemasaran Digital Berbasis Media Sosial Dalam Meningkatkan Engagement Konsumen di Era Metaverse," *J. Ilm. Ekon. dan Manaj.*, vol. 3, no. 6, pp. 441–454, 2025.
- [11] J. K. Onyima and N. C. Ojiagu, "Digital technology and formalization of informal businesses: A case of African traditional spiritualists," *Int. J. Acad. Res. Bus. Soc. Sci.*, vol. 7, no. 11, pp. 599–609, 2017.
- [12] I. U. R. Mir and M. I. Wani, "Street vendors using smartphones for digital payments: A qualitative study of digital opportunities and inequalities from Kashmir region in India," *J. Asian Afr. Stud.*, vol. 60, no. 4, pp. 2490–2504, 2025.
- [13] E. Arendse and C. Van Den Berg, "Exploring the barriers to digital financial inclusion amongst businesses in the informal sector," in *2024 IST-Africa Conference (IST-Africa)*, IEEE, 2024, pp. 1–11.
- [14] O. Daramola and E. Etim, "Affordances of digital platforms in sub-Saharan Africa: An analytical review," *Electron. J. Inf. Syst. Dev. Ctries.*, vol. 88, no. 4, p. e12213, 2022.
- [15] S. F. Simen, U. N. Banzoussi Niaka, Y. Agbeno, M.-L. Beyala Mvindi, and S. Paterne Nkoulou, "L'impact de la transition numérique sur l'entrepreneuriat informel des femmes commerçantes à Libreville au Gabon," *Rev. Organ. Territ.*, vol. 33, no. 1, pp. 134–147, 2024.
- [16] A. Muhajir, H. D. E. Sinaga, E. Y. Utami, A. P. Karo-karo, and D. Triadi, "Pengaruh Kewirausahaan dan Inovasi Bisnis terhadap Penerimaan Pasar pada Industri Makanan dan Minuman di Indonesia," *Sanskara Manaj. Dan Bisnis*, vol. 2, no. 02 SE-Articles, pp. 103–114, Mar. 2024, doi: 10.58812/smb.v2i02.368.
- [17] H. D. E. Sinaga, S. Syamsulbahri, A. Muhajir, and N. Darmayanti, "Analysis of the Effect of Social Media Usage, Search Engine Optimization, and Content Strategy on Business Growth in the E-Commerce Industry in Indonesia," *West Sci. J. Econ. Entrep.*, vol. 2, no. 01, pp. 11–18, 2024.
- [18] A. G. Aguilar and E. P. Campuzano, "Informal sector," 2009.
- [19] D. Vorisek *et al.*, "Informality in emerging market and developing economies: regional dimensions," 2022, *cap*.
- [20] A. Z. Tayibnapis, L. E. Wuryaningsih, and R. Gora, "The development of digital economy in Indonesia," *IJMBS Int. J. Manag. Bus. Stud.*, vol. 8, no. 3, pp. 14–18, 2018.
- [21] M. M. Uula and H. Surbakti, "Digital Economics in Indonesia: Development and Research Trend," in *Digit. Econ.*

- Rev.*, vol. 1, no. 1, 2024.
- [22] N. Z. Mhlongo, D. O. Daraojimba, O. Olubusola, A. O. Ajayi-Nifise, and T. Falaiye, "Reviewing the impact of digital platforms on entrepreneurship in Africa," *Int. J. Sci. Res. Arch.*, vol. 11, no. 1, pp. 1364–1375, 2024.
 - [23] D. Kim, N. Kim, and Y. Paik, "How Digital Platforms Unintentionally Foster Entrepreneurial Activities: The Case of the Staggered Entry of Craigslist," *Available SSRN*, 2023.
 - [24] S. Yu and T. Sekiguchi, "Platform-dependent entrepreneurship: A systematic review," *Adm. Sci.*, vol. 14, no. 12, p. 326, 2024.
 - [25] M.-A. Cuberos, M. Vivas-García, R. Mazuera-Arias, N. Albornoz-Arias, and M.-T. Carreño-Paredes, "YouTube and entrepreneurship in Spanish-speaking America".
 - [26] P. Athukorala and H. Hill, "Trade policy in a 'double-landlocked' transition economy: Kyrgyzstan," *World Econ.*, vol. 46, no. 12, pp. 3455–3471, 2023.
 - [27] M. Sun, J. Liu, and J. Lu, "Digital literacy in Africa: exploring its relationship with infrastructure, policy, and social inequality," *African Journal. Stud.*, vol. 44, no. 3, pp. 204–225, 2023.
 - [28] S. A. Oteng, E. Manful, and J. O. Nkansah, "Digital Literacy in the Informal Economy of Ghana: Life-long Learning and Extending Working Lives of Older Persons in Post-Covid-19 Era," *J. Cross. Cult. Gerontol.*, vol. 39, no. 4, pp. 375–395, 2024.
 - [29] A. T. Junaedi, H. P. Panjaitan, I. Yovita, K. Veronica, N. Renaldo, and J. Jahrizal, "Advancing Digital and Technology Literacy through Qualitative Studies to Bridging the Skills Gap in the Digital Age," *J. Appl. Bus. Technol.*, vol. 5, no. 2, pp. 123–133, 2024.
 - [30] K. Kuhlmann and B. Dey, "Using regulatory flexibility to address market informality in seed systems: A global study," *Agronomy*, vol. 11, no. 2, p. 377, 2021.
 - [31] A. O. Banwo, J. Du, and U. Onokala, "The determinants of location specific choice: small and medium-sized enterprises in developing countries," *J. Glob. Entrep. Res.*, vol. 7, no. 1, p. 16, 2017.
 - [32] M. Alter Chen, *Rethinking the informal economy: Linkages with the formal economy and the formal regulatory environment*, no. 2005/10. WIDER Research Paper, 2005.
 - [33] B. Zaghmout, "Navigating Grey Zones: A Study of Informal Business Networks in Emerging Economies," *Am. J. Manag.*, vol. 24, no. 2, pp. 71–82, 2024.