

A Bibliometric Analysis of Digital Literacy and Social Enterprise Development

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ABSTRACT

This study presents a comprehensive bibliometric analysis of scholarly research at the intersection of digital literacy and social enterprise development. Drawing data from the Scopus database (2000–2024) and using VOSviewer for visualization, the study examines publication trends, thematic clusters, author co-citations, and country collaborations. The analysis reveals that digital literacy is a central and foundational theme, closely linked with digital transformation, e-learning, financial literacy, and digital skills. Emerging keywords such as artificial intelligence and social media indicate a shifting focus toward advanced technologies and digital engagement strategies in the social innovation domain. Southeast Asian countries, particularly Indonesia and Malaysia, are shown to be leading contributors, while broader international collaboration remains limited. Prominent scholars such as Hair J.F., Davis F.D., and Brynjolfsson E. are identified as key influencers. The findings highlight the need for future research to enhance theoretical integration, address impact measurement, and foster global academic partnerships. This study provides valuable insights for academics, practitioners, and policymakers seeking to strengthen digital capacity and innovation in the social enterprise sector.

Keywords: Digital Literacy, Social Enterprise, Bibliometric Analysis, Digital Transformation, VOSviewer

1. INTRODUCTION

Digital literacy has emerged as a foundational skill in the 21st-century knowledge economy. As digital transformation accelerates across all sectors, the ability to effectively use digital tools, access online resources, and participate in digital communication has become indispensable for individuals, communities, and organizations [1]. In particular, digital literacy extends beyond mere technical competence to include critical thinking, information evaluation, and ethical online behavior. The concept now encompasses a broad range of competencies such as information literacy, media literacy, and communication literacy in digital environments [2], [3]. This holistic understanding makes digital literacy a crucial driver of social and economic inclusion, especially in contexts of development and social innovation.

In parallel, social enterprises—organizations that combine commercial and social objectives—have gained recognition as vital actors in addressing social issues through innovative and sustainable models. These enterprises prioritize mission-driven goals while utilizing business strategies to ensure financial viability and scalability [4]. The rise of social enterprises reflects growing dissatisfaction with traditional government and philanthropic models in solving complex societal challenges, including poverty, unemployment, and environmental degradation. As such, they have become important vehicles for inclusive growth, particularly in developing countries and marginalized communities [5], [6].

The intersection between digital literacy and social enterprise development presents a compelling area of exploration. Digital literacy empowers social entrepreneurs to adopt and leverage digital tools for outreach, fundraising, knowledge management, and service delivery. It enhances the capacity of enterprises to access new markets, engage beneficiaries, measure impact, and

promote transparency [7]. In rural or underserved communities, digital competencies can bridge the divide between resource constraints and innovative solutions. Thus, the synergy between digital literacy and social enterprise development may serve as a multiplier for community empowerment, resilience, and sustainable change.

In recent years, the growing scholarly interest in both digital literacy and social entrepreneurship has resulted in an expanding body of literature. However, the research is often fragmented, with studies focusing on specific regions, age groups, or sectors. The field includes a mix of conceptual papers, empirical case studies, and policy analyses, which makes it difficult to capture overall trends, intellectual structures, and emerging themes. This complexity calls for a systematic bibliometric analysis to synthesize the body of knowledge and map out its evolution, knowledge clusters, and research gaps [8]. Bibliometric methods provide an evidence-based approach to understanding how the literature has developed and which areas require further exploration.

Moreover, understanding the bibliometric landscape of digital literacy in the context of social enterprise development is vital for academic, policy, and practice communities. By uncovering the most influential works, leading journals, prolific authors, and thematic hotspots, this analysis can guide future research directions and inform evidence-based policy and program interventions. It can also support educators and practitioners in designing targeted digital literacy curricula and training programs tailored to the needs of social entrepreneurs. Hence, bibliometric analysis becomes a strategic tool in harnessing the collective academic insight on how digital capabilities can bolster social innovation ecosystems.

Despite the increasing relevance of digital literacy in enabling social enterprise success, the academic literature that connects these two domains remains scattered and lacks comprehensive mapping. There is limited understanding of the evolution, dominant themes, and scholarly influence in the interdisciplinary nexus between digital literacy and social entrepreneurship. As a result, researchers, practitioners, and policymakers may face challenges in identifying critical knowledge gaps, forming collaborations, and developing effective interventions. The absence of a synthesized overview risks underutilization of valuable research and hinders the development of integrated frameworks that can drive impact in real-world applications. This study aims to conduct a bibliometric analysis of scholarly publications that address digital literacy in the context of social enterprise development.

2. METHODS

This study employs a quantitative bibliometric approach to analyze the scholarly literature on the intersection of digital literacy and social enterprise development. Bibliometric analysis allows for the systematic examination of large volumes of academic publications to identify patterns, trends, and structural relationships within a field of study. The method is particularly effective in mapping the intellectual structure and thematic evolution of interdisciplinary domains [8]. By using bibliometric indicators such as publication volume, citation counts, co-authorship, and keyword co-occurrence, this study aims to reveal the development trajectory and research hotspots in the selected topic area.

The data were collected from the Scopus database, one of the largest and most reputable abstract and citation databases of peer-reviewed literature. A structured search query was designed using a combination of keywords related to “digital literacy,” “digital competence,” “social enterprise,” and “social entrepreneurship.” The search was conducted for the period between 2000

and 2024 to capture both foundational and recent contributions. Inclusion criteria were limited to journal articles, conference proceedings, and reviews published in English. The metadata, including author information, abstracts, keywords, citation data, and publication sources, were exported in RIS and CSV formats for further analysis.

The extracted data were analyzed using VOSviewer, a specialized software tool for constructing and visualizing bibliometric networks. Three types of bibliometric analyses were performed: (1) co-authorship analysis to identify collaborative networks among authors and institutions, (2) co-citation analysis to uncover the most frequently cited and influential works, and (3) keyword co-occurrence analysis to map the major themes and conceptual clusters. Network visualizations were generated to illustrate the structural relationships, density maps, and temporal trends.

3. RESULTS AND DISCUSSION

3.1 Network Visualization

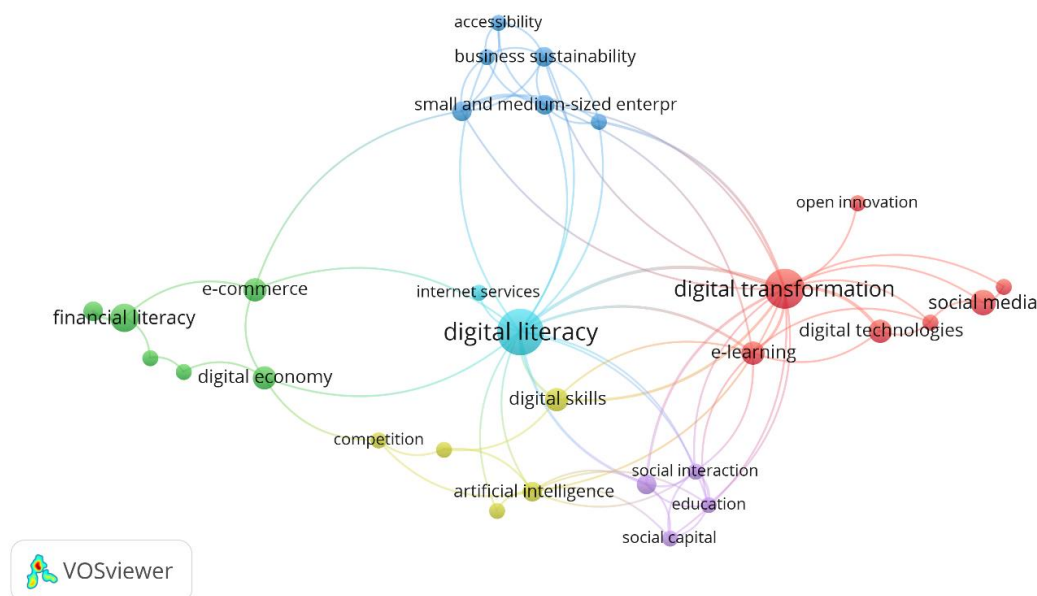


Figure 1. Network Visualization

Source: Data Analysis Result, 2025

Figure 1 presents a co-occurrence network map of keywords related to digital literacy and its connection to social enterprise development. At the center of the map, the keyword “digital literacy” acts as a central node, linking various clusters of research themes. Its strong connections to terms such as *digital transformation*, *internet services*, and *digital skills* suggest that it serves as a foundational concept across multiple research directions. The centrality and size of the “digital literacy” node also reflect its high frequency and prominence in the dataset, indicating it is a key thematic anchor in the scholarly discourse.

The red cluster, located on the right side of the map, revolves around the concept of digital transformation, which is linked to keywords such as *e-learning*, *social media*, *digital technologies*, and *open innovation*. This suggests that a significant portion of the literature focuses on how digital literacy enables or is influenced by broader digital transformation efforts, particularly in educational contexts and the adoption of emerging technologies. The presence of *social media* and *e-learning* further implies interest in the communicative and instructional dimensions of digital literacy, especially in how it fosters social innovation and public engagement.

On the green cluster to the left, the map highlights a strong relationship between digital literacy, financial literacy, and the digital economy. Keywords such as *e-commerce* and *competition* indicate that digital skills are also being explored in relation to economic empowerment and enterprise activities. This cluster likely corresponds to studies focusing on how digital competencies support financial inclusion and entrepreneurial capacity—key dimensions for the development of sustainable social enterprises, especially in low-resource or rural contexts.

The blue cluster emerging above the central node emphasizes business sustainability, accessibility, and small and medium-sized enterprises (SMEs). These keywords point to an emphasis on inclusivity and sustainability in the application of digital literacy, suggesting that scholars are exploring how digital tools support the long-term viability of socially-driven business models. This cluster aligns closely with development policy, inclusive innovation, and the role of technology in leveling the playing field for small enterprises seeking to scale social impact.

The yellow and purple clusters capture complementary themes. The yellow cluster, which includes *artificial intelligence* and *competition*, signals an emerging research interest in how advanced technologies intersect with digital skills development. Meanwhile, the purple cluster connects *education*, *social interaction*, and *social capital*, reflecting attention to the human and relational dimensions of digital literacy. These themes reinforce the idea that digital capabilities are not merely technical but also deeply social, influencing how individuals and communities interact, learn, and organize for collective benefit—foundational elements in the evolution of social enterprises.

3.2 Overlay Visualization

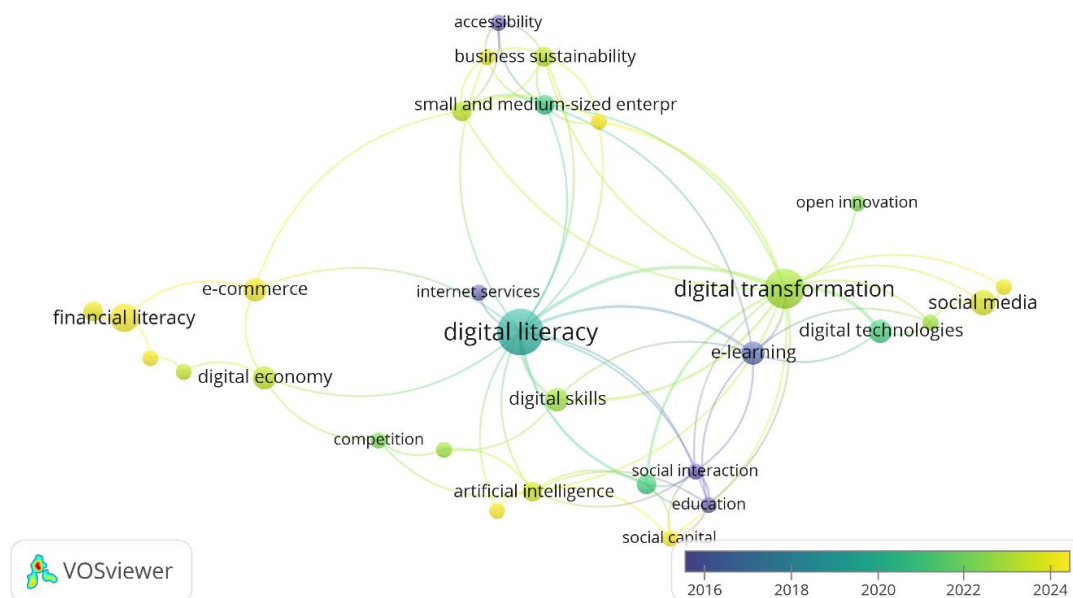


Figure 2. Overlay Visualization

Source: Data Analysis Result, 2025

Figure 2 illustrates the **temporal evolution** of research themes in the domain of digital literacy and social enterprise development. The color gradient from blue (older publications) to yellow (more recent studies) reveals that core concepts like “digital literacy,” “digital transformation,” and “e-learning” have been studied consistently over time. These central nodes, depicted in shades of green and turquoise, suggest a steady academic interest from 2016 to around 2021. The consistent centrality of these terms implies that they form the foundational basis for scholarly discussion in the field.

In contrast, keywords such as “social media,” “financial literacy,” “digital economy,” and “artificial intelligence” appear in brighter yellow tones, indicating that they are emerging or recently intensified areas of research, particularly after 2021. This reflects a growing interest in how new technologies and economic models intersect with digital literacy to influence social innovation and enterprise development. The inclusion of *social media* and *AI* also aligns with the current global digital landscape, where platforms and intelligent systems play a larger role in community outreach, fundraising, and entrepreneurial scalability.

Notably, terms such as “accessibility,” “business sustainability,” and “social capital” appear in darker blue or purple shades, suggesting they were explored earlier but have not seen significant resurgence in recent years. This may highlight a potential research gap or a saturation point in those thematic areas. Their peripheral location also indicates that while these concepts are relevant, they are not currently at the forefront of scholarly discourse.

3.3 Citation Analysis

Table 1. The Most Impactful Literatures

Citations	Authors and year	Title
406	[9]	Identifying digital transformation paths in the business model of smes during the covid-19 pandemic
313	[10]	Understanding the effect of e-learning on individual performance: The role of digital literacy
206	[11]	Understanding the role of employees in digital transformation: conceptualization of digital literacy of employees as a multi-dimensional organizational affordance
31	[12]	Barriers and Factors Affecting the E-Commerce Sustainability of Thai Micro-, Small- and Medium-Sized Enterprises (MSMEs)
27	[13]	Everyone Learns from Everyone: Collaborative and Interdisciplinary Professional Development in Digital Literacy
23	[14]	A systematic review on the factors governing precision agriculture adoption among small-scale farmers
16	[15]	Pursuing Long-Term Business Performance: Investigating the Effects of Financial and Technological Factors on Digital Adoption to Leverage SME Performance and Business Sustainability – Evidence from Indonesian SMEs in the Traditional Market
15	[16]	THE ROLES OF ENTREPRENEURIAL SKILLS, FINANCIAL LITERACY, AND DIGITAL LITERACY IN MAINTAINING MSMEs DURING THE COVID-19 PANDEMIC
14	[17]	Determinants of Smart Digital Infrastructure Diffusion for Urban Public Services
11	[18]	Digital transformation: Threats and opportunities for social entrepreneurship

Source: Scopus, 2025

3.4 Density Visualization

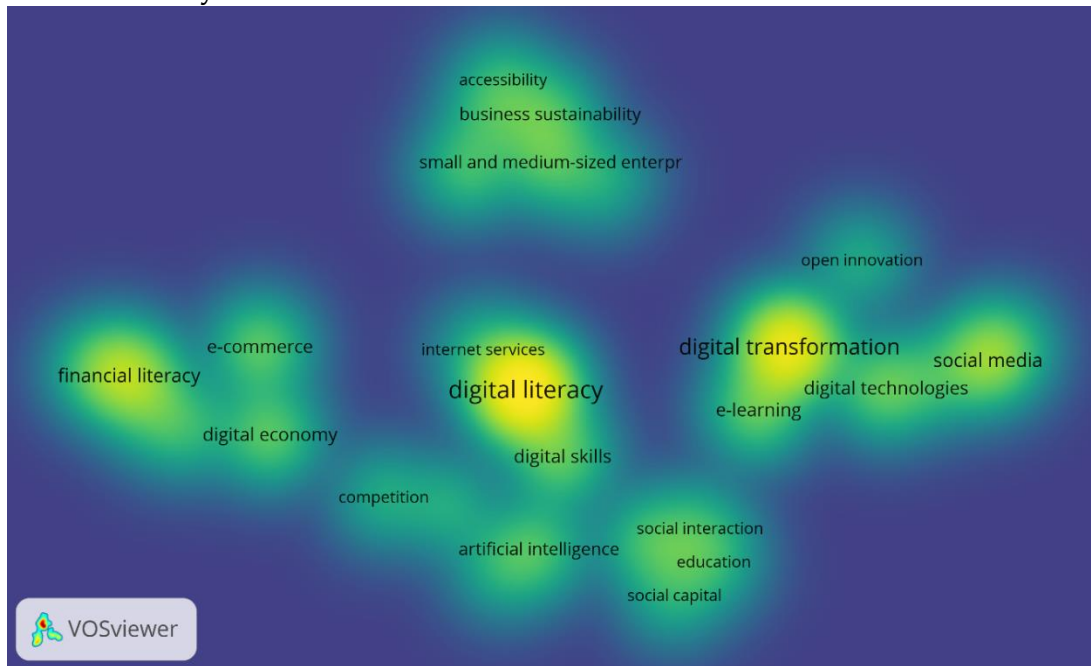


Figure 3. Density Visualization

Source: Data Analysis Result, 2025

Figure 3 reveals the density and intensity of research activity across various themes related to digital literacy and social enterprise development. The keywords “digital literacy,” “digital transformation,” and “financial literacy” appear in the brightest yellow zones, indicating they are the most frequently occurring and central topics in the dataset. This suggests that the academic literature is heavily concentrated around foundational digital competencies, their role in digital transformation processes, and their impact on financial knowledge—each playing a critical role in shaping digitally empowered social enterprises. Moderately active areas, shown in green, include themes such as e-learning, social media, artificial intelligence, and digital economy. These keywords demonstrate the emerging and supportive dimensions of the main discourse, reflecting how digital platforms, advanced technologies, and economic integration contribute to the expansion of social enterprises. In contrast, peripheral yet visible areas like *business sustainability*, *social capital*, and *accessibility* show less frequent but still relevant engagement, pointing to opportunities for deeper exploration.

3.5 Co-Authorship Network

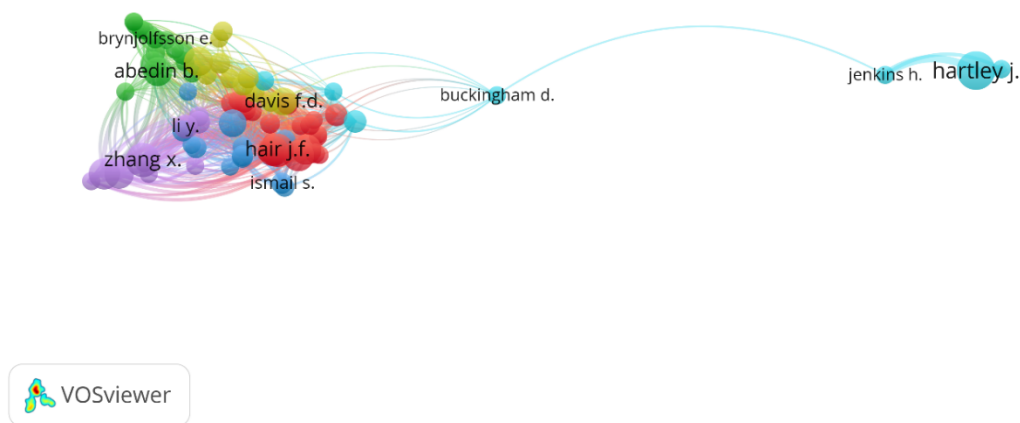


Figure 4. Author Visualization

Source: Data Analysis Result, 2025

Figure 4 illustrates the intellectual structure and influence patterns among frequently cited researchers in the domain of digital literacy and social enterprise development. At the core of the dense network are prominent scholars like Hair J.F., Davis F.D., and Brynjolfsson E., who are highly co-cited and tightly connected with others, indicating their foundational contributions to the field—likely in areas such as technology acceptance, innovation, and digital economics. The clustering by color also suggests the existence of distinct but interrelated scholarly communities or subfields. Notably, Hartley J. and Jenkins H. appear more isolated on the far right, forming a separate co-citation cluster. This indicates a specialized research trajectory, possibly focusing on media, culture, or participatory digital practices. The presence of Buckingham D. as a bridging node suggests some thematic crossover between core technology-oriented research and more socially or pedagogically focused work.

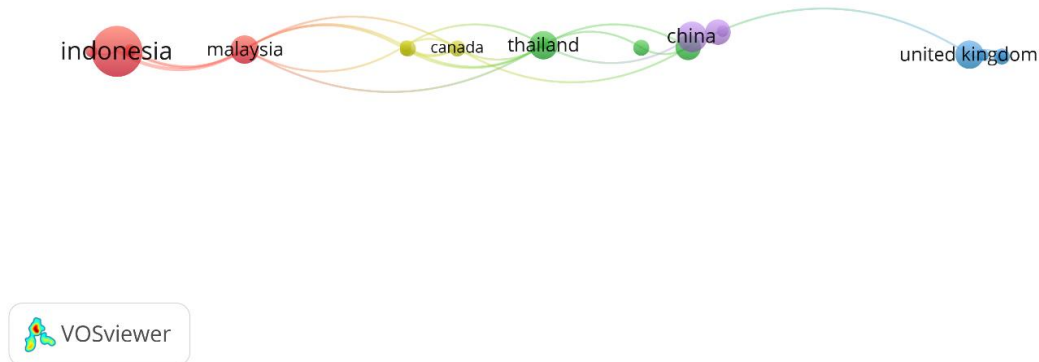


Figure 5. Country Visualization

Source: Data Analysis Result, 2025

Figure 5 shows the geographic distribution and international research cooperation in studies related to digital literacy and social enterprise development. Indonesia emerges as the most prominent node, indicating it has produced the highest number of publications or citations in this domain. It is closely connected to Malaysia, suggesting strong bilateral collaboration, likely due to regional proximity and shared developmental contexts. Countries such as Canada, Thailand, and China form intermediary links, acting as bridges in broader research cooperation. The United Kingdom, although more peripheral in the network, maintains a connection with China, reflecting transnational academic interactions.

Discussion

This bibliometric analysis provides a comprehensive overview of the intellectual landscape, thematic evolution, and geographic distribution of research in the field of digital literacy and social enterprise development. By analyzing co-occurrence of keywords, author co-citation, and country collaboration networks, several key insights have emerged regarding the current state and trajectory of the field. These findings contribute to a deeper understanding of how digital competencies intersect with social innovation efforts and where future scholarly work may be directed.

The keyword co-occurrence analysis reveals that *digital literacy* remains at the core of scholarly conversations, interlinked with a wide range of subtopics that reflect its multidimensional nature. Among the most prominent connections are terms such as *digital transformation*, *e-learning*, *internet services*, and *digital skills*. This implies that much of the academic discourse situates digital literacy as both an enabler and a consequence of broader digitalization processes. In the context of social enterprise development, this suggests that equipping individuals with digital skills is not merely a technical concern but an essential component of organizational growth, innovation, and community impact.

The emergence of clusters around social media, digital technologies, education, and social capital indicates that digital literacy plays a significant role in shaping how social enterprises interact with their stakeholders. Social media, for example, facilitates communication, fundraising, marketing, and awareness-building, all of which are crucial for resource-constrained social enterprises seeking visibility and engagement. Likewise, education-focused keywords such as e-

learning and digital transformation point to the increasing role of online platforms and pedagogies in building the competencies of social entrepreneurs and their target communities.

Equally important is the presence of *financial literacy*, *e-commerce*, and *digital economy* as frequent co-occurring terms, particularly in the green cluster of the network visualization. These indicate a growing interest in how digital and financial capabilities combine to foster entrepreneurship and inclusive economic participation. For many social enterprises operating in underserved regions, digital and financial literacies are interdependent assets that can unlock access to capital, markets, and customers. This link between digital inclusion and economic empowerment reinforces the argument that digital literacy is foundational to achieving broader development outcomes through socially driven ventures.

The overlay visualization provides temporal insights, showing that more recent research (2021–2024) is increasingly focused on themes such as *social media*, *artificial intelligence*, and *digital economy*. These emerging themes suggest that the field is evolving to accommodate new technological paradigms. The appearance of *artificial intelligence* in particular marks a shift toward exploring how advanced technologies can be leveraged for social innovation. While AI poses challenges in terms of accessibility and ethical use, it also opens new opportunities for automation, personalization, and data-driven decision-making in social enterprises.

Older topics, such as *accessibility*, *business sustainability*, and *small and medium-sized enterprises*, while foundational, appear less prominent in recent studies. This could reflect either a decline in focus or a potential saturation of earlier research efforts. However, given their importance to the inclusivity and longevity of social innovation models, revisiting these topics through the lens of newer technologies may be a productive direction for future research.

The density visualization further confirms the core importance of *digital literacy* and *digital transformation*, with the highest density of research activity concentrated around these nodes. Adjacent themes such as *e-learning*, *social interaction*, *internet services*, and *digital skills* also appear as moderately dense areas, indicating sustained scholarly interest. Meanwhile, less dense but emerging areas like *artificial intelligence*, *competition*, and *open innovation* suggest the field is gradually expanding its conceptual boundaries. These trends demonstrate an ongoing shift from basic digital inclusion toward more strategic and technologically advanced applications in the social enterprise domain.

The author co-citation network adds another layer of understanding by identifying the scholars who have most significantly influenced the field. Central figures such as Hair J.F., Davis F.D., and Brynjolfsson E. are well-known for their work on technology acceptance, innovation diffusion, and the digital economy, respectively. Their high co-citation frequency indicates that much of the research on digital literacy and social enterprise builds upon theoretical frameworks related to information systems, organizational change, and economic digitalization. Interestingly, scholars like Hartley J. and Jenkins H., located more peripherally, appear to be associated with media studies and participatory culture, suggesting that the field also draws from disciplines outside business and economics. This interdisciplinary grounding is a strength, as it allows for more holistic approaches to understanding how digital skills translate into social impact.

The country collaboration map sheds light on the global distribution of research activity. Indonesia appears as the most productive and central country in this field, followed by Malaysia, Thailand, and China. This highlights Southeast Asia as a regional hub of scholarly engagement with digital literacy and social enterprise issues. Given the region's economic diversity, population growth, and digital development challenges, it is logical that local scholars and institutions are contributing actively to the discourse. However, the relatively limited collaboration with countries from the Global North, such as the United Kingdom and Canada, suggests that the field could benefit from more robust international partnerships. Greater cross-regional collaboration could facilitate knowledge exchange, comparative studies, and innovation transfer.

Furthermore, the predominance of publications from countries like Indonesia reflects not only regional relevance but also local prioritization of digital inclusion and social entrepreneurship in national development agendas. However, for the field to mature, there needs to be a broader engagement with theories and empirical evidence from diverse contexts. Transnational collaborations, co-authored works, and international research funding could support this by bridging knowledge silos and introducing comparative dimensions.

Despite the richness of the bibliometric landscape, the field still faces several challenges. First, the conceptual boundaries between digital literacy and social enterprise are often blurred, with varying definitions and operationalizations across studies. Future research could benefit from clearer theoretical integration, such as using capability theory, stakeholder theory, or digital ecosystems frameworks to articulate how digital skills influence enterprise-level and system-level outcomes. Second, there is a noticeable gap in longitudinal and impact-based research. Most existing studies focus on describing practices, tools, or models, rather than empirically evaluating outcomes of digital interventions on social enterprise performance.

The rise of advanced technologies such as AI, blockchain, and big data analytics offers new research frontiers. Scholars should explore not only the opportunities these technologies present for scaling social impact, but also their implications for equity, ethics, and access. For example, how can AI be used responsibly in decision-making for community development? How can social enterprises leverage blockchain for transparency while ensuring digital literacy among users? These are pertinent questions that combine technological sophistication with social consciousness—a hallmark of impactful research in this domain.

CONCLUSION

This bibliometric study highlights the growing academic attention to the intersection of digital literacy and social enterprise development, revealing its multidimensional nature and evolving thematic focus. Through co-occurrence, overlay, density, author, and country network analyses, the findings demonstrate that digital literacy serves as a foundational enabler of digital transformation, financial inclusion, and social innovation. Core themes such as e-learning, digital skills, and internet services remain central, while emerging areas like artificial intelligence and social media signal future directions. Influential scholars and institutions, particularly from Southeast Asia—led by Indonesia and Malaysia—dominate the discourse, yet broader international collaboration remains limited. The field exhibits strong theoretical foundations and interdisciplinary potential but would benefit from more longitudinal, impact-oriented, and globally comparative research. Ultimately, this study underscores the vital role of digital competencies in empowering social enterprises to scale their impact, adapt to technological change, and contribute meaningfully to inclusive and sustainable development.

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