

Digital technology fostering synaptic financial signalling: a systematic review of digital technology's role in fintech information access and processing

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Abstract

Purpose – The emergence of digital technologies and internet connectivity in the financial services sector has paved the way for fintech offerings and innovative financial solutions. However, there remains an opportunity to deepen our understanding of how digital technology influences fintech access and the processing of customer information for credit risk assessments. Thus, this study seeks to further explore how the adoption of these technologies mitigates information asymmetry to empower financial service providers and lenders to effectively extend credit to individuals and small and medium-sized enterprises. By addressing this gap, we can foster greater financial accessibility and inclusion for diverse communities.

Design/methodology/approach – The researcher conducted a systematic review to explore and inductively explain digital technology in fintech access and in the processing of customer information for credit risk evaluation, using signalling theory as a framework.

Findings – The review develops a framework that highlights the role of digital technology in mitigating information asymmetry, facilitating the processing of necessary information for credit risk evaluation, and credit access for individuals and SMEs. The findings indicate that the synaptic signalling of borrowers' financial and demographic records for credit risk evaluation, as well as the acquisition of continuous synaptic financial signals and the specificity of these signals for credit risk evaluation, are responsible for processing information required for credit risk assessment.

Originality/value – This exploratory study highlights the innovative ways in which digital technology fosters the emergence of synaptic financial signalling, which is responsible for reshaping the credit market and promoting financial inclusion.

Keywords Financial technology, Financial inclusion, SMEs external financing, Fintech information access, Fintech information processing

Paper type Literature review

1. Introduction

The stability of the global financial system, especially in developing economies, has long been a vital concern for policymakers, economists and society (Bharathi, Perdana, & Kulkarni 2023; Lagna & Ravishankar, 2021). “Large parts of the world remain cut off from institutional financial services” (Senyo & Karanasios, 2020, p. 2). This is the experience of many individuals and small and medium-sized enterprises (SMEs) who are financially excluded, while some experience high costs of debt and equity financing due to information asymmetry, lack of creditworthiness and inadequate collateral (Chen, Xiao, Wang, & Ye, 2023; Chen & Yoon, 2022; Guo, Fang, Liu, Wang, & Wang, 2023; Walthoff-Borm, Schwienbacher, & Vanacker, 2018). This is a common experience shared by individuals in the global south (Lagna & Ravishankar, 2021). Information asymmetry significantly contributes to the high



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cost of external financing and financial exclusion experiences, as credit contracts rely heavily on accessible and processible information about the borrowers (Fasano & Cappa, 2022; Kukuk, 2022; Walthoff-Borm *et al.*, 2018). This issue remains the subject of intense debate, as fluctuations in access to credit continue to impact economic growth and the well-being of people across regions (Ha, Le, & Nguyen, 2025). The narrative is shifting with technological innovation, particularly in the context of digital technology, which has become a significant driver of change, positively transforming the financial landscapes across countries in recent years (Ha *et al.*, 2025). As digital technology evolves, “digital platforms [driven by AI, advanced algorithms, machine learning, and data analytics] have allowed fintech and big tech lenders to serve borrowers that may otherwise be unserved or underserved by incumbent financial institutions, even in economies with relatively deep credit markets, like the United States” (Cornelli, Frost, Gambacorta, & Jagtiani, 2024, p. 2).

Financial technology solutions (i.e., fintech) provide tailored support to financially excluded individuals and digitally driven SMEs through mobile banking, blockchain and digital payment platforms by transforming the way financial services are delivered (Fang, Kwon, & Park, 2021; Odei-Appiah, Wiredu, & Adjei, 2021). Especially across the unserved and underserved communities, where efforts continue to grow to minimise financial exclusion (Ha *et al.*, 2025; Odei-Appiah *et al.*, 2021). For instance, microfinance institutions, which aim to assist underserved populations financially (Gomber, Kauffman, Parker, & Weber, 2018), leverage digital technological tools to enhance outreach and effectiveness (Ha *et al.*, 2025). Integrating advanced digital and mobile technology and leveraging ubiquitous internet connectivity has led to the emergence of disruptive fintech, delivering innovative financial services and products (Ha *et al.*, 2025; Hsieh, Chang, & Cheng, 2024; Woroch, Strobel, & Wulfert, 2022). Thus, data analytics and alternative risk assessment algorithms offer credit opportunities to SMES and individuals. This process has paved the way for financial inclusion, accessibility and improved the economic health of the borrowers (Hsieh *et al.*, 2024). As a result, the fintech phenomenon in the financial service sector has caused “a shift from an economy of scale to a platform-driven network economy” (Woroch *et al.*, 2022, p. 2). Consequently, technological innovations in financial services enable socioeconomic scaling that extends financial inclusion to the underserved and unserved by driving dynamic platforms like digital wallet platforms, mobile payment platforms, crowdfunding platforms and website interfaces for digital financing operations (Bharathi *et al.*, 2023; Kukuk, 2022; Pal, 2023).

Today, fintech represents an emerging and dynamic field within the broader financial services landscape. While a growing body of studies continues to explore various aspects of fintech, especially in the development and evolution of fintech, which includes innovations in payment systems, lending platforms, blockchain technology and digital banking (Ha *et al.*, 2025; Kemal & Yan, 2015; Senyo & Osabutey, 2020), clarity and insight into how digital technology drives fintech access and processing of borrowers information for financial inclusion of the financially excluded remains unexplored (Li, Ye, Liu, Tao, & Jiang, 2024; Sanga & Aziakpono, 2023; Senyo & Karanasios, 2020; Sharma, Ilavarasan, & Karanasios, 2024). This gap requires a thorough examination and deserves more scholarly attention to better understand how fintech accesses and processes information to grant access to credit. For instance, Lagna and Ravishankar (2021, p. 71) emphasise that “research on fintech has started exploring the technologies of credit risk evaluation used by peer-to-peer lending platforms ... [however] [n]ew empirical research is needed to explicate better how such algorithms take into account poor and excluded communities ... [because] much of the algorithmic detail is shrouded in opaqueness rather than transparency”. Corroborating this view, Senyo and Osabutey (2020) and Eikmanns and Hann (2023) emphasise that the relationship between the growth of digital services and financial inclusion remains unclear and a potential area for study. Consequently, the unclear nature of the role of algorithms and analytics complicates understanding; for example, peer-to-peer technologies connect lenders with borrowers, achieve information symmetry, assess credit risk and set interest rates that benefit borrowers, but how it happens remains unknown. By delving deeper into this subject, scholars can help

clarify the connections and potential technological impacts, paving the way for innovative financial solutions.

Therefore, a systematic review was conducted to explore the processes of digitizing access to and processing of borrowers' information, which reduces information asymmetry and enhances credit risk evaluation (Leidner & Gregory, 2024; Paré, Wagner, & Prester, 2023). The study aims to provide a comprehensive theoretical elaboration of how digital technology drives information gathering, credit risk evaluation and cost-effective processing to guarantee credit access for the financially excluded, especially in developing economies (Leidner & Gregory, 2024; Leidner & Tona, 2021). By concentrating on this perspective to study, practitioners and scholars can better understand how to utilise emerging technologies to collect soft information, evaluate credit scoring criteria, assess credit risk and predict defaulters in the online credit markets (Sanga & Aziakpono, 2023, 2024). Therefore, to proceed with this study, the researcher asked the following research question: *RQ: How does digital technology enhance access to borrowers' information for credit risk evaluation, ensuring easier access to credit?* To address this research question, the researcher conducted a thorough systematic literature review to gather extensive and detailed data from selected studies (Webster & Watson, 2002). This analysis aimed to explore and emphasize the role of digital technology in facilitating the information symmetry necessary for evaluating the credit risk of borrowers, ensuring their access to credit. Secondly, the researcher adopts signalling theory to drive the theoretical redescription of the findings gathered from the literature for an in-depth explanation.

Conducting this study could pave the way for more effective strategies to support these vital sector (Eikmanns & Hann, 2023; Mamonov, 2021; Odei-Appiah *et al.*, 2021). The study's outcome contributes to the literature and practice, as it extends the literature through theoretical elaboration. The study enlightens SME founders and practitioners on navigating the processes needed to access credit financing for their businesses. Further, the study enlightens policymakers on setting up policies and programs to support the activities of fintech, especially in expanding financial services to marginalized communities. The remainder of the article structure includes section two, the literature review conducted for the study; section three contains the theoretical background of the study; and section four is the methodology adopted. Then, the next section is the findings, followed by the discussion, conclusion, theoretical contributions, practical implications and limitations of the study.

2. Literature review

Financial technology is an emergent phenomenon (Muthukannan, Tan, Chian Tan, & Leong, 2021), characterised by diverse innovations and technological advancements designed to enhance, automate and provide alternative financial services, particularly to the financially excluded in the developing economies (Bharathi *et al.*, 2023; Cai, Marrone, & Linnenluecke, 2022; Cornelli, Frost, Gambacorta, & Jagtiani, 2022; Senyo, Gozman, Karanasios, Dacre, & Baba, 2022). Fintech encompasses a variety of applications, including mobile payment systems, online lending platforms, blockchain technology, robo-advisors and personalised financial management tools (Chen *et al.*, 2023; Chen & Yoon, 2022). "Fintech typically represents the introduction of innovative technology-based financial services offered by start-ups, including crowdfunding, peer-to-peer (P2P) lending, and foundational digital technologies such as blockchain and artificial intelligence" (Ha *et al.*, 2025, p. 4). Today, fintech innovations are highly regarded as a game-changer in promoting financial inclusion (Ha *et al.*, 2025; Senyo & Osabutey, 2020). They leverage sophisticated algorithms, data analytics and cutting-edge software to enhance financial service efficiency, accessibility and customer experience within a given economic landscape. Thus, fintech has caused a "radical transformation of the financial market structures and induces complex changes to economic environments ... [through] reduced information asymmetries by making the financial information programmable, traceable and more readily available" (Muthukannan *et al.*, 2021,

p. 2). Ultimately, fintech operations are considered disruptive to traditional financial institutions, offering more user-friendly, cost-effective and transparent services to consumers and businesses (Cai *et al.*, 2022; Fabri *et al.*, 2022). The disruptions experienced resulted from Fintechs utilising alternative data, advanced algorithms and machine learning tools to enhance credit assessments (Cornelli *et al.*, 2024). The technology improves information sharing among lenders and expands lending channels and institutions (Chen & Yoon, 2022). Consequently, the innovations have streamlined the lending process, eased credit score evaluation, lowered costs, and enhanced speed and quality in processing, screening, appraisal and repayment (Lagna & Ravishankar, 2021; Sanga & Aziakpono, 2023). This transformation benefits lenders and borrowers by improving the outcome of credit risk assessments and making the lending experience more efficient and accessible (Chen & Yoon, 2022; Fan, Bae, & Liu, 2024; Sanga & Aziakpono, 2023). A good example is “Ant Financial [that] used big data and artificial intelligence technology to intelligently approve loans, thereby reducing the lender’s financing costs, drastically decreasing the loan approval time, and easing the financing constraints of small and medium-sized enterprises” (Fan *et al.*, 2024, p. 3). The convenience of these digital solutions means that seekers of external credits can navigate the application process from the comfort of their homes, often using just a smartphone or computer, creating quick turnaround times, cost efficiency and reducing the overhead associated with traditional lending processes.

2.1 SMEs external financing

Historically, SMEs possess the potential for fortifying the economic advancement of a country, especially across developing economies like sub-Saharan Africa (Hansen-Addy *et al.*, 2024). However, SMEs continue to encounter significant challenges securing financial support from traditional banks (Chen & Yoon, 2022; Hansen-Addy *et al.*, 2024; Sharma *et al.*, 2024). Traditional banks often regard lending to SMEs as a challenging endeavour (Chen *et al.*, 2023). This viewpoint stems from several critical factors, including the smaller loan amounts typically requested, the perceived heightened risk of default by these small businesses or individuals, and the considerable time and resources needed to evaluate and process each loan application. Yet, access to funding is fundamental for the survival and growth of SMEs (Sharma *et al.*, 2024). With sufficient funding, SMEs can innovate and adapt to market changes, ensuring long-term viability. Nevertheless, SMEs are hampered by financing problems and often struggle to access adequate funds for operations and expansion because information asymmetry and low credit records make traditional banks struggle to evaluate their creditworthiness (Fasano & Cappa, 2022; Guo *et al.*, 2023; Łasak, 2022). A challenge influenced by the limited information available, lack of collateral and no reliable credit history (Li *et al.*, 2024). Interestingly, SMEs’ financial risk assessment conducted by traditional banks is affected by high information search costs, delayed information acquisition and a single credit standard, which leads to biased credit assessments (Lyu, Ji, Zhang, & Zhan, 2023; Mashamba & Gani, 2024). This issue is often the subject of intense debate, as fluctuations in financial stability continue to impact economic growth and the well-being of SMEs in a given region. However, the narrative has changed since the advent of digital technology in the operation of financial services. Further, “[t]he digitization of [SMEs] business processes can provide a reliable alternative to audited financial records, allowing the use of digital records on sales, expenses, cash flow, and inventory needed for lenders to make informed and timely decisions on extending loans to SMEs” (World Bank Group, 2022, p. 16).

2.2 Digital technology and financial services

The financial service sector has experienced radical and disruptive innovation in its operational processes and services (Gomber *et al.*, 2018). Today, financially excluded individuals and SMEs are beginning to experience financial inclusiveness with the digital technology disruption in the financial sector. Secondly, the innovative frontier called fintech

significantly reduces transaction costs related to financial transactions and business operations, fostering greater efficiency and accessibility in the financial landscape (Gomber *et al.*, 2018). Further, the advancement in digital technology “facilitates advanced value-at-risk (VaR), expected shortfall and hypothetical and historical stress-testing calculations” (Gozman, Liebenau, & Mangau, 2018, p. 165) when evaluating the proper standing of SMEs for external financing. For instance, in the global south, financial services are enhanced by harnessing the power of mobile devices, the internet and payment cards (Siqueira, Diniz, & Pozzebon, 2023; Uwamariya & Loebbecke, 2019). In sub-Saharan Africa, the fintech landscape is notably shaped by the popularity of mobile money services, which enhance the effectiveness and inclusivity of lending options to meet diverse needs (Bharathi *et al.*, 2023; Mashamba & Gani, 2024). Especially in countries like “Kenya, Nigeria, South Africa, Uganda, and Ghana, [which] have the highest number of FinTech firms operating in their economies, making them the top five countries with the highest volumes of digital finance for SMEs [on the continent]” (Sanga & Aziakpono, 2024, p. 22). Fintech has significantly improved access to financial services and opportunities for individuals and SMEs (Gozman *et al.*, 2018; Hsieh *et al.*, 2024; Odei-Appiah *et al.*, 2021). Thus, digital financing and digital payment technology (Kessel & Giraldo, 2023) “gather and deal with vast amounts of data that allow for lower search costs, higher potential economies of scale and more precise risk estimations ... [By] leverag[ing] sophisticated algorithms that speed up the screening process of borrowers, thus, reducing the transaction costs associated with creditworthiness assessment, as well as the time needed to accept/deny loan requests” (Girardone, Nieri, Piserà, & Santulli, 2024, p. 1). This possibility drives efficiency that often translates into lower interest rates and fees for borrowers. Furthermore, leveraging advanced algorithms and data analytics, fintech assesses creditworthiness more inclusively, opening the door for those who might have previously been overlooked by conventional financial institutions (Gozman *et al.*, 2018; Mashamba & Gani, 2024). As a result, digital technology has broken traditional barriers of geography, access, and asymmetric information to cause “digital disruption and redefines financial inclusion plans to expand the supply of microcredit and financial services to marginalised and refugee populations in developing countries” (Bharathi *et al.*, 2023, p. 21). Consequently, digital technology has enabled SMEs and individuals to access appropriate and transparent financial services across all divides (Bharathi *et al.*, 2023).

3. Theoretical background

3.1 Signalling theory and the synaptic financial signalling

Signalling theory (Spence, 1973) is a framework for information communication essential for facilitating decision-making between two decision-making parties (Connelly *et al.*, 2010, 2024; Taj, 2016). The theory has been extensively used across disciplines like management, entrepreneurship, finance, economics, human resources and evolutionary biology (Bafera & Kleinert, 2023; Kennedy, 2013; Manwani & Koch, 1997; Svetek, 2022; Taj, 2016; Wang & Dudko, 2021; Yasar, Martin, & Kiessling, 2020). The theory originates from economics and offers a valuable perspective on the behaviour of two parties in interaction who possess different levels of information (Bafera & Kleinert, 2023). The core concept of the theory is about mitigating information asymmetry between parties involved, where the theory explains that the signaller (i.e. the information sender) has access to important insider information (i.e. the signal) that may not be publicly available or fully communicated to the receiver (Spence, 1973). Therefore, in signalling theory, the key elements include the signaller, the signal and the receiver of the signal (Spence, 1973; Taj, 2016). The theory emphasises the importance of exchanging accurate (i.e. honest and credible) signals between two parties, as this information exchange is crucial for making informed decisions in business and other endeavours (Steigenberger, Garz, & Cyron, 2024; Taj, 2016). This suggests that every signal should ensure credibility and clarity to the receiver to minimise knowledge disparity between the two entities (Taj, 2016; Yasar *et al.*, 2020).

A signal from a signaller can be either positive, negative or even neutral; the reputation of the signaller and the significance of the positive, negative, or neutral signal often determine its impact on the receiver's decision and reaction (Taj, 2016; Yasar *et al.*, 2020). Positive signals influence receivers' decision-making and reactions, while negative signals have a more substantial impact; for example, investors typically respond more strongly to negative news than to positive news (Yasar *et al.*, 2020). This suggests that the receiver's reaction to positive or negative signals from a signaller is expected; however, asymmetrical (Yasar *et al.*, 2020). Hence, some senders engage in dubious acts by strategically altering the signal to influence the decisions of those receiving them (Svetek, 2022). Most receivers pay attention to and prioritise signals that are informative and costly in terms of money, time or effort required to acquire them. Because information with such cost reduces the likelihood of manipulation by the signal sender. The implication is that if signallers give misleading information, receivers will adjust by learning to ignore those signals. This adjustment happens as their beliefs are shaped and updated through feedback mechanisms in the environment (Svetek, 2022). The trust dynamics adopted by receivers are essential to guide how the receiver operates. Certain signals that were previously viewed as informative may lose their significance if they do not effectively relate to performance or fail to differentiate between high-quality and low-quality signallers. This underscores the importance of signallers providing credible and reliable signals to facilitate informed decision-making on the part of receivers.

To expand this view, the study further draws insights from neuroscience, particularly to examine how borrowers signal credible information to lenders, likening it to synaptic signalling activity in neuroscience (Kennedy, 2013; Manwani & Koch, 1997; Wang & Dudko, 2021). This analogy helps to deepen our understanding of the information flow dynamics at play in fintech credit offerings. Synaptic, in our context, is a valuable alternative data platform driven by digital technology (AI, BDA, Advanced algorithms, Blockchain, Machine learning), designed to empower alternative financial firms and investors to access various information about the borrower across different media. By harnessing vast amounts of data in the digital space, fintechs extract and process actionable insights that can drive informed decision-making and enhance lending strategies, especially in offering credit to borrowers. In the concept of synaptic financial signalling, the study considers the application of robust alternative data and sophisticated analytics to enhance the assessment and understanding of the credit records of individuals and SMEs, ultimately leading to more informed financial service decisions. This approach leverages diverse data sources, such as social media insights, news articles, market trends, websites and other unconventional datasets, to evaluate the financial health, performance metrics, risks and potential growth trajectories of individuals and SMEs. By utilising techniques from digital technology, fintech can uncover valuable patterns and trends that traditional financial analysis might overlook. This enables a more nuanced assessment of lending opportunities, especially in a landscape where individuals and SMEs often lack the same level of disclosure as their public counterparts.

Thus, the concept of synaptic financial signalling helps to explain how fintech engages digital technology to mitigate information asymmetry experienced by traditional banks. As a result, fintech continuously leverages advanced digital tools to reshape the conventional views regarding the challenges of information asymmetry when engaging with borrowers (Chen & Yoon, 2022; Guo *et al.*, 2023; Samy, Kernstock, Volland, & Hein, 2024). A good example is "when users transact in Taobao, they leave traceable data, including transaction behaviour, logistics path, and supply chain relationship. These data can help banks restore users' real trading scenarios on the platform and judge their credit scores" (Chen & Yoon, 2022, p. 473). Building on this perspective, the relevant perception and acquisition of personal insights about loan applicants, their financial needs and the establishment of mutual trust between lenders and borrowers are essential elements in the lending decision-making process (Minard, 2016; Svetek, 2022). This approach enables a deeper understanding of the financing needs of these businesses and enhances the assessment of corporate financial risks, ultimately fostering more informed lending decisions (Guo *et al.*, 2023). Furthermore, the accessed information includes

an SME's internal investment, which serves as a positive indicator of their value and the owner's dedication to the business. While many SMEs effectively use bootstrapping for financing, those that take on internal and/or business debt demonstrate a strong commitment, which can reduce perceived downside risk. This proactive approach ultimately acts as a positive signal for enhancing their opportunities for securing external debt financing. Therefore, with digital technology, fintech captures a massive amount of information and analyses it for accurate decision-making.

4. Systematic literature review methodology

This study proceeds with the researcher conducting a concept-centric systematic literature review, as recommended by some scholars (Levy & Ellis, 2006; Okoli, 2015; Paré, Tate, Johnstone, & Kitsiou, 2017; Rowe, 2014; Schryen, 2013; Watson, 2015; Watson & Webster, 2020; Webster & Watson, 2002). A systematic literature review is described by scholars as a structured process aimed at identifying, analysing, evaluating and interpreting relevant literature related to a specific phenomenon of interest (Okoli & Schabram, 2010; Schryen *et al.*, 2016). This approach not only enhances the understanding of the topic but also contributes to the body of knowledge in a meaningful way. "Consequently, it provides a rigorous process, free of biases and the credible outcome needed by researchers as a foundation for advancing knowledge" (Ajah, Ononiwu, & Nche, 2022, p. 815). Following the framework developed by Levy and Ellis (2006), the researcher undertook a comprehensive systematic literature review structured in three distinct stages: input, processing and output. The input stage serves as the early stage of the research, wherein the researcher explicitly formulates the research questions and outlines a search protocol. This includes establishing clearly defined criteria for literature selection, as recommended by Levy and Ellis (2006). Critical elements of this stage involve identifying high-quality scholarly literature databases and reputable electronic journals that specialise in the phenomenon under investigation. Furthermore, the researcher developed a set of targeted keywords to enhance the efficacy of the relevant literature search. The keywords that were developed were extracted from literature and guided by criteria within the content boundaries of the phenomenon investigated, which focuses on fintech, fintech information access and processing, and financial inclusion of the financially excluded (Koseoglu & Arici, 2023). These keywords were further justified by the availability of further studies in the literature that relate to the keywords and the phenomenon investigated (Koseoglu & Arici, 2023). To ensure thoroughness, the researcher also employed backward and forward search protocols (Webster & Watson, 2002), allowing the researcher to uncover important studies, as suggested by Levy and Ellis (2006). For the second stage, the processing stage, the researcher critically examined the selected literature to gain depth of knowledge. Furthermore, this phase involves an in-depth synthesis of identified studies, accompanied by rigorous interpretation, analysis and evaluation. The objective was to use theory to inductively unearth new perspectives in the existing literature, thereby shedding light on underexplored areas that merit further investigation (Levy & Ellis, 2006). To achieve the three stages, the researcher developed an inclusion and exclusion criterion shown in Table 1; furthermore, a research protocol illustrated in Figure 1 was developed to help guide the systematic process engaged.

From Figure 1, the researcher first develops the research question, followed by identifying relevant literature from IS journals and appropriate databases that align with the research question using www.litbaskets.io. Furthermore, the researcher consulted additional databases, including Emerald Insight, Elsevier, Wiley Online Library, Springer, Taylor & Francis, Routledge and Google Scholar. The researcher used the following search strings for both the IS journals and the other databases: [Financial Technology OR Fintech Information Access OR Fintech Information Processing OR Financial Inclusion OR SMEs External Financing OR Information Asymmetry OR SMEs Credit Access OR Fintech in Developing Economies] (Koseoglu & Arici, 2023; Santisteban & Mauricio, 2017). The search conducted spans the

Table 1. Inclusive and exclusive criteria

Inclusion criteria	Purpose
Phenomenon of interest	The researcher considered studies that discuss financial technology, financial inclusion, SMEs’ external financing, Information asymmetry, fintech credit offerings, fintech innovation and fintech in developing economies
Empirical studies	The researcher conducted a comprehensive review of the literature based on empirical studies, encompassing quantitative, qualitative and mixed-method approaches
Conceptual studies	The researcher considered conceptual studies published in reputable peer-reviewed journals, conferences and book chapters (sections)
Unit of analysis	For the analysis, the researcher interrogated papers that are termed financial technology, or Fintech, or Digital financial inclusion
Type of article	The researcher considered only peer-reviewed journals, conference papers and book chapters written in the English language
Research focus	The researcher considers only digital technology financing articles between 2015 and 2024
Search coverage	
Exclusion criteria	Purpose
Phenomenon of interest	The researcher excluded literature that does not discuss our phenomenon of interest, using concepts and the relationship between concepts, explaining financial technology
Type of start-up studied	The researcher excluded studies that focus on traditional bank-driven credit access to individuals and SMEs
Unit of analysis	The researcher excluded literature about non-technology-based financial service studies
Focus of research	Non-scholarly peer-reviewed literature was excluded
Types of articles	The researcher excluded journals, conference papers and book sections that are not peer-reviewed
Search date exclusion	We excluded articles not published between 2015 and 2024

years 2015 to 2024. The choice to conclude the search in 2024 stems from the fact that the literature review began in December 2024, thus excluding 2025 from the initial search range. However, during the study, a few relevant articles published in 2025 were identified and subsequently incorporated into the study. The search process initially yielded 163 articles from various IS databases. Through careful application of inclusion-exclusion criteria, 45 articles were identified as relevant.

To broaden the scope, the search was extended to additional databases as indicated in [Figure 1](#), resulting in the identification of 17,300 articles, of which 63 were selected for further consideration. Combining the outputs from both phases led to a total of 108 articles. After removing 32 duplicates, 76 articles were available for further screening. A thorough review of these articles was conducted, with particular focus on the introduction, discussion and conclusion sections. This evaluation resulted in the removal of 9 articles deemed less relevant, refining the selection to 67 articles that were ultimately considered suitable for the study. To enhance the comprehensiveness of the literature review, the reference lists of these 67 articles were examined, facilitating both forward and backward searching, which uncovered an additional 21 articles. This effort makes the total count of selected articles 88, regarded as the primary sources for in-depth review. The literature review consists of a diverse range of empirical studies, including quantitative, qualitative and mixed-method approaches, as well as conceptual studies. All selected works, comprising journal articles, conference papers and book chapters, were peer-reviewed and published in reputable venues, ensuring quality and credibility. The review specifically focused on studies discussing fintech, digital financial

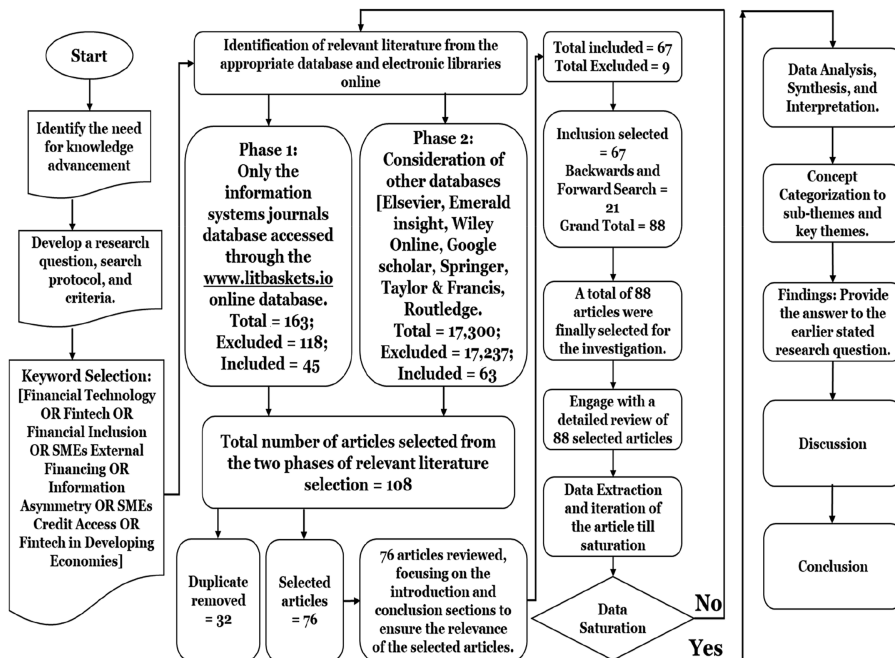


Figure 1. SLR protocol. Source: Adapted from Ajah (2024), Ajah et al. (2022)

inclusion, external funding for SMEs in developing economies, peer-to-peer funding and crowdfunding. By concentrating the search on these keywords, the selected articles aligned with the phenomenon under investigation.

4.1 Thematic data analysis for code extraction and theme development

To demonstrate the methodology used in organising themes derived from direct quotations in the reviewed literature, the researcher engaged in a thematic data analysis and has carefully provided a detailed example in Table 2 and Figure 2 (Braun & Clarke, 2006). This example serves as a valuable resource for readers, offering a clear visual representation of how the researcher systematically categorised the data. Elucidating the process of thematic analysis, it enhances the reader's comprehension of the applied analytical framework, thereby offering deeper insights into the intricacies of data interpretation and the overall analytical journey.

In line with the perspective offered by Webster and Watson (2002), the researcher conducted a review of 88 articles using a concept-centric approach. This methodology enabled the researcher to effectively organise and develop a comprehensive framework for the selected papers under examination. The researcher successfully identified and extracted key foundational theoretical concepts from the articles. These concepts illustrate the iterative processes involved in accessing information and evaluating the credit risk of borrowers, particularly as they pursue external funding from fintech firms. The researcher observed certain patterns among the concepts, leading to the grouping and merging of similar ideas that shared related and functional meanings (Templier & Paré, 2017). The process was both recursive and iterative, allowing the researcher to effectively evaluate the findings through a six-stage thematic data analytic approach (Braun & Clarke, 2006). This method facilitated a thorough coding and analysis of the data gathered from each selected article (Braun & Clarke,

Table 2. Illustrates some of the concepts, sub-themes and themes extracted from the coding of the data collected from the reviewed literature

Some literature	Direct quotes	Concepts	Sub-themes	Themes
Bernards (2019), Cai <i>et al.</i> (2022), Girardone <i>et al.</i> (2024), Gozman <i>et al.</i> (2018), Mamonov (2021), Milana and Ashta (2021), Muthukannan <i>et al.</i> (2021)	“The availability of big data, in conjunction with advances in artificial intelligence (AI) and machine learning (ML), allows FinTech to achieve more precise risk estimations” (Girardone <i>et al.</i>, 2024, p. 3) “Thanks to sophisticated algorithms, FinTech can speed up the borrower screening processes and reduce the time needed to accept/deny loan requests” (Girardone <i>et al.</i>, 2024, p. 3) “Financial information restructuring through combinations of technological innovations” (Gozman <i>et al.</i>, 2018, p. 170) “Data-driven analysis of historical customer data for personalised, real-time adopted financial recommendations gets even more precise. This is fostered by more available data and the evolving AI capability to handle structured and unstructured data” (Fabri <i>et al.</i>, 2022, p. 6) “Alternative credit data seeks to abstract calculable credit risks from everyday economic activities, and how those systems plug into existing financial infrastructures” (Bernards, 2019, p. 5) “The advent of mobile banking means that ML models being deployed by financial services firms today are able to leverage real-time location data to improve detection of fraudulent Transactions” (Gomber <i>et al.</i>, 2018, p. 231)	Sophisticated algorithms; Mobile computing; Advanced storage and networking; Borrowers’ data disclosure; Information flow; and financial information restructuring	De-obfuscating financial information flow; Coordinated flow of financial information; Data-driven analysis of historical customer data; Algorithmic scanning pattern; and Internet browsing histories	Synaptic Signalling of Borrowers’ Financial and Demographic Records for Credit–Risk Evaluation

(continued)

Table 2. Continued

Some literature	Direct quotes	Concepts	Sub-themes	Themes
Bharathi <i>et al.</i> (2023), Cai <i>et al.</i> (2022), Dhavamani <i>et al.</i> (2023), Girardone <i>et al.</i> (2024), Gozman <i>et al.</i> (2018) Mamonov (2021), Muthukannan <i>et al.</i> (2021), Pal (2023)	“The digital revolution has promised a world without boundaries, where opportunities are just a click away” (Samy <i>et al.</i>, 2024, p. 1) “Our findings show that fintech is broadening access to financial services, offering individuals in emerging markets like Egypt more options and therefore, theoretically, enhancing their well-being and thus pushing forward FI” (Samy <i>et al.</i>, 2024, p. 2) “Financial innovations that build on new technological platforms are breaking down traditional barriers of geography, access, and asymmetric information” (Gozman <i>et al.</i>, 2018, p. 149) “Crowdfunding platforms harness the power of social media to allow private individuals to collectively finance entrepreneurial activities” (Gozman <i>et al.</i>, 2018, p. 148) “A particularly common claim here is that innovative uses of what are often called “alternative” forms of data – ranging from algorithms scanning patterns of mobile phone use or internet browsing histories, to so-called “psychometric” credit scores – offer means of increasing lending to borrowers in the global south lacking recorded credit histories, property titles, or pay slips and income tax records” (Bernards, 2019, p. 1)	Value-cocreation and customer-centric; Extension of access; Screening and monitoring of borrowers’ activities	Machine-based learning and financial information flow; Disintermediate and restructure the financial information flow	Boundless Access and Continuous Synaptic Financial Signal Acquisition

(continued)

Table 2. Continued

Some literature	Direct quotes	Concepts	Sub-themes	Themes
Bernards (2019), Dhavamani <i>et al.</i> (2023), Girardone <i>et al.</i> (2024), Gomber <i>et al.</i> (2018), Gozman <i>et al.</i> (2018), Mamonov (2021), Muthukannan <i>et al.</i> (2021)	“Careful profiling of customer purchase patterns on one card can also help develop purchase patterns for infrequently used or potentially new cards” (Gomber <i>et al.</i>, 2018, p. 232) “Data-driven analysis of historical customer data for personalised, real-time adopted financial recommendations gets even more precise. This is fostered by more available data and the evolving AI capability to handle structured and unstructured data” (Fabri <i>et al.</i>, 2022, p. 6) “The automatic processing of the generated data allows Fintech to operate far more efficiently and enables them to make use of technologies, such as data analytics or artificial intelligence, to retain and expand their customer base while managing their risks” (Zhang-Zhang, Rohlf, & Rajasekera, 2020, p. 3) “The connection between the crowd and entrepreneurs is often facilitated by an online platform. Entrepreneurs present their projects on the platform, alongside other projects. Users can browse several projects, get information and updates, and are provided with direct channels of communication with the entrepreneurs. Hence, users take individual decisions to invest/lend/purchase/donate, but fund as a crowd” (Crosetto & Regner, 2018, p. 1463)	Precise risk estimation; Transparency of borrowers’ data; Borrowers’ specific information	Contextualised information gathering for a specific domestic borrower; personalised customer-centric experiment, information transparency	Specificity of Synaptic Financial Signals in Credit–Risk Evaluation

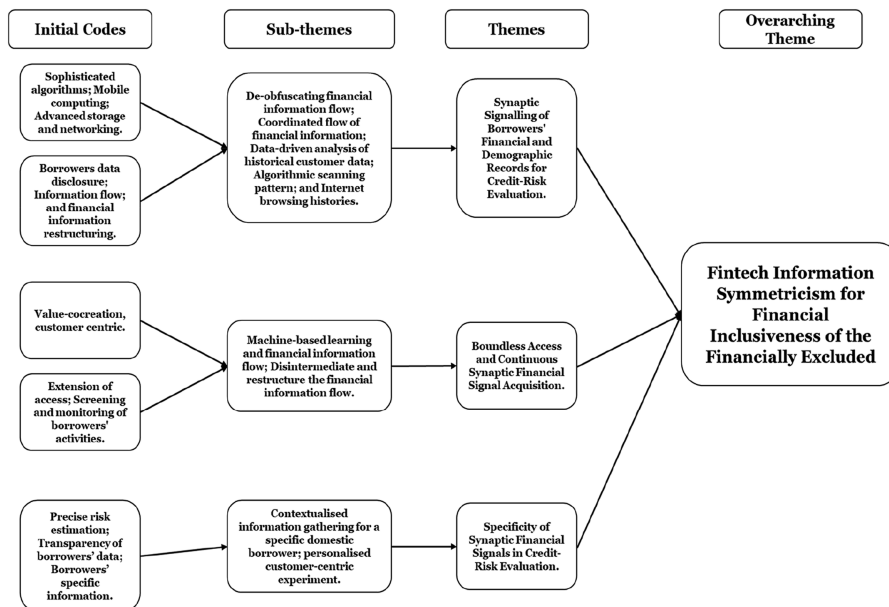


Figure 2. Thematic data analysis process

2006; Braun & Clarke, 2020a, b). The researcher systematically read and re-read the selected articles to extract and code concepts that captured the authors' perspectives on the phenomenon of interest in each article. This process continued until the researcher reached saturation, a stage where further exploration of additional articles yielded no new information and only reiterated previously identified concepts. Thus, Figure 2 and Table 2 depict some of the concepts, sub-themes and themes extracted from the coding of the data collected from the reviewed literature.

After reaching a state of saturation in the data collection process, the researcher identifies the overarching theme, which serves as the central narrative characterising the aggregated dimensions of the various themes and represents the core phenomenon under investigation. This thematic identification is crucial as it synthesises the essential elements from the data that reflect the complexities of the research topic. To ensure the validity and reliability of these identified themes, the researcher undertakes a thorough review of existing literature, carefully examining the viewpoints and arguments put forth by the authors in the selected studies. This step is pivotal for confirming that the identified themes authentically resonate with, and accurately represent, the perspectives shared by these authors regarding the phenomenon being studied. In essence, this validation process serves to bridge the research findings with established scholarly discourse, enhancing their credibility (Gioia, Corley, & Hamilton, 2012). However, some themes did not fully reflect all the authors' views presented in the selected literature. In such cases, the researcher revisited and reanalysed the literature. This iterative process involves a meticulous and nuanced examination of the texts to reconcile any disparities and accommodate differing viewpoints (Gioia *et al.*, 2012). By engaging in this careful study, the researcher ensures that the themes that emerge are comprehensive and reflective of the full scholarly opinion on the phenomenon, thereby enhancing the overall quality and depth of the research findings (Gioia *et al.*, 2012).

5. Findings

The study explored how digital technology reduces barriers for financial service providers in granting credit access to SMEs and individuals. Fintech solutions utilize vast online data and advanced algorithms to reshape the financial services landscape. The research findings demonstrate the impact of digital technology in two ways: first, lenders and financial service providers experience reduced information asymmetry, streamlining financial operational processes and thereby lowering the costs of obtaining external funding. Secondly, digital technology offers significant opportunities to borrowers by expanding the range of options available to borrowers and addresses financial exclusion globally (Ha *et al.*, 2025; Hsieh *et al.*, 2024; Lagna & Ravishankar, 2021; Samy *et al.*, 2024). By leveraging innovative solutions such as mobile banking, blockchain, advanced algorithms and artificial intelligence, fintech as a financial service provider could reach unserved or underserved populations that traditionally lack access to financial services (Lagna & Ravishankar, 2021; Samy *et al.*, 2024; Senyo & Osabutey, 2020). Digital technology makes customer information gathering and processing easy for financial service providers and lenders, thus democratizing financial services and enabling access to a broader demography by capturing out-of-reach customers (Cornelli *et al.*, 2024; Lagna & Ravishankar, 2021; Wenner, Bram, Marino, Obeysekare, & Mehta, 2017). The subsection highlights and discusses three key processes that ensure access and processing of borrowers' information to facilitate financial inclusion.

5.1 Synaptic signalling of borrowers' financial and demographic records for credit-risk evaluation

Credit risk evaluation by financial service providers and lenders requires reliable information from the intending borrowers. A process that often disadvantages individuals and SMEs in developing economies. This is a problem fintech set out to fix with the help of digital technology, through digital platforms and mobile devices. The study shows that digital technologies drive information communication between lenders and borrowers, which in this study is referred to as synaptic signalling. The concept of "synaptic signalling" is adopted from neuroscience as a signalling theoretical concept, describing how a signal is transmitted between neurons in the brain to influence the decision-driven activities of the neurons receiving the signal (Jeanneteau, Arango-Lievano, & Chao, 2020; Laping, 2003; Ma & Tymanskyj, 2020; Nogales *et al.*, 2022). In our context, such signalling information closes the information gap by providing information that informs the decisions of fintech towards borrowers. Such information is used to evaluate credit metrics and credit score predictions (Bafera & Kleinert, 2023; Girardone *et al.*, 2024; Gozman *et al.*, 2018; Jeanneteau *et al.*, 2020; Ma & Tymanskyj, 2020). The technology-driven synaptic signals are processed to de-obfuscate inaccessible financial information using AI, big data analytics and advanced algorithms to unlock actionable financial information about SMEs and individuals. The process involves collecting and evaluating valuable information from borrowers' social media accounts, mobile phone data and past financial transactions from digital platforms (Gozman *et al.*, 2018). Technically, this means that fintech, as a financial firm, engages machine learning, algorithms and data analytics to collect, review and analyse the vast amount of financial data and other pertinent details about the borrower that are needed for lending decisions (Girardone *et al.*, 2024; Gozman *et al.*, 2018). This means that data are collected through alternative sources for the benefit of fintech (i.e. lenders and investors), and they are analysed to derive informative patterns that are used to make the right lending, investment or business decisions. Consequently, fintech firms have borderless access to robust data, interoperable and decentralised algorithmic evaluation that assesses both the borrower's ability and willingness to repay a loan, simplifying the credit decision process to lend to SMEs and other individual borrowers (Cai *et al.*, 2022; Firmansyah, Masri, Anshari, & Besar, 2024; Glücksman, 2020). Corroborating this view, some scholars noted that

The availability of big data, in conjunction with advances in artificial intelligence (AI) and machine learning (ML), allows Fintechs to achieve more precise risk estimations. . . Thanks to sophisticated algorithms, Fintechs can speed up the borrower screening processes and reduce the time needed to accept/deny loan requests (Girardone *et al.*, 2024, p. 3).

Machine-learning algorithms review vast amounts of data to make predictions and recognise patterns that can lead to the decision ... the scope of analytics used to assess creditworthiness has widened to include social media and mobile phone data. Indeed, fintechs utilising advanced analytics to help financial incumbents better understand credit risk (Gozman *et al.*, 2018, p. 167).

In most developing economies, the concern of information asymmetry has been mitigated with fintech's easy access and the ability to analyse alternative data from borrowers. Financial service providers in this region engage with customers' vast financial and demographic datasets to evaluate financial service classification, interaction learning and behavioural patterns (Cai *et al.*, 2022; Odei-Appiah *et al.*, 2021; Pal, 2023). Thus, "AI has eliminated the need for intermediaries and reduced operational costs" (Bharathi *et al.*, 2023, p. 5), enabling lenders and financial service providers to focus on borrowers' existing credit scores, transaction histories and other relevant financial indicators in forecasting credit scores more accurately (Gozman *et al.*, 2018). Expanding this view, another group of scholars noted

Data-driven analysis of historical customer data for personalised, real-time, adopted financial recommendations gets even more precise. This is fostered by more available data and the evolving AI capability to handle structured and unstructured data (Fabri *et al.*, 2022, p. 6).

As a result, lenders can make more informed decisions, assess risk with greater precision and ultimately foster financial inclusion for underserved communities. Therefore, the findings from the review suggest that fintech uses digital technology to swiftly conduct a comprehensive analysis of an array of information on financial indicators when evaluating a borrower's creditworthiness and the associated risk of potential default (Bharathi *et al.*, 2023; Cai *et al.*, 2022; Dhavamani, Muthukannan, Tan, & Gozman, 2023). Key among these indicators are credit scores, which encapsulate a borrower's credit history, reflecting their reliability in repaying debts. Further, fintech lenders also scrutinise payment histories to assess punctuality and consistency in meeting financial obligations and current debt levels to evaluate overall financial health and capacity to take on additional borrowing. This thorough assessment process is critical, as it not only informs lenders about whether to give or extend a loan but also assists in determining the terms of the loan, such as interest rates and repayment periods. Consequently, digital technology drives the analytical framework, and it's integral to the risk management strategies of fintech. The risk management strategy is a process aimed at mitigating financial risks and giving borrowers access to credit. Another interesting consideration is the impact of machine-based learning methods and the use of "data analytics applied to social networking and mobile telephone data to provide risk profiles for lenders" (Gozman *et al.*, 2018, p. 161). This machine-based learning reduces information asymmetry between SMEs and lenders during credit provisioning, financial analysis and financial performance forecasting (Cai *et al.*, 2022). Therefore, the review shows that AI, big data analytics, advanced algorithms and blockchain are responsible for digital financing solutions, whose information processing capability has disrupted the financial sector, offering precise risk estimation and improving access to microcredit, especially to the financially excluded (Bharathi *et al.*, 2023; Fang *et al.*, 2021; Girardone *et al.*, 2024; Gozman *et al.*, 2018; Senyo & Karanasios, 2020).

5.2 Boundless access and continuous synaptic financial signal acquisition.

Digital technology created boundless access to information flow, opening a pool of robust information to financial service providers and lenders, offering them vast amounts of real-time data needed for credit-risk evaluation. Fintech uses technology to help them access and analyse the pool of data, enabling them to provide tailored solutions, streamline processes and

mitigate risks, which reinforces the financial ecosystem's stability and functionality (Bernards, 2019). As a result, financial and behavioural information are continuously generated and easily acquired through emerging innovative platforms, leveraging advanced technologies (Bharathi *et al.*, 2023; Fabri *et al.*, 2022; Gozman *et al.*, 2018; Mamonov, 2021). Some scholars noted

The digital revolution has promised a world without boundaries, where opportunities are just a click away (Samy *et al.*, 2024, p. 1).

Crowdfunding platforms harness the power of social media to allow private individuals to collectively finance entrepreneurial activities (Gozman *et al.*, 2018, p. 148).

Individuals and small enterprises, regardless of their geographical location or socioeconomic status, can now access loans, investments and insurance products with unprecedented ease (Krah, Tetteh, Boateng, & Amankwa, 2024). Financial service providers and lenders' access to boundless information through the use of technology has eased and facilitated financial inclusion, empowering underserved populations and creating new economic opportunities across various regions (Łasak, 2022). Consequently, borrowers access credit, especially the financially excluded in developing economies, through streamlined financial service processes that democratise access to credit and other financial products (Bollaert, Lopez-de-Silanes, & Schwiendbacher, 2021). Digital technology has made the financial sector more interconnected and accessible, with more precise risk estimation, breaking down traditional barriers that once limited access to essential financial services (Bernards, 2019; Girardone *et al.*, 2024). For example,

[N]ew technological platforms are breaking down traditional barriers of geography, access, and asymmetric information. Key technological developments include cheaper storage, quicker and more secure networks, and the use of the cloud, as well as the development of social media (Gozman *et al.*, 2018, p. 149).

Technological disruption in financial services offers a continuous exchange of information required to secure loans for individuals and small businesses (Cai *et al.*, 2022; Mamonov, 2021; Muthukannan *et al.*, 2021). Therefore, the boundless access and continuous financial information acquisition through synoptic signalling foster faster decision-making and improve financial inclusion (Muthukannan *et al.*, 2021). Corroborating this view, some scholars noted

In developing economies, alternative credit scores are being built based on mobile phone usage, such as call records and billing data. Alternatives are also appearing that combine mobile phone, browser, social network, and traditional transaction and credit data to create credit scores (Gomber *et al.*, 2018, p. 232).

Consequently, SMEs can access the credit they need more efficiently, paving the way for growth and innovation in their respective markets. Expanding the technology-driven, boundless view, robust information available aids the combination of credit scoring processes with blockchain to provide a more secure digital identification (Bharathi *et al.*, 2023). For instance, tamper-proof digital ledger transactions provide information that significantly enhances transparency and trust within the financial system. This improvement fosters greater financial inclusion and positions blockchain as a reliable solution for a secure, faster and cost-effective approach to access to credit and transactions. Additionally, blockchain facilitates more effective and precise monitoring of loan recoveries, contributing to a healthier financial ecosystem (Bharathi *et al.*, 2023). Our findings indicate that adopting digital technology offers unparalleled access to financial information and enables the continuous acquisition of synaptic financial signals. This transformation not only enhances the efficiency of financial services providers but also significantly elevates the overall customer experience. By leveraging continuous real-time data collection and sophisticated analytics, financial service providers and lenders can provide tailored solutions, streamline operations and foster a more responsive

environment that meets the evolving credit needs of their clients. Consequently, this integration of technology not only optimizes service delivery but also builds stronger customer relationships through personalized engagement (Girardone *et al.*, 2024; Mamonov, 2021). Furthermore, the offering of collaborative and seamless integration of various stakeholder systems, such as banks, mobile network operators, payment processors, regulatory bodies and consumer interfaces, has changed the financial service landscape (Dhavamani *et al.*, 2023; Mamonov, 2021). This integration is essential for delivering efficient financial services, as it ensures real-time communication and data exchange between different stakeholders involved in processes like mobile money transactions, crowdfunding initiatives and peer-to-peer lending platforms (Bharathi *et al.*, 2023; Cai *et al.*, 2022; Dhavamani *et al.*, 2023; Diniz, Sanches, Pozzebon, & Luvizan, 2024; Khando, Islam, & Gao, 2022; Mamonov, 2021).

5.3 Specificity of synaptic financial signals in credit-risk evaluation.

The evolving advancements in artificial intelligence, social media analytics, e-commerce platforms and cloud computing continue to facilitate the seamless acquisition and processing of large datasets on a global scale (Abellán & Castellano, 2017; Chen *et al.*, 2023; Chen & Yoon, 2022). This technological advancement allows fintech companies to leverage information from processed data of a specific individual borrower or SME for precise risk assessments and credit evaluations (Girardone *et al.*, 2024). Findings from our review highlight that fintech firms are increasingly leveraging cutting-edge data analytics tools to process and interpret vast datasets with exceptional accuracy. The analytics generate specific information in real time as needed. The integration of machine learning and deep learning algorithms enables fintech to extract and analyse intricate patterns and specific information from complex data sources regarding a specific customer. This capability enables them to compile detailed records of transactions and other pertinent details of the customer of interest, significantly enhancing the precision of credit risk modelling and evaluation. As a result, the financial services landscape is transforming, marked by improved risk assessment processes and more informed decision-making (Abellán & Castellano, 2017; Addo, Guegan, & Hassani, 2018; Gozman *et al.*, 2018). Therefore, with digital technology, financial service providers and lenders can draw specific insights from a borrower's financial history to achieve a thorough understanding of the borrower's unique behaviours, preferences and financial performance. For instance, some of the scholars emphasise that

The use of analytics to facilitate customer-centric strategies was also prevalent among firms engaged in delivering personalised financial management services in this cluster. Often, analytics are used to match users with the best financial products and services, resulting in the automated movement of funds, or they are used to predict spending habits and offer relevant advice (Gozman *et al.*, 2018, p. 167).

Therefore, digital technology facilitates personalised information gathering and targeted evaluation of precise financial information of a specific borrower who has a clear intention to secure a loan directly from financial service providers and lenders (Gozman *et al.*, 2018). This level of detailed analysis not only enhances the accuracy of creditworthiness assessments but also fosters more personalised lending solutions tailored to the unique needs of each borrower. These are the outcomes of fintech's ability to analyse vast amounts of data with unprecedented accuracy (Sharma *et al.*, 2024; Yang, Zhang, Gong, & Liu, 2024; Zhang, Li, Xiang, & Worthington, 2023). Ultimately, this innovative approach empowers fintech to make more informed decisions, reduce risk and improve the overall lending experience. Therefore, this view suggests that the evaluation of information accessed and the financial indicators not only reflect the borrower's creditworthiness and financial needs but also align with the lender's risk assessment criteria and investment goals. These capabilities make fintech competitive with traditional banking. Therefore, with fintech leveraging the extensive database, which includes transaction histories, social media interactions and behavioural patterns, fintech can make

more informed and precise lending decisions. This tailored approach not only enhances the efficiency of credit–risk assessment but also contributes to creating a more inclusive financial ecosystem, allowing for better access to credit for underserved populations.

6. Discussion

Although a growing number of studies examine various aspects of fintech, particularly the development and evolution of its products and services (Dhavamani *et al.*, 2023; Fang *et al.*, 2021; Gomber *et al.*, 2018; Senyo & Osabutey, 2020; Uwamariya & Loebbecke, 2019; Wenner *et al.*, 2017), demonstrating cost reduction in operational expenses, optimised operations, faster access to capital and scalability in the path of a fintech start-up. However, there remains a gap in understanding the function of the technology behind the fintech access to and processing of customers’ information. This study fills this gap by conducting a study that thoroughly investigates the role played by digital technology in information gathering and processing for credit risk evaluation. Even when they are responsible for driving disruptions and simplifications of financial products and services aimed at providing access to credit for the financially excluded population. How is technology applied in changing the narrative of the financially excluded, especially in developing economies? This gap in the literature highlights the need for a deeper understanding of how these digital innovations influence financial inclusion. Consequently, the framework developed in this study, as shown in Figure 3, presents synaptic signalling as a dynamic triggered by digital technology to cause the emergence of the fintech phenomenon. In analysing the findings, the study draws from signalling theory to shed light on the transformative role of digital technology in accessing and evaluating customers’ information, and mitigating information asymmetry, thereby guaranteeing individuals and SMEs access to financial services.

The findings illustrate three characterising factors, shown in Figure 3, which were triggered by digital technology, to help financial service providers and lenders speed up access to customer information, evaluate the credit score and financial risk of customers and achieve financial inclusion of the traditionally excluded. Many studies in the literature (Bollaert *et al.*, 2021; Bu *et al.*, 2024; Zhang *et al.*, 2023) agree with the view that “the rise of fintech lending has the potential to improve the screening or monitoring of borrowers and increase financial

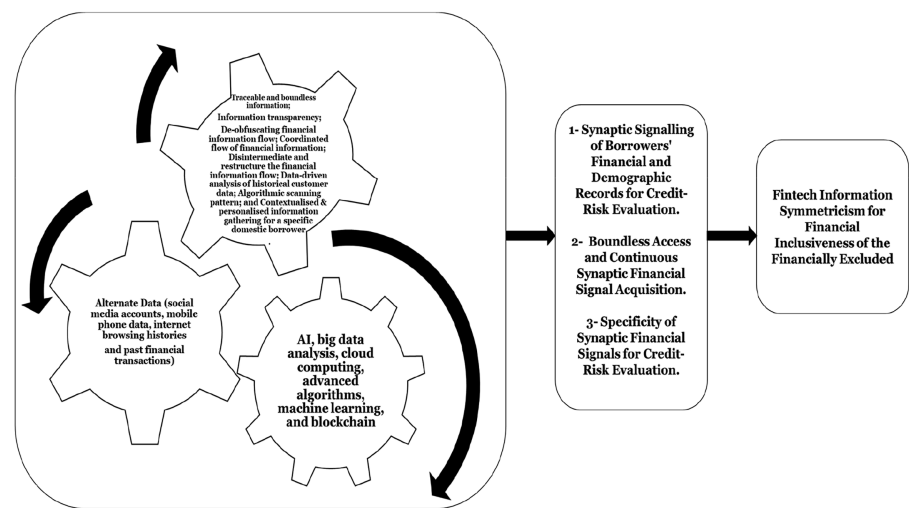


Figure 3. Framework for synaptic financial signalling in fintech financial inclusion

inclusion” (Ha *et al.*, 2025, p. 25). Yet another group of studies emphasises that algorithmic biases exist and can impede certain customers from accessing financial services (Kabiru, 2025; Rizzi, Kessler, & Menajovsky, 2021; Song *et al.*, 2024). These biases often stem from the training data used by the technology (Kabiru, 2025). While this is a valid concern, the overall benefit of financial service providers offering credit access to the unbanked and marginalised communities in developing economies is significant. Our study adds to this perspective by demonstrating how digital technology enhances financial service providers’ access and evaluation of borrowers’ financial and demographic records to assess credit risk. Digital technology enabled access and processing of customer information through synaptic signalling of borrowers’ financial and demographic records for credit-risk evaluation; boundless access to continuous synaptic financial signal acquisition; and the specificity of synaptic financial signals for credit-risk evaluation. The dynamics in technological advancement adopted in fintech allow for greater access and continuous improvement in financial services. Therefore, the emergence of advanced digital technology has paved the way for financial inclusion, especially in developing economies where many communities are financially marginalised. Thus, fintech operates with boundless access to information from different sources, thereby creating direct and unhindered communication between them and borrowers. This innovative interaction not only guides the decision-making processes of these fintech firms but also empowers them to offer credit swiftly and efficiently.

Figure 3 is different from other fintech models in the literature; the framework extends existing theory on fintech by demonstrating the financial service providers’ access and processing of customer information dynamics through the engagement of synaptic financial signalling. The framework illustrates how the synaptic financial signalling is continuously triggered by digital technology (AI, data analytics, advanced algorithms and machine learning) to enable fintech firms to access information from alternative data retrieved from social media profiles, mobile phone usage patterns, internet browsing histories and historical financial transactions. This view from our analysis is consistent with past studies (Ha *et al.*, 2025; Lagna & Ravishankar, 2021; Milana & Ashta, 2021). Especially as the framework shows that the processing of the dataset guarantees information de-obfuscation and transparency to the lenders who intend to offer credit to the borrowers. These findings confirm that fintech operations are dedicated to promoting financial inclusion for marginalised communities. The diverse array of alternative data generated to extract financial and demographic information provides deep insights into borrowers’ past financial transactions, behaviours and needs, making fintech confident to speedily offer the financial products and services requested. The framework not only shows how digital technology improves risk assessment and credit scoring processes but also facilitates the identification of underserved populations, ultimately fostering a more inclusive financial landscape. This is corroborated by the assertion that “[f]intech solutions can leverage data gathered from behaviour patterns of the unbanked population, such as mobile phone or social media usage, to improve creditworthiness algorithms” (Ha *et al.*, 2025, p. 20). Therefore, by utilising advanced algorithms, big data analytics and real-time communication tools to access and evaluate customers’ information, fintech firms drive the efficiency and accuracy of financial transactions and inclusions. Hence, synaptic financial signalling is a concept that drives fintech operations and promotes greater financial service participation and empowerment for individuals and SMEs who have been excluded from traditional financial systems.

7. Conclusion

Our findings from the systematic literature review conducted show that the digitalisation of financial services has fundamentally transformed the financial landscape in unprecedented ways, providing techniques to access and evaluate customers’ information and financial records easily, significantly improving individuals’ and small businesses’ access to credit (Gozman *et al.*, 2018; Hau *et al.*, 2024; Muthukannan *et al.*, 2021). As financial technology

continues to evolve and expand, the role of artificial intelligence and machine learning in accessing and evaluating information becomes increasingly critical in underpinning credit scoring, risk assessment and the creditworthiness of customers in the operations of the financial system (Gozman *et al.*, 2018). With the presence of mobile devices and different social network platforms, it has become easy to access all the information needed to process a customer request seeking credit from a fintech firm. Instant access to credit by individuals and SMEs is possible because fintech can access the required information generated from the synaptic signalling process triggered by digital technology (Dhavamani *et al.*, 2023). This innovation in the financial services sector has further transformed traditional banking practices, as they have integrated financial digitalisation into their operations. Thus, traditional banks are enabling more efficient transactions, enhanced data analytics and improved customer engagement to provide borrowers with greater access to more affordable credit services (Gozman *et al.*, 2018; Senyo & Karanasios, 2020). Today, we cannot separate digital tools (e.g. automated data analytics, artificial intelligence, distributed ledger technology and online lending platforms) from fintech, so we also cannot separate digital tools from the inclusion of financially marginalised communities, especially in developing economies, where a large number of people are financially excluded (Bharathi *et al.*, 2023; Cai *et al.*, 2022). Therefore, with fintech and lenders leveraging these technologies, information signals used to analyse credit metrics like cash flow, repayment history and overall financial health become easy (Girardone *et al.*, 2024).

7.1 Theoretical contribution

This study contributes to the existing literature by incorporating concepts from neuroscience to explain the information communication between fintech firms and their intended customers. It highlights the dynamics involved in accessing and evaluating customer information to determine credit scores, financial risks and histories of financial performance. By adopting the synaptic concept, this research offers a fresh perspective on what drives fintech decisions and actions in delivering financial services to underserved customers. Additionally, the study sheds light on how credible information is accessed and assessed, which is essential for effective decision-making. A noteworthy aspect introduced by signalling theory is the exploration of information dynamics within fintech operations. This involves utilising technology to gather insights about potential clients from alternative data sources. Overall, this research study provides important insights into the role of fintech in promoting financial inclusion for those who are currently excluded. The conceptual framework developed in this study adds to the existing literature on fintech financial inclusion by presenting a novel perspective and a structured approach that can inform future research.

7.2 Practical implications

The findings of this review offer valuable insights into current practices within the fintech sector, specifically highlighting how advanced algorithms, artificial intelligence (AI) and sophisticated analytics are utilised to effectively assess credit risk and evaluate the financial behaviours of potential customers. By using these innovative technologies, fintech companies can make more informed decisions regarding credit provision, which alleviates concerns about the credibility and reliability of their intended customers. Additionally, this research has significant implications for policymakers, as it sheds light on the mechanisms through which they can develop frameworks and regulations that promote the growth of fintech solutions. Such initiatives could greatly benefit underserved populations by encouraging fintech entrepreneurs to expand their services into marginalised communities, particularly in remote areas where traditional banking infrastructure is either limited or completely absent. Importantly, the study provides a blueprint for developing economies, equipping them with the insights needed to collaborate effectively with fintech firms. By doing so, these nations can work towards enhancing financial inclusion, thereby extending access to essential financial

services to individuals who have been historically excluded from the financial system. This approach represents a transformative opportunity to bridge the gap between these communities and the financial resources they critically need.

7.3 Limitations

While our review has provided valuable insights, it is important to acknowledge some limitations. The insights derived from this study are fundamentally grounded in signalling theory, which serves as a conceptual lens for analysis. While these findings contribute to a richer theoretical understanding, they remain primarily within a conceptual framework. To strengthen and validate the theoretical perspectives established herein, it is essential to undertake empirical research. This future study should aim to rigorously test the proposed conceptual framework, thereby providing data and real-world evidence to support or refine the initial theoretical assertions made in this investigation. Thus, an empirical study could be conducted in developing economies where a high rate of financial exclusion is experienced. Also, the researcher encountered challenges in including all relevant articles due to access restrictions and fees. To enhance future studies, it would be beneficial to explore additional articles beyond the specific databases and journals utilised in this analysis. This could lead to a more comprehensive understanding of the topic.

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