Heliyon 11 (2025) e44128

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Review article

Trust and financial inclusion: A literature review with reference to the digital transformation

Elisa Aracil [a,b], Laura Fernández-Méndez [b], David Roch-Dupré [a,b], Francisco Javier Fuertes [b,*]

[a] Institute for Research in Technology (IIT), Universidad Pontificia Comillas, Spain
[b] Faculty of Economics and Business Administration (ICADE), Universidad Pontificia Comillas, Spain

ARTICLE INFO

Keywords:
Trust
Digital
Financial inclusion
Fintech
Mobile money
Technology

ABSTRACT

Trust is essential in finance due to the forward-looking nature of financial contracts. The growth of digital finance has amplified its role in advancing financial inclusion, particularly in emerging markets. However, existing research on trust and financial inclusion is fragmented and lacks a cohesive synthesis. This study provides a literature review to systematize the relationship between trust and financial inclusion across traditional and digital contexts. Based on this analysis, we propose a conceptual framework to clarify this relationship and identify five key transformations in the trust-financial inclusion tandem driven by digital finance. These findings offer a foundation for future research on trust and financial inclusion in a digital era. This work presents significant implications for practitioners and policymakers wishing to strengthen financial inclusion to improve social well-being and cohesion. The study on trust and its transformative role in expanding digital financial inclusion may foster the digital economy and more inclusive economic growth.

1. Introduction

An old adage contends that 'trust is the glue of life.' Trust entails expecting beneficial, non-detrimental action from another party [1]. Finance is trust-based since it promises future returns in exchange for present payments [2,3]. However, information asymmetries between the parties of financial contracts can exacerbate opportunism, rendering trust a key enabler of financial contracts [2,4]. The complexity of bank products further increases the perception of risk and vulnerability to opportunism, making trust pivotal in finance. [2,5–7]. That is, one party's reliance on the actions of another is governed by trust, which limits opportunistic financial behavior and facilitates financial transactions [8–11].

According to Haerpfer et al. [12], roughly 50 % of individuals on average report 'not very much' or 'not at all' for confidence in banks (Fig. 1, panel A). This may explain why financial inclusion, defined as access to affordable essential financial services, has improved dramatically in recent years but is not yet universal. As shown in Fig. 1 (panel B), financial inclusion has increased globally to 76,2 % of the world population older than 15 years holding an active account in 2021, from 50,6 % a decade ago [13]. Much of the advancement in financial inclusion is driven by digital financial technology. Mobile financial technologies incorporate the unbanked population into the formal financial system in developing economies where branches and ATMs have traditionally been scant [14,15].

* Corresponding author.
E-mail address: ffuertes@comillas.edu (F.J. Fuertes).

https://doi.org/10.1016/j.heliyon.2025.e44128
Received 22 December 2023; Received in revised form 16 October 2025; Accepted 4 November 2025
Available online 12 November 2025

Fig. 1 (panel C) shows that 27 % of adults in low-income economies have a mobile money account [13]. However, financial inclusion dimensions – access, usage, and intensity-remain distant from the World Bank's universal financial access goal. We argue that the effective adoption of both traditional and digital finance relies on trust.

Traditional financial inclusion primarily depends on physical access to financial services through bank branches. In contrast, digital financial inclusion facilitates access via digital channels, such as mobile phones or the Internet, with a greater variety of players [16], including Fintechs, neo-banks, and decentralized finance [17], and nascent markets, like those for mobile money, that can significantly enhance financial inclusion [14]. Digital means allow the delivery of financial services to more customers since it overcomes the traditional financial inclusion barrier of lacking bank branches in rural and underdeveloped areas [14]. However, this shift from traditional to digital finance fundamentally alters the nature of trust, transitioning from interpersonal trust (e.g., trust in bankers) to systems trust (e.g., trust in technology) [18]. For example, in Kenya, mobile money services like M-Pesa have greatly enhanced financial inclusion, but concerns about fraud and data security still prevent some individuals from using them. This highlights the critical role of trust in expanding financial inclusion.

Because trust is a multifaceted notion, the existing literature on trust and financial inclusion remains fragmented. Existing studies focus on disparate aspects, such as social trust [4] or privacy concerns in digital finance [19], limiting a holistic understanding of trust's role in enabling financial inclusion. To address this gap, we propose the following research question: How does trust enable financial inclusion across traditional and digital paradigms? To achieve a comprehensive view of the trust-financial inclusion tandem, we review extant literature pursuing three research goals: first, to clarify and categorize the different trust targets, sources, and mechanisms enabling financial inclusion; second, to examine how these trust dimensions influence traditional and digital financial inclusion; and third, unveil the transformations that arise in the trust-financial inclusion linkage from shifting to a digital paradigm in finance. Our analysis reveals five key transformations in the trust-financial inclusion relationship driven by the shift to digital finance. We develop an integrative framework that categorizes trust dimensions—targets, sources, and mechanisms—and their influence on financial inclusion. This framework addresses the heterogeneity in existing studies, offering a cohesive foundation for future research.

Our work extends the multi-stakeholder framework to enhance Fintech use proposed by Danladi et al. [20], explicitly addressing the role of trust in promoting digital financial inclusion. We also complement existing analyses on trust towards certain financial

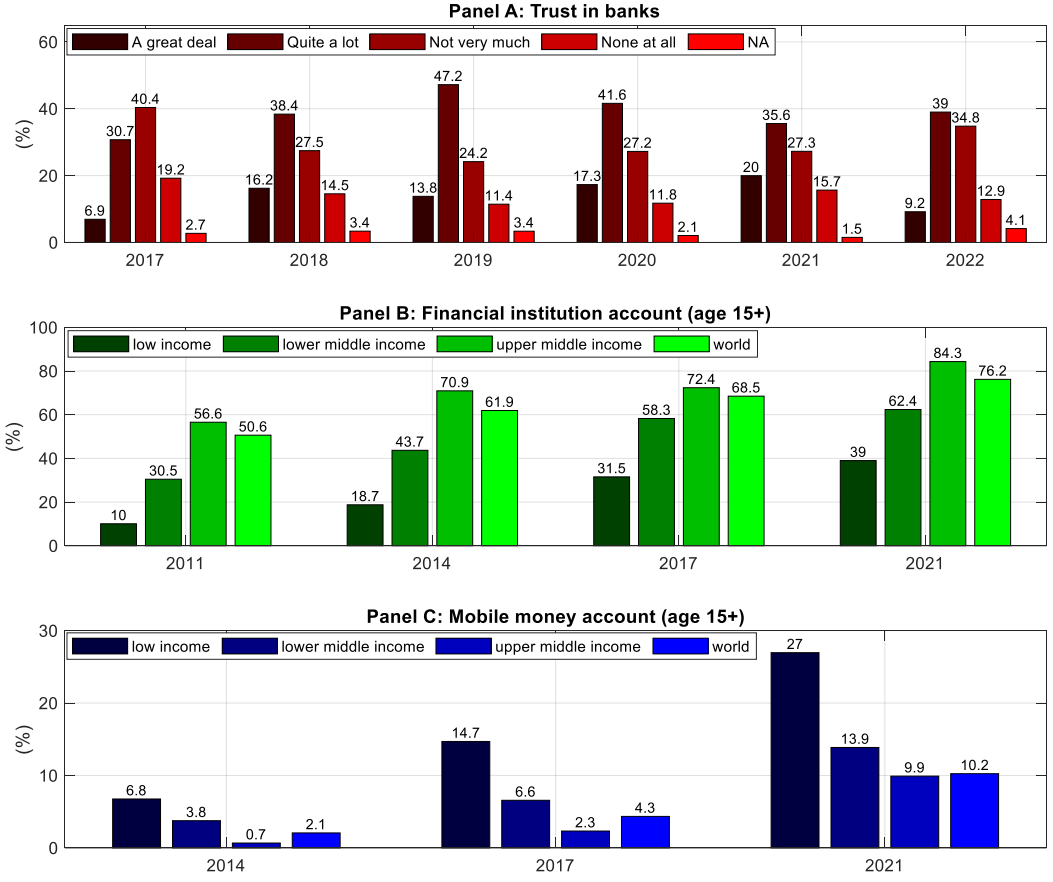

Fig. 1. Evolution of trust in banks, traditional financial inclusion, and digital financial inclusion.
Sources: Panel A: World values survey: Round seven-country-pooled datafile version 5.0 (2022) [12]Panels B and C: World Bank Global Findex Database (2021) [13]

services providers, such as Fintechs [21], by broadening the focus to the ecosystem of actors and systems involved in financial transactions. The review and proposed framework facilitate future research avenues and a standard structure that can foster the progress of academic research on broader financial inclusion, specifically through digital means. Our findings can be of interest to various stakeholders, including policymakers aiming to amplify financial inclusion and digital payments for a cashless society, traditional financial incumbents, newcomers such as Fintechs interested in expanding their client base, and the society that might benefit from increased social cohesion emanated from deeper financial inclusion levels.

2. Methods

Following previous studies based on systematic literature reviews [22], we apply a three-stage process – identification, screening, and inclusion-to select the articles to be included in the analysis (Fig. 2). The first step identifies the keywords used in the strategy search to build the database: "financial inclusion," "inclusive finance," and "trust." This search engine includes articles on financial inclusion (i.e., traditional and digital financial inclusion) and digital or technology trust. We implement our search strategy in the Web of Science (WoS) core collection database using the SUBJECT field (in particular, Title, Author keywords, keywords included by WoS, and Abstract).[1] WoS is one of the most accurate databases for scientific publications and a highly trusted citation index for scholarly research, literature reviews, and bibliometric studies in economics, finance, and business disciplines [23,24]. We imposed no restrictions on the starting and end points of the analysis period. The search using this equation yielded 114 publications between 2016 and 2024. To restrict the analysis to peer-reviewed articles, we excluded 10 publications other than journal articles (i.e., books and books' chapters, meetings, and conference proceedings) and 2 articles not written in English.

In the second step of the process, screening, we excluded 30 articles out of the remaining 102 due to their indexation in journals from research areas distant from Business and Economics (e.g., psychology, forestry, and fisheries, among others). After this refinement, we obtained 72 articles eligible for the literature review. We read the abstracts of these 72 articles and the full article when needed to verify their inclusion in the final set. This process excluded 33 articles for the following reasons: i) 18 documents were not pertinent to the topic analyzed. For instance, some articles consider financial inclusion as a context, but the research primarily focuses on other variables such as technology; ii) 9 documents did not analyze the relationship between trust and financial inclusion. For example, some examined financial inclusion without considering the trust variable, or vice versa; iii) 5 documents were unavailable even though we tried several options to access them; iv) 1 was a literature review document.

After excluding these articles, we reached a final sample of 39 documents, marking the last step – inclusion – in the methodological process.

3. Findings

3.1. Descriptives

We conduct a preliminary sample analysis to gather a descriptive overview of the state of the art in the relationship between trust and financial inclusion. The reviewed articles consider several financial services such as bank accounts, electronic payments, insurance, microcredits, and mobile banking, among others. Keywords in titles are shown in Fig. 3 and in the word cloud in Fig. 4, which reveals the most frequent words. The term financial inclusion leads the chart, unsurprisingly, since it is the core of this research. Taking the frequency of 'financial inclusion' as a basis, we calculate the relative frequency of the remainder identified keywords. We find 'mobile' as the most frequent term (*relative n* = 45 %) as a form of financial inclusion, indicating a shift towards analyzing the digital paradigm in finance and the role of trust in the digital context. The term 'Fintech' is gaining increased importance (*relative n* = 14 %), although it is still less analyzed than 'banks' (*relative n* = 27 %). We also observe that the analyses follow a basic financial inclusion perspective, focusing on payments (*relative n* = 23 %) and leaving minimal room for more sophisticated financial services such as crowdfunding (*relative n* = 9 %). Interestingly, the term 'microfinance' (*relative n* = 5 %) is the least used in the titles in our sample, which reveals a lower academic interest towards a traditional mechanism for financial inclusion (microfinance), which is substituted by newer, digital means to promote bancarization, for example, mobile wallets for digital payments.

Table 1 presents the publications in our sample categorized by their respective journals, their 2022 JIF (Journal Impact Factor), and their accumulated citations. We observe that Journals in the category of "Economics" are the most frequent (*n= 22,58 %*), followed by journals in the categories of "Business" and "Business, Finance" (*n= 19,35 %* respectively). These three categories account for 61,29 % of journals, while the rest (including "Development Studies") constitute the remaining 38,71 %, with none representing more than 10 % of journals.

3.2. Main findings

We use an organizing structure to guide our literature review and findings based on a combination of two approaches: ADO (Antecedents, Decisions, and Outcomes) [59], and TCM (Theories, Contexts, and Methods) [60]. ADO and TCM allow us to analyze trust from different perspectives. The ADO framework unveils trust targets, sources, and mechanisms, whereas the TCM approach

[1] (TI=((("financial inclusion" or "inclusive finance") and ("trust")))) OR (KP=((("financial inclusion" or "inclusive finance") and ("trust")))) OR (AB=((("financial inclusion" or "inclusive finance") and ("trust")))), and language: (English). The search was conducted on the 31st of May of 2024.

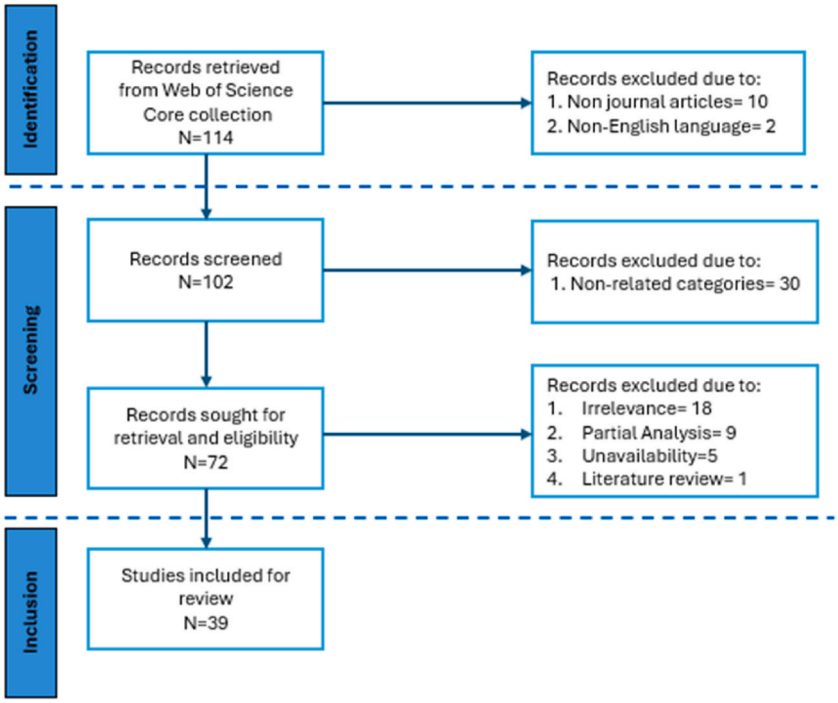

Fig. 2. Methodological process for the identification and inclusion of articles in the review.

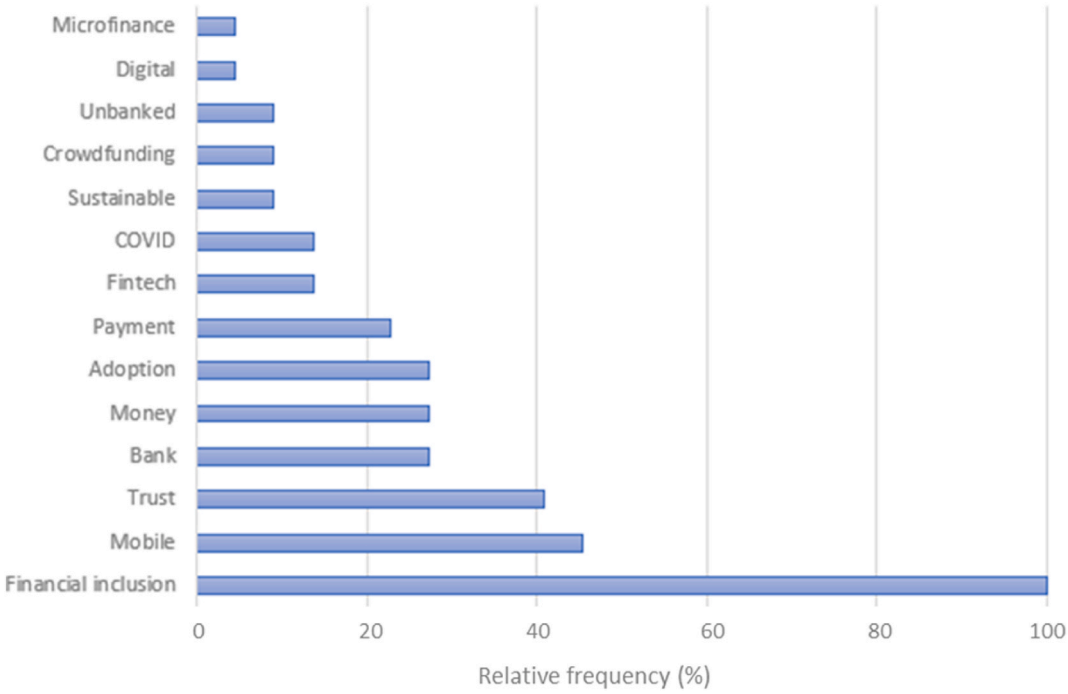

Fig. 3. Keyword frequency in titles.

examines underlying theories, contextual factors affecting geographical scopes, and methodological observations in the trust-financial inclusion literature. Based on these analyses, we identify several transformations in the literature on trust and financial inclusion driven by digital technologies promoting greater financial access.

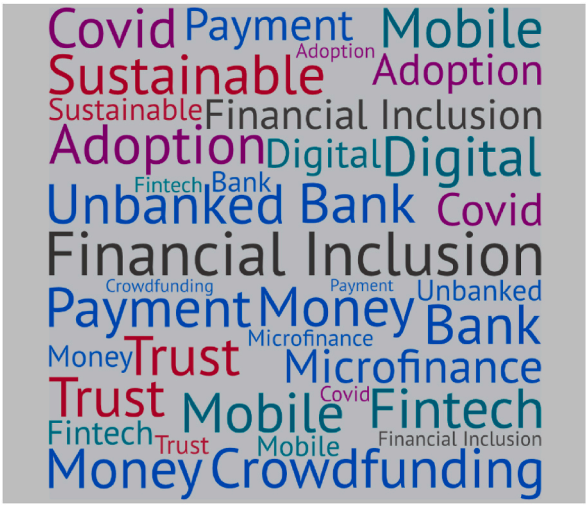

Fig. 4. Cloud of coded terms.

3.2.1. *Trust targets to foster broader financial inclusion*

Because trust is situation-specific [61], we analyze the targets of trust that affect the provision of financial services, that is, whom (the trustee) or what (the trustworthiness of) is being trusted. Seminal literature on trust targets [62–65] suggests that trust can be directed towards actors or systems. That is, truster A may trust the integrity of individuals or firms (trustee B) or the reliability of a system (trustworthiness of technological, social, or institutional systems). In other words, we can refer to narrow-scope trust when the trust target is an actor or part of the contract, such as a bank, whereas broad-scope trust refers to trusting institutions or overall systems ([5]). Table 2 classifies different trust targets and their association with digital or traditional finance. Most studies linking trust and financial inclusion (39,47 % of papers, *n= 15*) reveal that narrow trust, i.e., trusting banks, is an antecedent of financial inclusion. Other targets of trust within systems have received less attention, such as social trust (21,05 %, *n=8*) and trust in institutions (10,53 %, *n=4*).

We argue that trust in banks, social trust, and trust in institutions as enablers of financial inclusion obey the traditional finance paradigm. Institutions such as norms, procedures, and cultural values are known as the 'guardians of trust' [65]. Trusting banks requires confidence in the broader institutional context, including effective mechanisms to control fraud and supervise operators, in line with the 'institutions-based trust' idea [66]. As a result, research finds that trust's role in enabling financial inclusion is contingent on the institutional context. For example, Zikhali [43] claims that trust in government enhances financial inclusion in Zimbabwe, mitigating the complexities of currency trade. In addition, trust in the financial system and supervisory authorities is crucial to enable trust in the financial system [67]. In contrast, we identify studies contending that institutional voids (i.e., weak institutions) can be supplemented by enhanced trust. For example, weak governance structures or low educational levels act as barriers to financial inclusion; however, trust can overcome them [29,37,39].

Nonetheless, when the digital paradigm in finance is considered, additional trust targets are at play within actors (narrow-scope) and systems (broad-scope) trust. We find articles addressing technology as a trust target (26,32 %, *n= 10*) within systems trust and trust in the provider of financial digital services or Fintech (31,58 %, *n= 12*) within actors' trust. Trust in technology may offset customers' reluctance to use digital means as explained by technology acceptance models (TAM) [68]; see Rondan-Cataluña et al. [69] for a review of TAM).

The digital revolution introduces new actors to the market, such as Fintech companies offering digital financial services. A significant challenge in building trust towards these organizations is the public's familiarity with them [52]. As emerging organizational forms, Fintechs suffer from the liability of newness [70]. Customers have no prior experience with these firms, which brings uncertainty and fears of opportunism derived from the spatial separation between lenders and borrowers that digital banking entails [71]. That is, non-technological savvy customers prefer personal interaction [19,25] versus online financial solutions. As a result, building trust in Fintechs fosters digital financial inclusion. For example, Hahm et al. [52] find a crucial relevance in trusting the technological platforms and the providers to support e-remittances from developing small Pacific islands. The authors suggest a 'ladder of Fintech-based remittance services' where trust is the last step, following literacy, awareness, accessibility, and availability. Finally, Table 2 shows that studies in our sample addressing digital financial inclusion (73,68 %, *n=28*) exceed those focused on traditional finance (26,32 %, *n=10*).

Transformation 1. Trust targets. *Beyond the distinction in trust targets between actors (banks) and systems (institutional or social), the literature is shifting toward digital trust targets on emerging actors (Fintechs) and systems (technology).*

3.2.2. *Sources of trust for enhanced financial inclusion*

The reviewed literature points to different sources that build trust and the subsequent improvement in financial services usage. We

Table 1
Publications in trust and financial inclusion across journals.

Journal	JIF (2022)	WoS category[a]	Rank by JIF (2022)[b]	Ref.	# citations in WoS (June 2024)
International Journal of Bank Marketing	5.3	Business	69/154 (Q2)	[25,26]	197
Information Technology for Development	4.8	Development Studies	8/42 (Q1)	[27]	72
Transnational Corporations Review	3.5	Business		[28]	71
Finance Research Letters	10.4	Business, Finance	1/111 (Q1)	[4]	58
Journal of Risk and Financial Management	0.95[c]	Business, Finance		[29,30]	24
Cogent Business & Management	3.0	Business		[31]	20
Journal of Economic Behavior & Organization	2.2	Economics	176/380 (Q2)	[32,33]	20
Macroeconomics and Finance in Emerging Market Economies	1.3	Economics		[34]	18
Cogent Economics & Finance	1.9	Economics		[35,36]	15
Journal of African Business	1.9	Business		[37]	15
Journal of Behavioral and Experimental Finance	6.6	Business, Finance	8/111 (Q1)	[38]	15
Future business journal	3.4	Business		[39]	14
Information	3.1	Computer Science, Information Systems		[40]	12
Social Responsibility Journal	3.2	Management		[15]	12
International Journal of Social Economics	1.9	Economics		[41]	11
Sustainability	3.9	Environmental Studies	48/128 (Q2)	[42]	10
Canadian Journal of African Studies	1.1	Area Studies		[43]	7
Journal of Public Affairs	2.6	Public Administration		[44]	6
Geografia-Malaysian Journal of Society & Space	0.5	Social Sciences, interdisciplinary		[45]	5
Studies in Comparative International Development	2.7	International Relations	23/96 (Q1)	[46]	5
African Development Review	2.9	Development Studies	17/42 (Q2)	[47]	3
Journal of Emerging Market Finance	1.5	Business, Finance		[48]	3
Information Systems Frontiers	5.9	Computer Science, Theory & Methods	16/111 (Q1)	[49]	2
International Review of Economics & Finance	4.5	Economics	69/380 (Q1)	[50]	2
Journal of International Development	1.4	Development Studies	37/42 (Q4)	[51]	2
Asia & the Pacific Policy Studies	1.9	Area Studies	20/84 (Q1)	[52]	1
Economic Analysis and Policy	6.5	Economics	31/380 (Q1)	[53]	1
Journal of Development Studies	2.9	Economics	133/380 (Q2)	[54]	1
Borsa Istanbul Review	5.2	Business, Finance	14/111 (Q1)	[55,56]	–
Journal of Asia Business Studies	2.9	Business		[57]	–
Journal of International Money and Finance	2.5	Business, Finance	59/111 (Q3)	[58]	–

[a] We show the category with the highest percentile for journals under several categories.
[b] Rank by JIF unavailable until the end of June 2024 for journals entering JIF in June 2023.
[c] Due to JIF's unavailability, we show the latest (2021) JCI (Journal Citation Indicator) from WoS.

observe that these sources of trust formation pertain to the trust targets identified in Transformation 1. In particular, the literature is shifting towards incorporating digital sources of trust.

Sources of trust in organizational targets such as banks and Fintechs so that financial inclusion is enhanced include reputation and brand image, as in Nathan et al. [30] and Pal et al. [27], who find that the reputation of Fintech (wallet providers) promotes trust and usage; word-of-mouth, third-party endorsements, and referrals, for example, in the form of 'bank mitras' (friends from the bank as per the local language in India) to disseminate services offered by the banks to rural customers at each village [57]; and collaborating with the communities through different means, such as developing an app for farmers in Colombia [73].

Sources for trusting systems, such as institutions, rely on a sound regulatory framework that protects vulnerable financial consumers [28] and strong political rights [33]. Finally, the formation of trust in technology rests on reliable technologies, security of personal data [15,26] and cybersecurity [30,31]. For example, Dziwornu et al. [48] find that personal data privacy among women entrepreneurs in Uganda is an antecedent for trusting mobile financial services. Customers fear their data's vulnerability and monetary positions at the expense of hackers and illegitimate uses [31]. Moreover, there is a nascent literature on implementing e-government in developing economies, where digital financial inclusion is paramount for the digital relationship between government and citizenship. In this realm, trust enables the acceptance of digital finance models if it lowers the perceived risk of personal data protection [44,57].

Transformation 2. Sources of trust. *Building trust for enhanced financial inclusion embeds traditional sources of trust, such as reputation, and newer sources associated with reliable technologies and personal data security that enhance digital financial inclusion.*

3.2.3. Mechanisms for trust-based financial inclusion

Based on the targets and sources of trust highlighted in Transformations 1 and 2, we identify the mechanisms (or mediators) that translate trust into broader financial inclusion: improved behavioral intention and reduced perceived risk. Existing and potential

Table 2
Trust Targets in the transition between traditional and digital financial inclusion.

		Organizations and actors		*Systems*		
		Trust in banks *n=15 (39,47%)*	**Trust in Fintech** *n=12 (31,58%)*	**Trust in Technology** *n=10 (26,32%)*	**Trust in Institutions** *n=4 (10,53%)*	**Social Trust** *n=8 (21,05%)*
Financial Inclusion	**Digital** *n=28 (73,68%)*	[29], [32], [35], [37], [43], [51], [72]	[15], [19], [25], [27], [30], [31], [37], [42], [44], [47], [48], [52]	[19], [26], [37], [39], [40], [49], [52], [53], [57], [73]	[37], [43]	[4], [33], [37], [43], [45], [49]
		n=7 (18,42%)	*n=12 (31,58%)*	*n= 10 (26,32%)*	*n=2 (5,26%)*	*n=6 (15,79%)*
	Traditional *n=10 (26,32%)*	[28], [34], [36], [38], [41], [46], [50], [55]			[55], [58]	[54], [55]
		n=8 (21,05%)			*n=2 (5,26%)*	*n=2 (5,26%)*

customers' positive behavioral intention toward financial services arises when trust is built through previously identified sources such as reputation and referrals. That is, customers' cognitive assessments emanated from favorable reputation or word of mouth lead towards enhanced behavioral intention to access financial services. Interestingly, we observe that works analyzing the influence of behavioral intention emanating from trust primarily focus on digital financial inclusion [15,40]. In particular, a perceived ease of use and intention is amplified in high-trust environments [37]. Moreover, some studies [30] suggest that improved behavioral intention can positively affect willingness toward financial literacy. Enhanced financial literacy builds trust since informed clients can deepen their relationship with financial institutions through a more informed knowledge about financial products [41,54].

In developing economies, perceived risks in overall financial inclusion are rooted in negative experiences from opportunistic lenders that encourage borrowers to unsustainable debt levels or make them vulnerable to theft and abuses [46]. Building trust in financial institutions is necessary in these contexts to overcome a generalized mistrust in the financial sector. Therefore, trust significantly reduces perceived risks associated with financial inclusion [46] and digital financial inclusion initiatives like mobile banking [25,40]. This can be manifested through expanded initial access to finance (i.e., bancarization) or a wider adoption of financial services (i.e., usage and intensity). Behavioral intention and a lower perceived risk facilitate financial inclusion and cross-selling possibilities, potentially improving financial access, usage, and intensity.

Transformation 3. Mechanisms for trust-based financial inclusion. *Behavioral intention and reduced perceived risks act as mediating mechanisms between trust and financial inclusion, particularly in digital finance.*

3.2.4. Contextual factors influencing the role of trust in fostering financial inclusion

Trust-enabling financial inclusion does not happen in a vacuum, but it is influenced by various contextual factors at institutional (systems' characteristics) and individual (customer differences) levels. Institutional features and individual traits strengthen or weaken (moderate) the impact of trust in financial inclusion. From an institutional perspective, conventional financial inclusion has been traditionally associated with weak governance conditions that characterize low-income countries [27] and the cyclicality in banks' trustworthiness, as experienced in the aftermath of the 2008 financial crisis [46]. In contrast, literature analyzing trust and financial inclusion in the digital paradigm incorporates technological contextual factors linked to the digital gap. For example, the lack of basic digital infrastructure and digital platforms [29,52], poor mobile connectivity, and the digital gap resulting from low digital penetration [27].

A large body of research focuses on the individual level, analyzing personal traits that influence an inclination towards financial inclusion. In this literature, vulnerable groups presenting irregular and low incomes are a focal point, including women [48], unemployed [29], and illiterate [28]. Interestingly, some studies find that trust can substitute certain voids to access finance, such as low educational levels [4] and the absence of informal networks in individual societies [32]. Moreover, financial literacy has been a barrier to financial inclusion in the traditional paradigm; however, some studies analyzing digital financial inclusion [30] find a negative relationship with financial literacy. This means that customers with limited literacy, but specific technological skills can access digital financial services that were previously inaccessible, overcoming this barrier.

Transformation 4. Contextual factors. *Contextual factors based on individual traits or weak governance institutions are crucial in traditional finance, whereas for digital finance, technological contextual factors arise. Financial literacy is a barrier in the traditional paradigm and exerts a contested role in the digital one.*

3.2.5. Theories, methods, and geographical scope in the trust-financial inclusion literature

We analyze the theories most frequently used in this literature, where TAM and the unified theory of acceptance and use of technology (UTAUT) are prominent. Although TAM is widely applied to explain the behavioral intention to engage in digital transactions, including financial ones [26,30], the model does not incorporate a valence construct between risk and trust [40]. However, in the UTAUT theory [74], trust in the technological infrastructure emerges as a critical factor in promoting the usage of digital financial services [25,31,40,73]. For example, a study [73] about the acceptance of a digital financial app for agriculture in Colombia, finds that trust in technology supports the use of digital financial services by rural farmers. Other theoretical frameworks are in use in some studies, such as the diffusion of innovation theory [49] and the resistance to innovate theory [27].

From a methodological perspective, we observe that quantitative methods using statistical models (i.e., SEM or OLS) are predominant in this literature ($n = 26$). The remaining studies in our sample ($n = 13$) rely on qualitative techniques based on case studies (interviews, focus group discussions, and historical analysis). The effect of trust is also mixed in the literature. In most articles ($n = 22$), the trust variable directly impacts financial inclusion. For instance, analyzing the direct effect of refugees' trust in banks on financial inclusion in the United States [51]. However, we find some contributions where trust exerts a mediated or moderated effect, always concerning digital financial services. This marks another transformation in the literature by considering more complex nuances in the analysis of trust-digital financial inclusion with mediating [42] and moderating [46] effects of trust in the linkage with financial inclusion towards other social goals, such as sustainable development in Pakistan [42] and happiness in China [75].

How trust is effectively measured is a contested issue. Most studies in our sample use their surveys and scales to assess trust. We find two studies [4,55] gathering trust data from the World Values Survey (WVS)[2] that offers open data on various trust metrics worldwide across temporal waves. Thus, a clear drawback in this literature is the lack of a generalized scale for measuring trust, which may follow the OECD's guidelines [76]. Reliability and validation are crucial for a generalized adoption of scales. Reliability arises from the consistency of trust measures across different surveys and periods of the same study. In contrast, the validity of trust measures can emanate from the expected correlation with other socioeconomic indicators [76]. A recent development in this area is the creation and validation of a financial trust index [56]. Trust scales and their further validation are crucial to advance this literature, generalize its comparability, and encounter emerging trust models in the wake of the digital revolution. Regarding the assessment of financial inclusion, the World Bank's Global Findex Database is prominent [4,28,32–34,41,72], with minor evidence of usage [55] of the IMF's Financial Access Survey (FinScope). Besides, scholars assess financial inclusion through questionnaires, surveys, and interviews incorporating digital variables such as the choice of use of mobile services, including money transfer, payments, and checking account balance via SMS alerts [48], or the number of digital financial services used in the last 90 days [47].

The geographical scope analyzed in the linkage between trust and financial inclusion is illustrated in Table 3. Almost half of the studies analyze Africa (n = 19, 48.72 %, 16 country analyses, and 3 regional analyses), given it is the epicenter of the mobile money revolution and home of the pioneer mobile payment service M-Pesa. Research on Asian countries is slightly less abundant (n = 15, 38.46 %, 13 country analyses and 2 regional analyses). Other developing countries, such as those in Latin America, have barely been analyzed (just one document in our sample), which demands further research attention. When the level of analysis is compared (country vs regional), we find that most documents are country-specific (n = 34, 87.18 %), failing to show continental or worldwide trends.

Transformation 5. Methodological transformations.

a) Transformation in trust measurements. *Scales measuring trust are yet to be generalizable; however, under the digital paradigm, trust measurements are evolving, incorporating technology-related insights.*

b) Transformation in the directionality of trust. *In the traditional paradigm, trust is often an independent variable in the trust-financial inclusion linkage. In contrast, in the digital one, there is a transformation towards more complex relationships where trust mediates or moderates digital financial inclusion with socioeconomic variables.*

c) Transformation in geographical scopes. *The literature on trust-financial inclusion concentrates on country-specific African or Asian studies. More evidence is required in other developing countries such as Latin America.*

4. A research framework on trust transformations for – financial inclusion

As a result of the transformations emanated from our analysis, we propose a research framework to guide future investigations on trust and financial inclusion (Fig. 5). The framework considers the four perspectives in the trust analysis: trust targets, sources of trust, mechanisms that transform trust into enhanced financial inclusion, and contextual factors influencing trust. Moreover, the framework differentiates between traditional and digital financial inclusion. This distinction is crucial since it allows for new research contributions to the rapidly growing digital financial inclusion domain. In addition, the framework accommodates the traditional view of financial inclusion, based on binaries regarding access and usage, and the digital one, which includes financial inclusion intensity. Finally, the framework is generalizable to fit academic progress within the trust-financial inclusion literature.

[2] The World Values Survey (WVS) is a global research project born in 1981 that explores people's values and beliefs, how they change over time, and what social and political impact they have. The WVS conducts representative national surveys in almost 100 countries.

Table 3
Geographical scope in the trust-financial inclusion literature.

Study	Ref.	COUNTRY ANALYSES *n=34 (87,18 %)*																		REGIONAL ANALYSES *n=9 (23,08 %)*			
		AFRICA *n=16 (41,03 %)*								ASIA *n=13 (33,33 %)*					OTHER *n=5 (12,82 %)*								
		ETH	GHA	KEN	NGA	TUN	UGA	ZAF	ZWE	BGD	IND	MYS	PAK	VNM	COL	NLD	PNG	PSIDS	USA	AFR	ASIA	EUR	ROW
Abdu & Adem (2021)	[35]	x																					
Ali et al. (2023)	[56]												x										
Amari & Anis (2021)	[41]					x																	
Bekele (2022)	[72]	x		x																			
Broekhoff et al. (2024)	[53]															x							
Dagnachew & Mawugatie (2022)	[36]	x																					
Damra et al. (2023)	[55]																			x	x		
David-West et al. (2021)	[49]				x																		
De & Shukla (2020)	[44]										x												
Duggan (2016)	[46]						x																
Dziwornu et al. (2018)	[48]		x																				
Farah et al. (2018)	[25]												x										
Ghosh (2021)	[38]										x												
Hagstrom & Pereira (2021)	[51]																		x				
Hahm et al. (2021)	[52]																	x					
Hassan et al. (2022)	[40]									x													
Hoy et al. (2022)	[54]																x						
Koomson et al. (2023)	[50]		x																				
Lu et al. (2021)	[32]																						x
Ly et al. (2022)	[31]													x									
Ma et al. (2024)	[33]																						x
Mugume & Bulime (2022)	[47]			x			x																
Nair & Jain (2022)	[57]										x												
Nathan et al. (2022)	[30]													x									
Nitoi & Pochea (2024)	[58]																					x	
Nor & Hashim (2020)	[45]											x											
Nova & Gonzalez (2022)	[73]														x								
Okello et al. (2020)	[15]						x																
Oyelami et al. (2020)	[39]				x																		
Pal et al. (2020)	[27]										x												

(*continued on next page*)

Table 3 (*continued*)

Study	Ref.	COUNTRY ANALYSES *n=34 (87,18 %)*																		REGIONAL ANALYSES *n=9 (23,08 %)*			
		AFRICA *n=16 (41,03 %)*								ASIA *n=13 (33,33 %)*					OTHER *n=5 (12,82 %)*								
		ETH	GHA	KEN	NGA	TUN	UGA	ZAF	ZWE	BGD	IND	MYS	PAK	VNM	COL	NLD	PNG	PSIDS	USA	AFR	ASIA	EUR	ROW
Pramani & Iyer (2023)	[19]										*x*												
Rizwan & Mustafa (2022)	[42]												*x*										
Simatele (2024)	[37]							*x*															
Simatele & Maciko (2022)	[29]							*x*															
Sinha et al. (2019)	[26]										*x*												
Soumare et al. (2016)	[28]																			*x*			
Xu (2020)	[4]																						*x*
Zikhali (2022)	[43]								*x*														
Zulkhibri (2016)	[34]																			*x*	*x*		
		3	2	2	2	1	3	2	1	1	6	1	3	2	1	1	1	1	1	3	2	1	3

Totals may not add up due to several countries being examined in the same article.
Percentage figures as a proportion of the final sample (39 documents).
Acronyms: **AFR**: Africa, **ASI**: Asia, **BGD**: Bangladesh, **COL**: Colombia, **ETH**: Ethiopia, **EUR**: Europe, **GHA**: Ghana, **IND**: India, **KEN**: Kenya, **MYS**: Malaysia, **NGA**: Nigeria, **NLD**: Netherlands, **PNG**: Papua New Guinea, **PSIDS**: Pacific SIDS, **PAK**: Pakistan, **ROW**: Rest of the World, **TUN**: Tunisia, **USA**: USA, **UGA**: Uganda, **VNM**: Vietnam, **ZAF**: South Africa, **ZWE**: Zimbabwe.

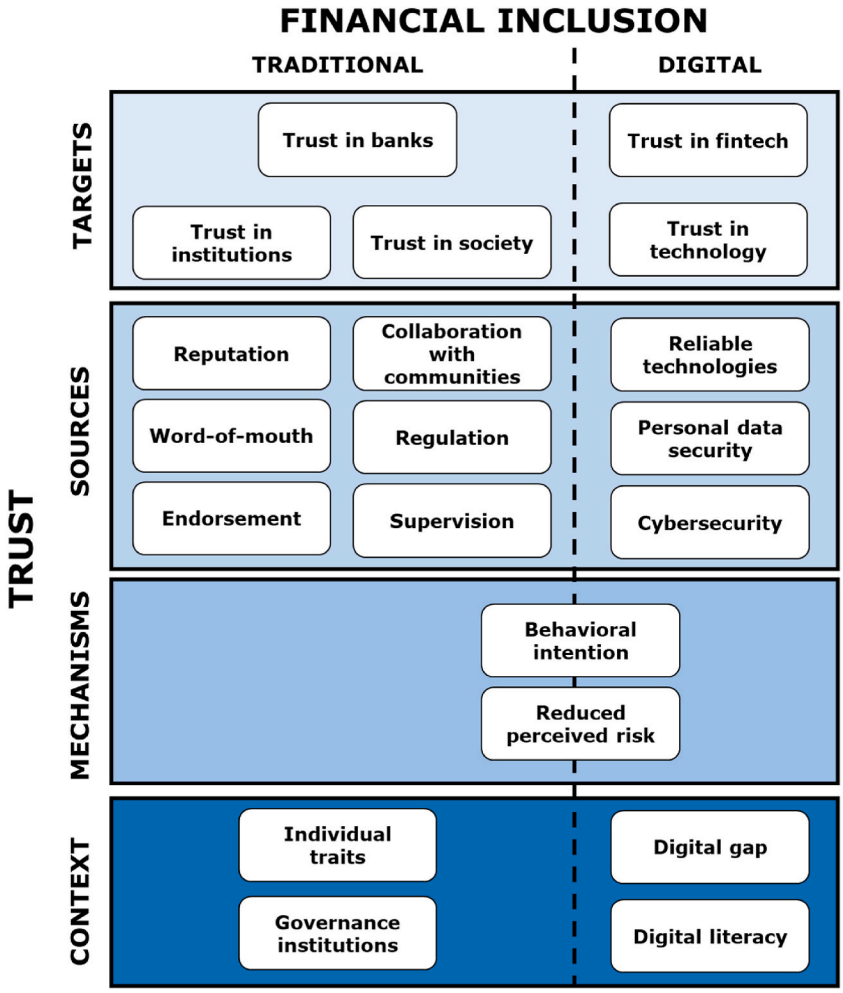

Fig. 5. Trust transformations for digital financial inclusion: A framework.

5. Discussion and research agenda

Trust is pivotal in enabling financial transactions [2]. We contend that the digital revolution in finance [77] is shaping the role of trust in enhancing financial inclusion, specifically in emerging markets. While Luhmann [64] views trust as a mechanism to reduce complexity in economic interactions, and Zucker [66] emphasizes its institutional embedding, these perspectives do not fully capture the trust challenges posed by digital financial systems. Our framework extends these theories by incorporating technological trust, clarifying how digital finance reshapes trust's role in financial inclusion. Our analysis of trust and financial inclusion allows us to depict the various trust targets, sources, mechanisms, and contextual factors enabling financial inclusion in the traditional and digital finance paradigms. We observe different transformations in this literature and propose a framework to advance academic research, managerial action, and policymaking toward widespread digital financial inclusion. Our framework clarifies how trust enables both traditional and digital financial inclusion, offering a deeper understanding of trust-financial inclusion dynamics.

5.1. Differences in trust formation for digital and traditional financial inclusion

The transformations highlighted above allow us to observe conceptual and methodological differences between the traditional and the digital paradigms in the linkage trust-financial inclusion. These involve risk perception due to unfamiliarity with Fintechs, issues related to customer technology acceptance, concerns about personal data security and regulatory soundness, and lack of physical interactions. First, Fintechs are disruptive forces, new-to-the market, threatening their legitimacy and perceived trust by the public [78]. However, the erosion in the reputations of traditional financial companies since the 2008 financial crisis may offset this newness in the eyes of critical consumers. Second, technological financial services, such as mobile money, are often slowly accepted due to customers' reluctance to employ a new technology [38]. Investments in digital literacy that break the digital divide and build trust in technology can offset this barrier, both conceptual education and practical (i.e., how can I use online banking?). Third, digital financial

inclusion is often perceived as riskier than traditional financial inclusion due to concerns about data privacy, security, and fraud [46]. This requires efforts and massive investment by conventional banks and Fintechs in cybersecurity and extensive usage of blockchain technology. In addition, using artificial intelligence to extract the commercial value of the enormous amount of data (big data) generated by digital finance requires an institutional compromise about the privacy in the collection, storage, and exploitation of these data so that trust in banks and Fintechs is enhanced [71]. Moreover, regulatory frameworks may need to be adapted to address the unique risks and challenges associated with digital financial inclusion, such as data privacy and cybersecurity. This issue demands additional measures to protect consumers and build trust in the institutional setting and the supervision of financial institutions [58]. Finally, the financial transformation from face-to-face models to digital interactions may require additional customer support to build trust and foster financial inclusion. Word-of-mouth has become more critical in the digital paradigm [79]. While personal relationships and social networks are relevant for traditional financial inclusion (i.e., microfinance models based on RoSCAS or rotating savings and credit associations) [80], building trust for digital financial inclusion demands different means, such as online reviews or social media referrals. Digital financial services need to develop higher levels of trust than conventional finance since customers are subject to broader informational asymmetries and uncertainty [71].

5.2. Future research directions

Based on the transformations identified, we foresee significant avenues for future research. Conceptually, scholars still need to agree on the meaning of 'digital trust,' which has yet to be defined. Thus, future studies could use our framework to conceptualize digital trust across its various elements. Regarding financial inclusion, the literature needs to progress from the current binary view of basic financial inclusion (having or not having a bank account) [43] towards more advanced forms of financial inclusion that examine its intensity, that is, considering financial inclusion within a continuum where customers incorporate additional financial services into their portfolios. This follows the recent evidence on the progress in the world's bancarization levels [13], which calls for the next step in financial inclusion regarding its usage and intensity beyond access.

The literature must advance by combining efforts from different disciplines regarding sources of trust or how trust is built to enable broader financial inclusion. The rate of progress in technological innovations applied to finance is accelerating rapidly, which requires multidisciplinary research teams on finance, technology, and development. We can only comprehend the different elements of trust that enhance (digital) financial inclusion by applying a collaborative effort. From a methodological perspective, we contend that the literature on trust-financial inclusion may benefit from widening the geographical scope to emerging markets other than Asia and Africa, for example, by incorporating cross-country and worldwide analyses and focusing on Latin American reality or even developed countries, which is nowadays absent in the literature and could increase the generalizability of the results. Moreover, considering the intensity of digital financial inclusion opens the path to studies in developed economies contexts. For quantitative analyses, potential reverse causality issues between (digital) trust and (digital) financial inclusion need yet to be explored. We also suggest additional methodologies beyond case studies and quantitative techniques like the ones used in the analyzed papers (e.g., logit, probit, and SEM, among others). Specifically, the use of methods that allow a balance between quantitative and qualitative insights, such as Qualitative Comparative Analysis (QcA) [81], can open future avenues of research on this topic.

Our observations across the reviewed literature call for more specific scales to measure trust and digital trust that cover all trust targets (actors and systems) instead of current academic efforts concentrating on particular targets. This may open future avenues to design and validate scales to effectively measure digital trust associated with financial services adoption, which may follow the OECD's guidelines on measuring trust [76]. These metrics, in combination with the recently developed digital financial inclusion index [56], can provide empirical evidence on the role of trust in enhancing digital financial inclusion. Regarding financial inclusion measurement, although most studies draw on the World Banks' Findex (and some of them on IMF's FinScope), researchers need to elaborate more sophisticated and broader measurements of financial inclusion based on Findex beyond binary conditions. The richness of information available in Findex (saving, borrowing, end uses, and frequency, *inter alia*) allows for such measurements.

This study significantly contributes to the state of the art in the body research on financial inclusion and trust [82] by organizing existing literature, highlighting the relevance of this research stream, proposing a framework to guide future research, and identifying the transformations that follow the adoption of digital finance. To the best of our knowledge, no study has provided a comprehensive overview of trust across its different elements, particularly in relation to both traditional and digital finance. The main limitation of this article is the document selection, which may potentially exclude some relevant studies, although we used the Web of Science, a reference for academic literature.

The increased academic interest in exploring trust and (digital) financial inclusion is critical to incentivizing an adequate regulatory framework and the development of technological infrastructures and social capital to reach the goal of universal financial access. Moreover, although financial inclusion is not a specific target within the Sustainable Development Goals (SDGs), it contributes to some of them, such as ending poverty and inequality reduction (SDGs 1 and 10) [83] and mitigates the risks linked to the informal economy, frequently plagued by corruption, thus contributing to SDG 16 [84]. Thus, an advancement in financial inclusion levels, be they traditional or digital, can indirectly enhance the UN's Sustainable Development Agenda.

CRediT authorship contribution statement

Elisa Aracil: Writing – original draft, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Laura Fernández-Méndez:** Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **David Roch-Dupré:** Writing – review & editing, Visualization, Software, Resources, Investigation, Conceptualization.

Francisco Javier Fuertes: Writing – review & editing, Conceptualization.

Data availability statement

We use public data, specifying the databases in the manuscript.

Ethics statement

Review and/or approval by an ethics committee was not needed for this study because it does not include experiments with humans or animals or any sensible data.

Declaration of AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT to improve readability and language, not to replace key researcher tasks such as interpreting data or drawing scientific conclusions. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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