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Making the world a better place with fintech research

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Abstract

Financial technology (fintech) is seen as possessing significant potential to provide the poor access to financial services and help them escape the clutches of poverty. Surprisingly, Information Systems (IS) research has engaged little with fintech's promise of fostering financial inclusion for the poor. In the spirit of 'making a better world with ICTs', conducting 'responsible IS research for a better world' and 'understanding and tackling societal grand challenges through management research', we advance a framework for guiding IS research on fintech-led financial inclusion. Drawing on the IS literature and Information and Communication Technologies for Development (ICT4D) scholarship, we extrapolate five areas of research that can better illuminate fintech's contributions to financial inclusion: (a) business strategies for fintech-led financial inclusion; (b) digital artifacts of fintech-led financial inclusion; (c) business environment of fintech-led financial inclusion; (d) microfoundations of fintech for financial inclusion; (e) developmental impacts of fintech. We conclude with a discussion of how the five areas offer opportunities for impactful research on fintech and the promise of building a financially inclusive society.

KEYWORDS

financial inclusion, fintech, fintech for development, grand challenges, sustainable development goals

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1 | INTRODUCTION

Financial technology (fintech) has become front-page news in recent years. In its broadest meaning, fintech is the application of technological innovations to financial services and processes.¹ Recent annual data show global fintech investments of USD\$135.7 billion (KPMG, 2019).² Startups, established technology firms and banks have emerged as key players in this growing sector (Gomber et al., 2018a, 2018b; Gozman et al., 2018; Hendrikse et al., 2018). Policymakers and regulators view fintech as an opportunity to make the financial system 'more efficient, effective and resilient' (Carney, 2017, p. 12).

Fintech innovations promise to provide the poor access to financial services such as payments, savings, credit and insurance. A total of 1.7 billion people worldwide, most of whom live in developing countries, are excluded from these basic financial services, hindering their ability to escape the clutches of poverty (Demirgüç-Kunt et al., 2018, p. 4). Fintech innovations resonate with calls for 'making a better world with ICTs' (Walsham, 2012), 'responsible IS research for a better world' (ISJ, 2019b) 'understanding and tackling societal grand challenges through management research' (George et al., 2016) because of their potential to enhance financial inclusion for the poor—that is, 'ensuring access to financial services [...] by vulnerable groups such as weaker sections and low-income groups at an affordable cost' (Rangarajan in RBI, 2008, p. 297).³ This article advances this noble definition of 'financial inclusion' as the delivery of financial services to the poor, unbanked and marginalised. International development organisations such as the World Bank and the International Monetary Fund have projected fintech's ability to deliver financial inclusion as an effective approach to poverty reduction (GPFI, 2016, 2017). A vision of fintech-led financial inclusion appears to have burst on the global scene, one that takes to heart the United Nations' Sustainable Development Goals (SDGs), especially: SDG1 (no poverty); SDG2 (zero hunger); SDG8 (decent work and economic growth); and SDG10 (reduced inequalities) (UNSGSA, 2018).

Information Systems (IS) journals are seeing an explosion of research publications on fintech. However, despite this excitement around fintech in the IS community, much of the research is disconnected from the financial inclusion agenda. A notable exception to this detachment is the Information and Communication Technologies for Development (ICT4D) stream of IS, which we will refer to later in this article. IS research's disengagement with fintech-led financial inclusion is evident in how articles either do not refer to financial inclusion at all or use the term in a perfunctory manner with limited focus on the provision of financial services for the poor.

The main purpose of this article is to highlight opportunities for IS scholars to take an ethical turn and explicitly align their fintech research with the pro-poor financial inclusion agenda. To this end, we provide a framework that can guide future IS research on fintech-led financial inclusion. Our objective is not to offer a critique of existing fintech research in IS. We acknowledge the relevance of published IS research on fintech and the valuable insights they continue to generate for several business stakeholders and policymakers. Fintech initiatives are set to make the financial services industry more innovative and competitive and we are not questioning the IS community's natural excitement to study this business landscape. Rather, in this article, we suggest ways in which IS research can be an integral part of a research agenda to foster financial inclusion and fight poverty through fintech innovations.

The rest of the article is structured as follows. In Section 2, we review IS research on fintech and highlight its limited engagement with the financial inclusion agenda. We then draw on the IS literature and a small group of ICT4D studies to extrapolate five areas of research that can better inform analyses of fintech's potential to enhance the financial inclusion of the poor: (a) business strategies for fintech-led financial inclusion; (b) digital artifacts of fintech-led financial inclusion; (c) business environment of fintech-led financial inclusion; (d) microfoundations of fintech for financial inclusion; (e) developmental impacts of fintech. In Section 3, we build on these five areas to discuss research opportunities around fintech and its promise of fostering pro-poor financial inclusion.

2 | LITERATURE REVIEW

2.1 | IS research on fintech

The IS community has taken significant interest in fintech. Table 1 is an overview of 121 papers on fintech published between 2000 and 2020 in the AIS Senior Scholars' Basket of Journals and other prominent IS journals in the 'Information Management' subject area of the UK's Chartered Association of Business Schools (CABS) Academic Journal Guide. Appendix A details the literature review approach, which helped create Table 1. We searched for keywords that are broad enough to capture the wide range of fintech research in IS. Querying keywords for the 2000 to 2020 period allowed us to source IS journal articles on financial technologies that are relevant to our analysis, including those papers that may not have explicitly adopted the term 'fintech' or used the term in its present-day connotation—that is, innovative technologies and organisations that have disrupted the financial services industry since the 2008 global financial crisis.

Notably, fintech is increasingly a popular choice for journal special issues. The *Journal of Management Information Systems* has published a special issue titled 'Financial information systems and the fintech revolution' (Gomber et al., 2018b). Another special issue titled 'Fintech—innovating the financial industry through emerging information technologies' is in progress at *Information Systems Research* (Hendershott et al., 2017). The IS community's growing attention to fintech is also visible in the increasing number of papers on financial technologies being presented at major IS conferences such as the International Conference on Information Systems (ICIS) and the European Conference on Information Systems (ECIS).⁴

TABLE 1 Fintech research in IS journals (categorised by topics), 2000 to 2020

Topics	Number of studies	Exemplary studies	Studies that refer to financial inclusion
Cryptocurrencies and/or blockchain and/or initial coin offerings	24	Kavanagh and Miscione (2019), Mai et al. (2018) and Yin et al. (2019)	Ciaian et al. (2016), Cousins et al. (2019), Polasik et al. (2016), Schuetz and Venkatesh (2020) and Zachariadis et al. (2019)
Crowdfunding	49	Burtch et al. (2018), Kim and Viswanathan (2019) and Li and Wang (2019)	None
Peer-to-peer lending and/or microlending	26	Ge et al. (2017), Jiang et al. (2018) and Leong et al. (2017)	Leong et al. (2017)
Mobile financial services (mobile money and/or mobile payments and/or mobile banking)	9	Kazan et al. (2018), Liu et al. (2015) and Yang et al. (2020)	Iman (2018)
Business models in the fintech sector	2	Gomber et al. (2018a) and Gozman et al. (2018)	Gomber et al. (2018a) and Gozman et al. (2018)
Regulatory technology (regtech)	1	Currie et al. (2018)	None
Algorithmic trading and/or high-frequency trading and/or electronic trading	7	Cooper et al. (2017), Haferkorn (2017) and Parker and Weber (2014)	None
Robo-advisors and/or wealth management	2	Belanche et al. (2019) and Wang et al. (2019)	None
Supply-chain finance	1	Chen et al. (2019)	None

However, within this growing body of IS research on fintech, financial inclusion—that is, the delivery of financial services to the poor, unbanked and marginalised—has received scarce attention. Even when financial inclusion is touched upon (see column 4 in Table 1 for the few IS studies on fintech that refer to financial inclusion), the poor are invariably not the focus. Fintech research (both IS and non-IS) is witnessing an expansion of the scope of the term ‘financial inclusion’, incorporating within its remit a wide spectrum of consumers and business initiatives, and going way beyond the term’s original focus on helping the poor (United Nations, 2006, p. iii). When international development organisations started using the term ‘financial inclusion’ in the 2000s (Gabor & Brooks, 2017; Mader, 2016; Soederberg, 2013), they were referring to financial services for the poor. At that time, UN Secretary General Kofi Annan urged stakeholders to ‘empower the poor and to ensure that poor people around the world have access to a wider range of financial services’ (United Nations, 2006, p. iii). The relatively recent expansion of the notion of financial inclusion—with the help of consultants and marketers—away from its original intent allows a range of actors to jump on the ‘fintech for financial inclusion’ bandwagon (Bateman, 2012; Bull, 2019). However, it may eventually trivialise the term and reduce its potential for generating developmental impacts. We would therefore suggest that IS research on fintech needs to focus on the unbanked and contexts of poverty alleviation when conceptualising and applying the notion of financial inclusion.⁵

IS research has investigated instantiations of fintech innovations (e.g., crowdfunding, peer-to-peer lending), the underpinning digital technologies (e.g., blockchain, artificial intelligence), and how tech firms and financial incumbents compete and cooperate to innovate financial services. This body of research also offers regulators and policymakers useful ideas on how to maximise fintech’s potential for customer value while minimising the risks to financial stability (Gomber et al., 2018a, p. 254). Thus, despite its limited attention to financial inclusion and poverty alleviation per se, recent IS research has described the focal actors, practices and technologies of the so-called ‘fintech revolution’ (The Economist, 2015), creating also a heightened awareness of how fintech innovations can offer novel products and services. In this sense, IS research provides helpful clues to uncover the key dimensions of fintech-led financial inclusion in greater depth. We examined the research findings of the 121 selected IS studies on fintech (Table 1 and Appendix A) and derived four thematic areas covering related ideas in the literature, namely: business strategies; digital artifacts; business environment; microfoundations (see Table 2 for an overview of the four thematic areas; see Appendix A for a full elaboration of our coding scheme). These four thematic areas emerging from existing IS scholarship can form the building blocks of a roadmap for IS research on fintech and the promise of financial inclusion.

First, IS research’s focus on fintech business strategies draws attention to the development of fintech business models, fintech firms’ strategic positioning in global markets, their interactions with stakeholders and the configuration of organisational resources for business sustainability (see e.g., Gomber et al., 2018a; Gozman et al., 2018; Kazan et al., 2018). Ideas from this body of work explicate the processes of developing commercially viable fintech innovations. They are, thus, well placed to inform fintech research that explores the development and implementation of business strategies in the pursuit of overt financial inclusion goals. Second, IS scholarship on digital artifacts directs attention to the management of digital infrastructures (Zachariadis et al., 2019) and the specific technologies (e.g., artificial intelligence, blockchain and cloud computing) that underpin the design and delivery of financial services (Gozman et al., 2018). This research can be especially relevant for conceptualising, developing and evaluating digital tools that fully account for the contextual conditions of poor communities at the receiving end of fintech innovations. Third, research on the business environment of fintech highlights the work of users of fintech services such as peer-to-peer lending (Jiang et al., 2018; Riggins & Weber, 2017; Xu & Chau, 2018) and explores the environmental drivers that support fintech innovations—for example, through the monitoring of algorithmic trading (Cooper et al., 2017), the use of regulatory technology (or ‘regtech’) in financial markets (Currie et al., 2018) and an effective regulation of mobile payments (Liu et al., 2015). This body of work has a bearing on research that seeks to develop insights into the actors, and the institutional arrangements and incentives that nurture financial inclusion through technological interventions. Fourth, IS research’s insights into what may be termed ‘microfoundations’ point to crucial starting phases of fintech entrepreneurial ventures, including the background, motivations and actions of individual entrepreneurs (see Ryu & Kim, 2018). A deeper understanding of such foundational elements can inform

TABLE 2 Four thematic areas of IS research on fintech

Thematic areas	Focus	Illustrative studies
Business strategies	<ul style="list-style-type: none"> • Business models • Business strategies • Organisational design 	Gomber et al. (2018a), Gozman et al. (2018) and Kazan et al. (2018)
Digital artifacts	<ul style="list-style-type: none"> • Design and delivery of fintech services • Role of digital and mobile technologies • Governance of digital infrastructures 	Burtch et al. (2018), Gozman et al. (2018) and Zachariadis et al. (2019)
Business environment (users) Business environment (regulation and policymaking) Business environment (market dynamics)	<ul style="list-style-type: none"> • Adoption and use of fintech services • Role of regulators and policymakers • Microeconomic and macroeconomic forces 	Jiang et al. (2018), Riggins and Weber (2017) and Xu and Chau (2018) Cooper et al. (2017), Currie et al. (2018) and Iman (2018) Haferkorn (2017), Ma and McGroarty (2017) and Mai et al. (2018)
Microfoundations of fintech entrepreneurship	<ul style="list-style-type: none"> • Entrepreneurial motivations • Entrepreneurial actions 	Ryu and Kim (2018)

TABLE 3 ICT4D research on financial inclusion (categorised by topics), 2000 to 2020

Topics	Number of ICT4D studies on financial inclusion	Illustrative studies
Mobile-enabled financial services	14	Hayes and Westrup (2012)
ICT-enabled banking	4	Joia and Dos Santos (2019)
ICT and microfinance	1	De' and Ratan (2009)
Economic impact of ICT development and financial inclusion	1	Chatterjee (2020)

research into the social and psychological aspects of fintech social innovators and the consequences for fighting poverty at scale (cf. Sandeep & Ravishankar, 2015).

Next, we turn to the small group of IS studies operating within the ICT4D frame, which focus squarely on pro-poor financial inclusion. Overall, ICT4D research has a long history of exploring, critiquing and championing the idea of achieving inclusion via information and communication technologies. In the specific case of fintech, ICT4D studies complement the IS literature well with a sharp focus on the 'developmental impacts' of financial technologies.

2.2 | ICT4D studies on financial inclusion

Table 3 presents an overview of 20 ICT4D articles on financial inclusion published in prominent IS journals. Appendix B details the literature review approach, which helped create Table 3. The selected keywords allowed us to source ICT4D studies on financial inclusion that may have not adopted the 'fintech' term yet, using instead terms such as 'ICT', 'mobile money', 'mobile payments' and 'mobile banking'.

Most of the 20 ICT4D papers on financial inclusion have considered mobile-enabled financial services in developing countries. This is not surprising given the world-wide interest and excitement generated by mobile money services such as M-Pesa in Kenya (Duncombe & Boateng, 2009; Foster & Heeks, 2013; Hayes & Westrup, 2012; Morawczynski & Miscione, 2008; Oborn et al., 2019; Suri & Jack, 2016).

We analysed the research findings of the ICT4D literature on financial inclusion and synthesised four broad themes: business strategies for financial inclusion; digital artifacts of financial inclusion; business environment of financial inclusion; developmental impacts of fintech (see Table 4 for an overview of the four thematic areas; see Appendix B for a full elaboration of our coding scheme). The framing and positioning of ICT4D research are similar to mainstream IS research in so far that it discusses ideas about business strategies, digital artifacts and business environment, but with an explicit emphasis on poor communities and financial inclusion goals. Importantly, unlike most IS research, ICT4D studies strive to explore the developmental impacts of financial technologies on poor and marginalised communities. In particular, we see a focus on the outcomes of pro-poor financial literacy initiatives and women empowerment interventions in marginalised areas. Overall, as indicated in Table 4, this set of ICT4D research articles suggests opportunities for the thematic areas of mainstream IS research to be contextualised around financial inclusion.

In the next section, we draw on ideas around business strategies, digital artifacts, the business environment of fintech, the microfoundations of fintech entrepreneurship, and the developmental impacts of fintech to offer and discuss a framework for IS research on fintech-led financial inclusion.

3 | FINTECH AND THE PROMISE OF FINANCIAL INCLUSION: A RESEARCH AGENDA

The above review and synthesis highlight five areas of opportunities for the IS community to examine fintech-led financial inclusion as an important phenomenon. Table 5 summarises these five areas of research. It offers a set of research questions, relevant academic literature, concepts and methodologies. The table highlights also several pathways to scholar-practitioner engagement. We do not intend to force the use of specific academic literature, theoretical constructs and methodological strategies. Studying fintech-led financial inclusion requires pluralism in theoretical perspectives, meta-theoretical positions, methodologies and disciplinary background. Hence, our research suggestions should be seen as an invitation to be open-minded about the multiplicity of vantage points fintech-led financial inclusion can be approached from, as well as an encouragement to experiment with and 'problematize' (Alvesson & Sandberg, 2011; Chatterjee & Davison, 2020) existing knowledge boundaries. Having an undogmatic attitude to research is likely to lead to 'a more holistic analysis and a more effective outcome with corresponding implications for both practice and scholarly learning' (Davison & Martinson, 2011, p. 289).

TABLE 4 Four thematic areas of ICT4D research on financial inclusion

Thematic areas	Focus	Illustrative studies
Business strategies for financial inclusion	<ul style="list-style-type: none"> Organisational models of mobile payment systems for financial inclusion 	Wenner et al. (2018)
Digital artifacts of financial inclusion	<ul style="list-style-type: none"> Design, implementation and delivery of financial services for the poor Digital and mobile technologies underlying fintech services for financial inclusion Governance of digital infrastructures for financial inclusion 	Leonardi et al. (2016)
Business environment of financial inclusion	<ul style="list-style-type: none"> Adoption and use of fintech services by the poor Regulators and policymakers overseeing and supporting financial inclusion initiatives Interaction among different stakeholders in support of financial inclusion initiatives 	Hayes and Westrup (2012)
Developmental impacts of fintech	<ul style="list-style-type: none"> Financial inclusion improving well-being, life chances and agency of the poor Financial literacy of the poor and marginalised Empowerment of women in marginalised communities Microentrepreneurial capabilities Obstacles to pro-poor financial inclusion 	Joia and Dos Santos (2019)

TABLE 5 Fintech-led financial inclusion—five areas of research opportunities

Thematic areas	Research questions	Relevant literature and concepts	Examples of methodologies	Approaches to impactful research
Business strategies for fintech-led financial inclusion	<ul style="list-style-type: none"> • How do financial inclusion-targeting firms frame their social mission to a diverse set of stakeholders? • How do they compete in their respective business areas? • How do non-profit oriented fintech firms scale and sustain their business model? • How do funding and revenue streams impact financial inclusion outcomes? • How do financial inclusion-targeting firms manage conflicting organisational identities? • How do they manage organisational change? 	<ul style="list-style-type: none"> • Mission drift • Fintech innovation landscape matrix • Scaling for social impact • Hybrid organising • Strategy-as-practice perspective 	<ul style="list-style-type: none"> • Longitudinal case study design; qualitative research strategy; participant observation and semi-structured interviews as primary research methods 	Scholar-practitioner engagement on strategizing and organising for social impact
Digital artifacts of fintech-led financial inclusion	<ul style="list-style-type: none"> • How are the digital artifacts of fintech firms designed and implemented to support low-income and vulnerable beneficiary communities? • How does algorithmic agency influence financial inclusion outcomes? • How are attributes such as fairness, sensitivity and empathy encoded in fintech firms' digital artifacts? • How do the aesthetic attributes of fintech applications impact user experience and inclusion of low-income groups? • How do fintech firms employ digital artifacts to build credibility and legitimacy about their financial inclusion motives? 	<ul style="list-style-type: none"> • User-centred design and technology appropriation • Algorithms and artificial intelligence in organisations • Digital visibility and aesthetics in organisations 	<ul style="list-style-type: none"> • Comparative case study; qualitative research strategy; experiments • Design science and design thinking as research paradigms 	Scholar-practitioner engagement on inclusive digital technologies
Business environment of fintech-led financial inclusion	<ul style="list-style-type: none"> • How do financial inclusion-seeking fintech firms engage with business partners, 	<ul style="list-style-type: none"> • Ecosystems (business, innovation, platform) 	<ul style="list-style-type: none"> • Cross-sectional survey; quantitative research strategy; 	Scholar-policy maker engagement on sustainable business environment for

(Continues)

TABLE 5 (Continued)

Thematic areas	Research questions	Relevant literature and concepts	Examples of methodologies	Approaches to impactful research
	governments and customers? <ul style="list-style-type: none"> • How do poor and unbanked people use fintech innovations in their daily financial activities? • How do national and sub-national level regulatory environments contribute to the creation and development of fintech hubs? • How do fintech firms' draw on national digital infrastructure projects? • What policy instruments help fintech hubs develop an explicit focus on financial inclusion objectives? • What roles do international development organisations and philanthropic foundations play in fintech hubs? 	<ul style="list-style-type: none"> • Acceptance and use of technology • Diffusion of innovations • Fintech and 'portfolios of the poor' • Transformative innovation policy 	<ul style="list-style-type: none"> questionnaire as research method • Longitudinal case study; qualitative research strategy; semi-structured interviews through 'financial diaries' 	fintech-led financial inclusion
Microfoundations of fintech for financial inclusion	<ul style="list-style-type: none"> • What are the individual-level motivational triggers of fintech entrepreneurship for financial inclusion? • How do financial inclusion-seeking fintech entrepreneurs recognise opportunities for impactful financial innovations? • How do financial inclusion-seeking fintech entrepreneurs make technology choices in the start-up phase? • How can fintech innovations built on deeply ingrained personal values be replicated in different institutional contexts around the world? 	<ul style="list-style-type: none"> • Motivations of social entrepreneurship • Microfoundations of institutions (e.g., practice-driven institutionalism, emotions and institutions) 	<ul style="list-style-type: none"> • In-depth case study; qualitative research strategy; participant observation and semi-structured interviews 	Scholar-practitioner engagement on ethical entrepreneurship

TABLE 5 (Continued)

Thematic areas	Research questions	Relevant literature and concepts	Examples of methodologies	Approaches to impactful research
Developmental impacts of fintech	<ul style="list-style-type: none"> • How is fintech-led financial inclusion defined and measured? • What are the longitudinal effects of fintech initiatives on poverty reduction in developing countries? • How do financial inclusion-seeking firms foster the individual and collective capabilities of poor people? • How do financial inclusion-seeking firms foster social equality? • What are the dark sides of fintech-led financial inclusion? 	<ul style="list-style-type: none"> • Power parity theory of ICT4D • Fintech innovations as ‘surveillance capitalism’ 	<ul style="list-style-type: none"> • Longitudinal cross-country survey; quantitative research strategy; structured interviews 	Engagement with civil society organisations and policymakers on ethical, sustainable and impactful fintech innovations

3.1 | Business strategies for fintech-led financial inclusion

IS research has explored how fintech startups, big tech companies and financial incumbents are reimagining business models in the financial sector, competing and cooperating to create valuable financial services (Gomber et al., 2018a; Gozman et al., 2018). However, there is scarce research into how fintech firms develop business models, manage business strategies and organise their internal resources in pursuit of a financial inclusion mission.

First, there is the question of how fintech firms frame their social mission to stakeholders such as investors, customers and the general public. Do fintech firms refer explicitly to financial inclusion and social impact in their mission statements, vision and objectives? For example, microlending providers like the Bangalore-based Rang De and the San Francisco-based Kiva were founded with the explicit mission of providing loans to low-income communities. Rang De (2020a) promises to ‘...support the entrepreneurial and educational needs of low-income households’, while Kiva (2020a) envisions ‘a financially inclusive world where all people hold the power to improve their lives’. Mission statements like the ones put forward by Rang De and Kiva draw attention to the importance of achieving alignment between an intention to generate social impact and the actions undertaken to achieve such impact. Research could examine how socially oriented fintech firms use mission statements and other forms of communication to construct their digital/organisational identities and images. This examination of identity and image construction practices can help develop insights into the challenges of ‘mission drift’ (Battilana & Lee, 2014; Grimes et al., 2019) in fintech firms—that is, how over time companies may act in ways that do not conform with their socially oriented identity and image. Specifically, it would be useful to investigate the origins of fintech firms’ mission drift, how stakeholders react to such drift and how firms respond to stakeholders’ perception of drift.

Second, there are opportunities to study business strategies and their operationalization—that is, how fintech firms strategize to pursue a financial inclusion mission. A strategy-as-practice perspective (Morton et al., 2020; Vaara & Whittington, 2012) would be particularly useful in this regard. What decisions do fintech firms make concerning the portfolio of pro-poor financial services and the geographical scope of their service delivery? How do fintech firms price their services to benefit the poor? How do they ensure the sustainability of their socially oriented business models? How do funding and revenue streams impact financial inclusion outcomes? For example, while

Rang De directs its portfolio of services towards marginalised communities in India (Rang De, 2020a), Kiva has a presence in 77 countries with 3.6 million borrowers and 1.9 million lenders (Kiva, 2020a). Although Rang De's geographical scope poses limits to the scaling of the enterprise, such self-imposed restrictions arguably allow for deep and significant involvement in local communities and close monitoring of socio-economic impact—an aspect that could positively differentiate Rang De's strategies from its competitors. Moreover, while Rang De has recently transitioned to a for-profit legal status and currently funds its operations through membership fees and interest rate repayments (Rang De, 2020a, 2020b), Kiva continues to cover its operating costs through donations, philanthropic grants and platform fees paid by partnering local organisations (Kiva, 2020b). Investigating the strategies of inclusion-oriented fintech firms could illuminate the processes of disrupting market structures and enhancing customer experience through pro-poor financial services. The 'fintech innovation matrix' (Gomber et al., 2018a) could be a useful analytical tool to frame such research. Furthermore, studying fintech-led financial inclusion from a business strategy perspective is an opportunity to create new knowledge about the scaling and sustaining of impact-oriented business models (Seelos & Mair, 2017).

Third, IS research can address a range of important questions around culture, identity and talent management in inclusive fintech business models—in other words, how do firms manage the challenges of conflicting organisational identities? When fintech firms explicitly articulate a financial inclusion mission, they typically manage twin organisational identities—that is, a socially oriented identity and a business-oriented identity. The simultaneous sustenance of intrinsically contrasting identities requires careful organisation of mutually incompatible internal systems (and individuals)—a process that could pose tricky questions for senior management teams. Organisations could face internal conflicts when taking money from fintech investors who are less interested in the firms' financial inclusion aims and more interested in financial returns. Similarly, senior management teams can face the difficult task of attracting and retaining employees, who may want to switch to less socially focused fintech companies that can pay better salaries. The 'hybrid organising' (Battilana & Lee, 2014; Mair et al., 2015) of inclusion-seeking fintech firms—especially the balancing of commercial and social objectives—is thus a worthwhile topic for further research. On the other hand, research could also explore the internal processes and mechanisms of organising when fintech firms achieve significant financial inclusion outcomes without being preoccupied with socially oriented objectives.

IS research into the business strategies for fintech-led financial inclusion can be conducted through a variety of research design, research strategies and methods (Bell et al., 2019). For instance, as interpretivist researchers, we would be inclined to address the question of how firms manage conflicting organisational identities through a longitudinal case study design and a qualitative research strategy that uses methods such as participant observation and semi-structured interviews. However, we leave it to researchers to choose methods they deem suitable and experiment with methodological pluralism. Overall, IS research into business strategies for fintech-led financial inclusion can help fintech practitioners better manage the challenges of strategizing and organising for social impact.

3.2 | Digital artifacts of fintech-led financial inclusion

Fintech firms deploy a wide variety of digital and mobile technologies to deliver financial services. The design of such technologies and their implementation in pursuit of financial inclusion is a fruitful area for scholarly investigation.

IS research has explored the technological innovations that are transforming banking, capital markets and insurance. For instance, Gozman et al. (2018) have considered fintech innovations as core services (e.g., front-end technologies with which users interact directly), business infrastructure (e.g., middle office and back-office technologies complementing core services) and components (e.g., the underlying technologies supporting core services and business infrastructure). Future research needs to investigate the design and implementation of such technological innovations for low-income and marginalised groups. Some recent examples highlight research possibilities in this regard. Leonardi et al. (2016) have discussed the design and implementation of banking technologies that the poor can 'appropriate' depending on their habits and needs. Similarly, the case of WorldRemit—a London-based money

transfer provider—shows how technologies like smartphone apps can be developed with the unbanked in mind, allowing beneficiaries in developing countries to receive remittances on their mobile money accounts or as airtime credit (Shemkus, 2015).

Furthermore, IS research on fintech has started exploring the technologies of credit risk evaluation used by peer-to-peer lending platforms (see e.g., Wang et al., 2020). New empirical research is needed to better explicate how such algorithms take into account poor and excluded communities. Fintech innovations have often glorified algorithmic capabilities and their supposedly objective decision-making. Yet, in reality, much of the algorithmic detail is shrouded in opaqueness rather than transparency (Pasquale, 2015). Such opaque nature of algorithms makes it difficult to decode, for instance, how peer-to-peer technologies match lenders to borrowers and how they fix interest rates that can benefit the poor. The emerging literature on ‘learning algorithms’ and artificial intelligence in organisations (Alaimo & Kallinikos, 2020; Faraj et al., 2018; Lyytinen et al., 2020) could offer an ideal analytical context to study the design of algorithmic technologies and their impacts on the poor.

Finally, inclusion-oriented fintech firms encode attributes such as empathy, fairness and sensitivity in the aesthetics of front-end digital artifacts. For example, both Rang De and Kiva make extensive use of images on their online and mobile platforms through which they aim at building an empathic relationship between lenders and borrowers. More work is needed to explore the role of digital aesthetics and visualisations in building credibility among stakeholders, attracting lenders, and improving the user experience. Exploring the aesthetics of digital artifacts for financial inclusion is an opportunity to engage with studies on ‘organisational visibility’ (Boxenbaum et al., 2018; Lagna & Lenglet, 2020; Meyer et al., 2013) and, more broadly, the ‘aesthetics’ of organisational life (Strati, 1999). Thus far, IS research on fintech has not dealt with these aspects, despite the ‘digital’ being a ubiquitous aesthetical brand of the fintech revolution.

Research on the digital artifacts of fintech-led financial inclusion can be approached through several methodological strategies. For example, the question of how the aesthetic attributes of fintech apps impact the user experience of low-income groups could be addressed both through comparative case study designs and experiments. The thematic area of digital artifacts also lends itself to design science (Hevner et al., 2004) and design thinking (Micheli et al., 2019)-based research, and the creation of technological artifacts that squarely address problems of financial inclusion.

3.3 | Business environment of fintech-led financial inclusion

Fintech-led financial inclusion is not just the work of fintech firms but is built on the actions of stakeholders such as business partners, customers, governments, civil society organisations and philanthropic foundations in the broader environment. Some recent work has highlighted the role played by multiple stakeholders in developing financial inclusion initiatives. Leonardi et al. (2016) illustrated how the IT artifact in the Brazilian banking correspondent system is one key element of a wider network of financial inclusion that includes policymakers, banks, post offices, retail shops, technology network integrators and the users of banking services. Similarly, Joia and Dos Santos (2019) have shown the political, business and technological factors shaping the bank boat project in the Brazilian Amazon, raising also important questions around how such financial inclusion initiatives can better engage with poor communities. Rang De and Kiva (referred to earlier) also depend on local partnerships with citizens' organisations to identify borrowers and strengthen links with local communities (Kiva, 2020b; Rang De, 2020b). Many citizens' organisations work in remote rural locations where even mainstream microfinance institutions do not have any business operations. Given the important role of interactions among a network of stakeholders in the quest for fintech-led financial inclusion, further research through multiple methodologies is needed to examine the work of such actors. We suggest several opportunities.

First, insights from the literature on ‘ecosystems’ (Jacobides et al., 2018) can usefully inform new research on how interdependent organisations coordinate their activities and resources in a non-hierarchical manner and in the pursuit of fintech-led financial inclusion. Research could focus on how and why ecosystems of fintech-led financial

inclusion emerge, how their interorganizational structures and technological features evolve and what services they provide to poor and unbanked individuals.

Second, quantitative research on the acceptance and use of fintech innovations by the poor (Senyo & Osabute, 2020) together with studies on the diffusion of fintech innovations in developing countries (Lashitew et al., 2019) could offer useful analytical frameworks to explore fintech-led financial inclusion from the end-user perspective. Ethnographic studies about the 'portfolios of the poor' (Collins et al., 2009) and 'money at the margins' (Maurer et al., 2018) could complement quantitative research on the acceptance and use of fintech innovations. Particularly, semi-structured interviews through so-called 'financial diaries' (Collins et al., 2009, pp. 6–13) are useful to capture how the poor and unbanked manage small and irregular sums of money through informal financial practices.

Finally, policymaking and regulation at the regional, national and sub-national levels to support fintech-led financial inclusion is a fruitful area of research enquiry. Public-private partnerships have helped establish numerous fintech hubs around the world, the most famous of which are London, New York, the Silicon Valley area, Hong Kong and Singapore (Deloitte, 2017). Numerous hubs have also started to emerge in the Global South, such as the Mumbai Fintech Hub and the Fintech Valley Vizag (Medici, 2019). These developments raise many worthwhile research questions around the organisation of fintech hubs and the extent to which they create spaces for financial inclusion as an agenda of 'transformative innovation policy' (Schot & Steinmueller, 2018).

Overall, studying the business environment of fintech-led financial inclusion will create opportunities for the IS community to engage with policymakers, fintech firms, fintech hub representatives, development organisations and philanthropic foundations working on pro-poor financial inclusion projects.

3.4 | Microfoundations of fintech for financial inclusion

Fintech's potential to address challenging problems of financial exclusion and contribute to socio-economic development brings the entrepreneurial origins of fintech innovations into sharp focus. There is scarce research into the 'microfoundations' (Powell & Rerup, 2017) of fintech innovations such as fintech entrepreneurs' 'individual-level motivational triggers' (Sandeep & Ravishankar, 2015) or how fintech entrepreneurs deal with the financing of new ventures (Kolokas et al., 2020). IS research on fintech and the ICT4D literature on financial inclusion are still in its infancy in terms of evaluating—for example, through in-depth case studies and semi-structured interviews—the motives and actions of fintech entrepreneurs, and their rationales for turning to fintech innovations in their pursuit of creating social impact.

Some examples from the world of practice suggest that the microfoundations of fintech entrepreneurship relate specifically to empathy towards low-income communities and to ideas of pursuing ethical goals through digital technologies. These examples raise questions about the extent to which the success of fintech innovations built on foundations of deeply ingrained personal values (e.g., empathy) can be replicated in different parts of the world (Sandeep & Ravishankar, 2015). Inclusion-oriented peer-to-peer lenders, for instance, speak of empathy as a basic motivational trigger, with some pointing to the microfinance work of Muhammad Yunus (Grameen Bank) as an inspiration in their efforts to lower borrowing costs for the poor via digital technologies (Rang De, 2020b). Similarly, there are examples of fintech enterprises originating from the founder's personal experience of incurring high costs of remittances to developing countries (Smale, 2014).

In short, research into the microfoundations of fintech for financial inclusion will not only help document and better understand variations in entrepreneurial origins and actions, but also help contrast and compare these variations in terms of their contributions to the building of a more financially inclusive society. For instance, will the absence of a strong market-oriented entrepreneurial spirit kill fintech innovations even before they can reach many beneficiary communities? Equally, what are the limits of purely market-based fintech entrepreneurship in terms of reaching financially excluded poor communities?

3.5 | Developmental impacts of fintech

The World Bank and other international development organisations are supporting fintech as a powerful enabler of financial inclusion and poverty reduction in line with the UN SDGs (UNSGSA, 2018). Such a vision of fintech-led financial inclusion creates opportunities for IS scholarship to carefully investigate the extent to which fintech innovations have a positive impact on the poor and financially excluded.

Recent studies in international political economy and development studies have questioned fintech innovations' positive impacts on financial exclusion and poverty (Bateman et al., 2019; Bernards, 2019; Gabor & Brooks, 2017; Mader, 2016, 2017). Quantitative and qualitative longitudinal research is needed to assess the effects of fintech initiatives on poverty reduction in developing countries, and the impacts of fintech interventions on the individual and collective capabilities of beneficiaries. Such research can shed new light on ICT projects' contribution to development objectives and the extent to which such projects enhance the 'power parity' (Chipidiza & Leidner, 2019) between dominant stakeholders and users of financial technologies. In other words, research in this area can offer novel insights into the 'big question' of whether fintech-led financial inclusion can really help the poor escape poverty, when too often the poor have no political means to challenge the unequal power relations at the root of their financial exclusion and hardship (Bateman, 2012).

IS research on fintech could critically examine how and whether fintech innovations intrude into the lives of poor people as a form of 'surveillance capitalism' (Zuboff, 2019). The fintech revolution has brought into the spotlight how fintech firms can use digital technologies to 'de-risk' those who have no bank accounts and credit histories—that is, low-income individuals who may be perceived as too risky to lend to, unless sky-high interest rates are charged to them (Kaminska, 2015). Fintech innovations promise to leverage alternative data derived from unbanked individuals' behavioural patterns—such as their use of mobile phones or social media—to create algorithms that assess their creditworthiness (Gabor & Brooks, 2017). Although IS research on fintech has noted such algorithmic technologies (see e.g., Gozman et al., 2018, p. 167), more work is needed on the impacts that alternative credit algorithms—and their underlying behavioural analytics—have on poor people's agency and empowerment; how alternative credit algorithms may reinforce existing forms of social discrimination (Eubanks, 2015; Noble, 2018); how alternative forms of credit assessment may transform the poor into generators of securitized assets to be traded on global financial markets (Gabor & Brooks, 2017). These questions provide an ideal platform to conduct interdisciplinary and methodologically pluralist research on what may be termed 'fintech for development' (F4D), bringing in scholarly insights and expertise from IS, ICT4D, international political economy, organisation theory and other cognate fields.

In researching the developmental impacts of fintech, it is crucial to remember that fintech innovations are in many cases about for-profit firms offering market-based solutions to problems of financial exclusion. Such firms may be focused more on advancing their own commercial interests rather than working to maximise social welfare, equality and achieve sustainable developmental goals. Besides intruding into poor people's lives and commodifying their digital footprints, fintech firms may raise non-market barriers to keep out competitors, leaving low-income groups with fewer and expensive digital financial services. Furthermore, they may lower risk assessment standards to increase profits and externalise the costs deriving from a default, potentially compromising macro-financial stability (GPFI, 2016). The rise and fall of aggressive peer-to-peer lenders in China are testimony to the dangers of a fintech sector growing unchecked (Liu, 2018). By interacting with policymakers and civil society organisations, IS scholars could play an important role in co-creating institutional frameworks (e.g., regulations that mitigate against risky lending and borrowing via peer-to-peer lending platforms) that address the 'dark sides' of fintech-led financial inclusion, protecting low-income users of fintech services and making sure that fintech innovations are a force for good.

4 | CONCLUDING REMARKS

In this article, we drew attention to the scarcity of IS research on fintech-led financial inclusion and discussed five areas of research opportunities. Our arguments have moral and ethical overtones. We invoke 'responsible IS

research for a better world' (ISJ, 2019b), 'making a better world with ICTs' (Walsham, 2012) and 'understanding and tackling societal grand challenges through management research' (George et al., 2016) with the explicit objective of encouraging IS research on a topic of global significance: fintech innovation as a means to achieve financial inclusion and reduce global poverty. There is also an implicit suggestion in our paper: the creation of a body of published, expert knowledge about the achievements (and pitfalls) of financial inclusion through fintech is a virtuous endeavour because it facilitates the greater good in society. But is it even plausible that new IS research on fintech-led financial inclusion will help fight global poverty? A sobering observation is in order.

Academic studies of fintech and financial inclusion are unlikely to directly foster far-reaching financial inclusion outcomes on their own. We are not making the naïve claim that production of novel theoretical insights, conceptual categories and explanatory theory related to fintech and financial inclusion, on their own, will 'create magic' in society and make the world a better place for the poor. This body of work could face the same critique that many other IS research endeavours confront—they are full of academic rigour, but are they relevant? It is probable that a proportion of academic research efforts around fintech-led financial inclusion will suffer from the problem of 'high information-action ratios' (Postman, 1985). In other words, they are bound to produce a large volume of information (or 'knowledge') relative to their scope for relevant action in the world of practice and policy. Potentially useful knowledge generated through IS research on fintech will need to be carefully translated and acted upon in the wider society before we see financial inclusion outcomes. In this regard, we urge the IS research community to make 'engagement' with practitioners and policymakers an integral part of their research commitment to fintech and financial inclusion. 'This 'engagement' agenda is also increasingly institutionalised in some academic systems around the world with the UK's Research Excellence Framework 'impact case studies' (REF, 2014) offering illustrative examples.'

While recognising the limitations above, we would argue that developing a corpus of IS research on fintech-led financial inclusion is fundamental to the creation of innovative and sustainable approaches in the fight against global poverty. Without being too optimistic, it is conceivable that at least some of the research insights will inspire positive, meaningful action in the policymaking, practitioner and academic communities. The five areas of research discussed in our paper are a step in this direction.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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ENDNOTES

¹ Fintech has recently become a buzzword for tech startups and big tech firms disrupting the financial sector with their digital innovations. As The Economist (2015) pointed out, the 'magical combination of geeks in T-shirts and venture capital that has disrupted other industries has put financial services in its sights'. However, practitioners have occasionally used the term fintech since the 1970s—for example, as a name for business projects at the interface between finance and technology (Bettinger, 1972; Hochstein, 2015). This is hardly surprising considering that banks, stock exchanges and other financial organisations have historically been large users of technology (Arner et al., 2016). Our definition of fintech—as the application of technological innovations to financial services and processes—is extensive enough to encompass the historical evolution of fintech from a support area of the financial services industry to a domain where financial organisations and tech firms are focusing their innovation strategies; the actors designing, implementing and using financial

technologies, including incumbents (e.g., large banks, asset management firms, legacy technology providers) and newcomers (e.g., fintech startups, big tech firms); the technologies that incumbents and newcomers develop and use; the routine and disruptive application of such technologies to different areas of the financial services industry.

- ² Data by KPMG (2019) include fintech investments across mergers and acquisitions, private equity and venture capital. Financial actors' operational spending in technology is not included in the data. In this regard, technology spending by banks is forecast to increase to USD\$309 billion by 2022 (Greer et al., 2019).
- ³ Fintech's potential for enhancing pro-poor financial inclusion also echoes recent calls for studying digital social innovations (DSI), that is, social innovations whose business models rely primarily on digital technologies (ISJ, 2019a).
- ⁴ We searched the ICIS and ECIS conference proceedings for working papers on fintech. The search generated 75 results at ICIS and 56 at ECIS in the period between 2015 and 2020. See the AIS eLibrary at <https://aisel.aisnet.org>
- ⁵ According to Demirgüç-Kunt et al. (2018, pp. 35–36), about 1.7 billion adults are unbanked worldwide. Unbanked means not having an account at a financial institution or through a mobile money provider. Most of the unbanked adults live in developing economies and tend to be concentrated among poorer households. Our definition of financial inclusion focuses particularly on the delivery of payments, savings, credit, and insurance services to this large portion of poor and unbanked population worldwide. Concentrating IS research efforts on fintech and the financial inclusion of the poor and unbanked has the potential to create greater developmental impacts (United Nations, 2006, p. iii).

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APPENDIX A.

Literature review (IS research on fintech)

We followed the structured approach recommended by Webster and Watson (2002) to source relevant IS studies on fintech.

In the first phase, we chose the Web of Science Core Collection as the main database for our study. We selected a 2000 to 2020 Timespan and searched for the following keywords in Topic (Title, Abstract, Keywords, Keywords Plus): fintech OR 'financial technology' OR 'financial technologies'; fintech AND blockchain; crowdfunding; cryptocurrenc*; cryptocurrenc* AND ethereum; cryptocurrenc* AND bitcoin; 'peer-to-peer lending'; fintech AND regtech; 'algorithmic trading' OR 'high-frequency trading'; fintech AND 'financial inclusion'; 'peer-to-peer lending' AND 'financial inclusion'; crowdfunding AND 'financial inclusion'; blockchain AND 'financial inclusion'; fintech AND microfinance; fintech AND development. We focused our search on articles published in the AIS Senior Scholars' Basket of Journals ('Basket of Eight') and other prominent journals that are part of the 'Information Management' subject area in the UK's ABS Academic Journal Guide. Using the 2000 to 2020 Timespan helped us find IS papers on financial technologies that may not have explicitly adopted the term 'fintech' or used the term in its present-day connotation—that is, innovative technologies and firms disrupting financial services. Our initial search produced 126 articles.

In the second phase, we analysed all results and removed the following 12 studies because they did not engage with financial technology substantially:

- Berutich, J. M., Lopez, F., Luna, F., & Quintana, D. (2016). Robust technical trading strategies using GP for algorithmic portfolio selection. *Expert Systems with Applications*, 46, 307–315.
- Booth, A., Gerding, E., & McGroarty, F. (2014). Automated trading with performance weighted random forests and seasonality. *Expert Systems with Applications*, 41, 3651–3661.
- Hashim, M. J., Kannan, K. N., & Maximiano, S. (2017). Information feedback, targeting, and coordination: an experimental study. *Information Systems Research*, 28(2), 289–308.
- Kampouridis, M., & Otero, F. (2017). Evolving trading strategies using directional changes. *Expert Systems with Applications*, 73, 145–160.
- Kauffman, R., Kim, K., Lee, S., Hoang, A., & Ren, J. (2017). Combining machine-based and econometrics methods for policy analytics insights. *Electronic Commerce Research and Applications*, 25, 115–140.
- Montana, G., Triantafyllopoulos, K., & Tsagaris, T. (2009). Flexible least squares for temporal data mining and statistical arbitrage. *Expert Systems with Applications*, 36, 2819–2830.
- Petropoulos, A., Chatzis, S., Siakoulis, V., & Vlachogiannakis, N. (2017). A stacked generalization system for automated FOREX portfolio trading. *Expert Systems with Applications*, 90, 290–302.
- Picasso, A., Merello, S., Ma, Y., Oneto, L., & Cambria, E. (2019). Technical analysis and sentiment embeddings for market trend prediction. *Expert Systems with Applications*, 135, 60–70.
- Redmond, U., & Cunningham, P. (2013). A temporal network analysis reveals the unprofitability of arbitrage in The Prosper Marketplace. *Expert Systems with Applications*, 40, 3715–3721.
- Son, Y., Noh, D., & Lee, J. (2012). Forecasting trends of high-frequency KOSPI200 index data using learning classifiers. *Expert Systems with Applications*, 39, 11607–11615.
- Tan, Z., Quek, C., & Cheng, P. (2011). Stock trading with cycles: a financial application of ANFIS and reinforcement learning. *Expert Systems with Applications*, 38(5), 4741–4755.
- Vella, V., & Ng, W. (2016). Improving risk-adjusted performance in high frequency trading using interval type-2 fuzzy logic. *Expert Systems with Applications*, 55, 70–86.

We then conducted backward and forward reference searching to identify other relevant articles. The backward search resulted in six relevant articles: Hedman and Henningsson (2015), Liu et al. (2015), Parker and Weber (2014),

Polasik et al. (2016) and Staykova and Damsgaard (2015). The forward search resulted in one relevant article: Au et al. (2020). This brought the final number of selected articles to 121 (see Table A1). These articles were published in the following journals: *Communications of the ACM*; *Communications of The Association for Information Systems*; *Computers in Human Behavior*; *Decision Support Systems*; *Electronic Commerce Research and Applications*; *Expert Systems with Applications*; *Industrial Management and Data Systems*; *Information and Management*; *Information and Organization*; *Information Society*; *Information Systems and E-Business Management*; *Information Systems Frontiers*; *Information Systems Journal*; *Information Systems Research*; *Information Technology for Development*; *International Journal of Electronic Commerce*; *International Journal of Information Management*; *Internet Research*; *Journal of Enterprise Information Management*; *Journal of Information Technology*; *Journal of Management Information Systems*; *Journal of Strategic Information Systems*; *MIS Quarterly*.

In the third phase, we examined the research findings of the selected IS studies on fintech and synthesised four broad themes encompassing related ideas in the literature: business strategies; digital artifacts; business environment; microfoundations. This approach of structuring the literature review draws on Webster and Watson's (2002, p. xvi) recommendation for a concept-centric review.

APPENDIX B.

Literature review (ICT4D research on financial inclusion)

We followed the same structured approach (Webster & Watson, 2002) used for the IS literature on fintech (Appendix A) to source and select ICT4D studies on financial inclusion.

In the first phase, we searched the Web of Science Core Collection by choosing a 2000 to 2020 Timespan and querying the following keywords in Topic (Title, Abstract, Keywords, Keywords Plus): ICT4D AND fintech; ICT AND 'financial inclusion'; ICT4D AND 'financial inclusion'; ICT AND 'financial services'; ICT4D AND 'financial services'; ICT4D AND 'peer-to-peer lending'; banking AND 'financial inclusion'; ICT4D AND banking; money AND 'financial inclusion'; ICT4D AND money; payments AND 'financial inclusion'; ICT4D AND payments; ICT and microfinance; ICT4D AND microfinance. These keywords allowed us to source relevant ICT4D studies on financial inclusion by taking into account the fact that most of these studies have not adopted the 'fintech' term yet and use instead terms such as 'ICT', 'mobile money', 'mobile payments' and 'mobile banking'. Using the alternative acronym 'ICTD' instead of 'ICT4D' did not generate different results. In some cases, using ICTD produced no results and hindered an effective search of relevant literature.

As we did with IS research on fintech, we focused on articles published in the AIS Senior Scholars' Basket of Journals ('basket of eight') and other journals that are included in the 'Information Management' subject area of the UK's ABS Academic Journal Guide. Our search produced 19 results.

In the second phase, we analysed all articles and rejected the following paper, which does not concern financial technology:

- Parthiban, R., Qureshi, I., Bandyopadhyay, S., Bhatt, B., & Jaikumar, S. (2020). Leveraging ICT to overcome complementary institutional voids: insights from institutional work by a social enterprise to help marginalized. *Information Systems Frontiers*, 22(3), 633–653.

Backward and forward reference searching led to two further results, respectively: Jayo et al. (2012) and Pal et al. (2020). This brought the final number of selected articles to 20 (see Table A2). These articles were published in the following journals: *Behaviour & Information Technology*; *Computer Supported Cooperative Work*; *Electronic Commerce Research and Applications*; *Information and Organization*; *Information Systems Frontiers*; *Information Systems Journal*; *Information Technology for Development*; *MIS Quarterly*.

TABLE A1 IS studies on fintech, 2000 to 2020

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
Alabi, K. (2017). Digital blockchain networks appear to be following Metcalfe's Law. <i>Electronic Commerce Research and Applications</i> , 24, 23–29	Cryptocurrencies	<ul style="list-style-type: none"> Number of users in a digital currency network creates network value 	No	Business environment (users) Business environment (market dynamics)
Alonso-Monsalve, S., Suarez-Cetrulo, A., Cervantes, A., & Quintana, D. (2020). Convolution on neural networks for high-frequency trend prediction of cryptocurrency exchange rates using technical indicators. <i>Expert Systems with Applications</i> , 149, 113250	Cryptocurrencies	<ul style="list-style-type: none"> Short-term price trends of cryptocurrencies can be predicted using deep learning neural networks 	No	Business environment (users) Business environment (market dynamics)
Andrychowicz, M., Dziembowski, S., Malinowski, D., & Mazurek, L. (2016). Secure multiparty computations on Bitcoin. <i>Communications of the ACM</i> , 59 (4), 76–84	Cryptocurrencies	<ul style="list-style-type: none"> Bitcoin can be used to build protocols for secure decentralised multiparty lottery systems 	No	Digital artifacts
Au, C., Tan, B., & Sun, Y. (2020). Developing a P2P lending platform: Stages, strategies and platform configurations. <i>Internet Research</i> . doi: https://doi.org/10.1108/INTR-03-2019-0099	Peer-to-peer lending	<ul style="list-style-type: none"> The development of a P2P lending platform unfolds in three stages emphasising different stakeholders, strategy type and platform configuration 	No	Business strategies
Au, Y., & Kauffman, R. (2008). The economics of mobile payments: Understanding stakeholder issues for an emerging financial technology application. <i>Electronic Commerce Research and Applications</i> , 7(2), 141–164	Mobile payments	<ul style="list-style-type: none"> Users, technology producers and vendors are key stakeholders for the market success of m-payments 	No	Business environment (users) Business environment (regulation and policymaking)
Babaei, G., & Bamdad, S. (2020). A multi-objective instance-based decision support system for investment recommendation in peer-to-peer lending. <i>Expert Systems with Applications</i> , 150, 113278	Peer-to-peer lending	<ul style="list-style-type: none"> P2P lenders can optimise their investment decisions by focusing on return maximisation and risk minimization 	No	Business environment (users)
Bastani, K., Asgari, E., & Namavari, H. (2019). Wide and deep learning for peer-to-peer	Peer-to-peer lending	<ul style="list-style-type: none"> P2P lenders invest their money through an approach based on 	No	Business environment (users)

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
lending. <i>Expert Systems with Applications</i> , 134, 209–224		credit scoring and profit scoring		
Belanche, D., Casalo, L., & Flavian, C. (2019). Artificial intelligence in fintech: Understanding robo-advisors adoption among customers. <i>Industrial Management & Data Systems</i> , 119(7), 1411–1430	Robo-advisors	<ul style="list-style-type: none"> Consumers' attitudes, mass media and interpersonal subjective norms determine the adoption of robo-advisor services 	No	Business environment (users)
Bretschneider, U., & Leimeister, J. (2017). Not just an ego-trip: Exploring backers' motivation for funding in incentive-based crowdfunding. <i>Journal of Strategic Information Systems</i> , 26(4), 246–260	Crowdfunding	<ul style="list-style-type: none"> Backers of crowdfunded projects have self-interest motivations, but some backers are also pro-socially motivated 	No	Business environment (users)
Burtch, G., & Chan, J. (2019). Investigating the relationship between medical crowdfunding and personal bankruptcy in the United States: Evidence of a digital divide. <i>MIS Quarterly</i> , 43(1), 237–262	Crowdfunding	<ul style="list-style-type: none"> Greater success among medical crowdfunding campaigns translates into a reduction in personal bankruptcy filings 	No	Business environment (users)
Burtch, G., Ghose, A., & Wattal, S. (2013). An empirical examination of the antecedents and consequences of contribution patterns in crowd-funded markets. <i>Information Systems Research</i> , 24(3), 499–519	Crowdfunding	<ul style="list-style-type: none"> Contributors to journalism crowdfunding platforms may experience a decrease in marginal utility 	No	Business environment (users)
Burtch, G., Ghose, A., & Wattal, S. (2014). Cultural differences and geography as determinants of online prosocial lending. <i>MIS Quarterly</i> , 38(3), 773–794	Crowdfunding	<ul style="list-style-type: none"> Lenders on the pro-social platform Kiva prefer culturally similar and geographically proximate borrowers 	No	Business environment (users)
Burtch, G., Ghose, A., & Wattal, S. (2016). Secret admirers: An empirical examination of information hiding and contribution dynamics in online crowdfunding. <i>Information Systems Research</i> , 27(3), 478–496	Crowdfunding	<ul style="list-style-type: none"> Concealing contributors' lending information negatively influences other contributors' likelihood of giving money 	No	Business environment (users)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
Burtch, G., Hong, Y., & Liu, D. (2018). The role of provision points in online crowdfunding. <i>Journal of Management Information Systems</i> , 35(1), 117–144	Crowdfunding	<ul style="list-style-type: none"> Market design of crowdfunding platform may reduce investors' herd behaviour 	No	Digital artifacts
Cai, S., Lin, X., Xu, D., & Fu, X. (2016). Judging online peer-to-peer lending behavior: A comparison of first-time and repeated borrowing requests. <i>Information & Management</i> , 53(7), 857–867	Peer-to-peer lending	<ul style="list-style-type: none"> Interest rate and credit grade significantly influences the likelihood of successful funding 	No	Business environment (users)
Chen, D., Lou, H., & Van Slyke, C. (2015). Toward an understanding of online lending intentions: Evidence from a survey in China. <i>Communications of the Association for Information Systems</i> , 36, 317–336	Peer-to-peer lending	<ul style="list-style-type: none"> Trust is the most critical determinant of willingness to lend 	No	Business environment (users)
Chen, K. (2019). Information asymmetry in initial coin offerings (ICOs): Investigating the effects of multiple channel signals. <i>Electronic Commerce Research and Applications</i> , 36, 100858	Initial coin offerings	<ul style="list-style-type: none"> Different ways to communicate the features of blockchain ventures impacts the success of ICOs 	No	Business strategies
Chen, Q., Li, J., Liu, J., Han, J., Shi, Y., & Guo, X. (2020). Borrower learning effects: Do prior experiences promote continuous successes in peer-to-peer lending? <i>Information Systems Frontiers</i> . doi: https://doi.org/10.1007/s10796-020-10006-7	Peer-to-peer lending	<ul style="list-style-type: none"> Borrowers who experience failures are willing to repeat borrowing but unable to learn from their failures 	No	Business environment (users)
Chen, X., Liu, C., & Li, S. (2019). The role of supply chain finance in improving the competitive advantage of online retailing enterprises. <i>Electronic Commerce Research and Applications</i> , 33, 100821	Supply-chain finance	<ul style="list-style-type: none"> Fintech improves the efficiency of supply chain finance and a company's competitive advantage 	No	Business strategies
Chen, X., Zhou, L., & Wan, D. (2016). Group social capital and lending outcomes in the financial credit market: An empirical study of online peer-to-peer lending. <i>Electronic Commerce Research and Applications</i> , 15, 1–13	Peer-to-peer lending	<ul style="list-style-type: none"> Borrower's social capital has a negative impact on the borrower's funding and repayments 	No	Business environment (users)

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
Cho, M., & Kim, G. (2017). A cross-cultural comparative analysis of crowdfunding projects in the United States and South Korea. <i>Computers in Human Behavior</i> , 72, 312–320	Crowdfunding	<ul style="list-style-type: none"> More comments and updates on crowdfunding projects indicate people's willingness to support such projects in the US, but not in Korea 	No	Business environment (users)
Ciaian, P., Rajcaniova, M., & Kancs, A. (2016). The digital agenda of virtual currencies: Can Bitcoin become a global currency? <i>Information Systems and E-Business Management</i> , 14(4), 883–919	Cryptocurrencies	<ul style="list-style-type: none"> Bitcoin will not be able to compete with standard currencies as long as it is driven by speculation 	No, but it mentions that bitcoin could enhance financial inclusion	Business environment (market dynamics)
Cooper, R., Seddon, J., & Van Vliet, B. (2017). High-frequency trading and conflict in the financial markets. <i>Journal of Information Technology</i> , 32(3), 270–282	High-frequency trading	<ul style="list-style-type: none"> Regulation should not aim at building liquid and informationally efficient market for long-term investors 	No	Business environment (regulation and policymaking)
Cousins, K., Subramanian, H., & Esmailzadeh, P. (2019). A value-sensitive design perspective of cryptocurrencies: A research agenda. <i>Communications of the Association for Information Systems</i> , 45, 511–547	Cryptocurrencies	<ul style="list-style-type: none"> Bitcoin has several benefits (e.g., financial inclusion, privacy) and harms (e.g., scams, volatility) 	No, but it mentions that bitcoin could enhance financial inclusion	Business environment (users)
Cox, J., Nguyen, T., Thorpe, A., Ishizaka, A., Chakhar, S., & Meech, L. (2018). Being seen to care: The relationship between self-presentation and contributions to online pro-social crowdfunding campaigns. <i>Computers in Human Behavior</i> , 83, 45–55	Crowdfunding	<ul style="list-style-type: none"> Image-conscious funders increase their levels of visible activity on a pro-social crowdfunding platform 	No	Business environment (users)
Currie, W., Gozman, D., & Seddon, J. (2018). Dialectic tensions in the financial markets: A longitudinal study of pre- and post-crisis regulatory technology. <i>Journal of Information Technology</i> , 33(4), 304–325	Regulatory technology	<ul style="list-style-type: none"> Regulatory technology may have negative effects on the transparency of financial reporting and the surveillance of managers/traders 	No, but it cites the 2016 G20's High-level Principles on Digital Financial Inclusion	Business environment (regulation and policymaking) Digital artifacts
Currie, W., & Seddon, J. (2017). The regulatory, technology and	High-frequency trading	<ul style="list-style-type: none"> Regulators find challenging to 	No	Business environment

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
market 'dark arts trilogy' of high frequency trading: A research agenda. <i>Journal of Information Technology</i> , 32(2), 111–126		isolate causal mechanisms from automated trading across many countries		(regulation and policymaking)
Drummer, D., Feuerriegel, S., & Neumann, D. (2017). Crossing the next frontier: The role of ICT in driving the financialization of credit. <i>Journal of Information Technology</i> , 32(3), 218–233	Peer-to-peer lending ICT and financialization	• ICT innovations are disintermediating banks and financializing the credit system	No	Digital artifacts
Du, W., Pan, S., Leidner, D., & Ying, W. (2019). Affordances, experimentation and actualization of fintech: A blockchain implementation study. <i>The Journal of Strategic Information Systems</i> , 28(1), 50–65	Blockchain	• Blockchain offers three affordances to organisations: direct payment settlement; automatic transaction settlement; financial inclusion of SMEs	No	Business strategies
Du, Z., Wang, K., & Li, M. (2019). Promoting crowdfunding with lottery: The impact on campaign performance. <i>Information & Management</i> , 56(8), 103159	Crowdfunding	• Lottery option helps fundraisers attract a large number of backers and increase the amount of funds raised	No	Business environment (users)
Eyal, I., & Siner, E. (2018). Majority Is not enough: Bitcoin mining Is vulnerable. <i>Communications of the ACM</i> , 61(7), 95–102	Cryptocurrencies	• A practical modification to the Bitcoin protocol would prohibit miners' collusion	No	Digital artifacts
Farrugia, S., Ellul, J., & Azzopardi, G. (2020). Detection of illicit accounts over the Ethereum blockchain. <i>Expert Systems with Applications</i> , 150, 113318	Cryptocurrencies	• Machine learning offers a method to detect illicit accounts over the Ethereum network	No	Digital artifacts
Feller, J., Gleasure, R., & Treacy, S. (2017). Information sharing and user behavior in internet-enabled peer-to-peer lending systems: An empirical study. <i>Journal of Information Technology</i> , 32(2), 127–146	Peer-to-peer lending	• Hard financial data do not impact lending behaviour on Lending Club	No	Business environment (users)
Ferrer-Gomila, J., Francisca Hinarejos, M., & Isern-Deya, A. (2019). A fair contract signing protocol with blockchain	Cryptocurrencies	• Bitcoin blockchain can remove the need of a third-	No	Digital artifacts

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
support. <i>Electronic Commerce Research and Applications</i> , 36, 100869		party guarantor in contract signing		
Fry, J., & Serbera, J. (2020). Quantifying the sustainability of Bitcoin and Blockchain. <i>Journal of Enterprise Information Management</i> . doi: https://doi.org/10.1108/JEIM-06-2018-0134	Cryptocurrencies	<ul style="list-style-type: none"> • Cryptocurrency markets are overvalued and characterised by speculative bubbles 	No	Business environment (market dynamics)
Ganchev, K., Nevmyvaka, Y., Kearns, M., & Vaughan, J. W. (2010). Censored exploration and the dark pool problem. <i>Communications of the ACM</i> , 53(5), 99–107	Algorithmic trading	<ul style="list-style-type: none"> • Machine learning can help optimally distribute a large trade over many dark pools 	No	Digital artifacts
Gao, Y., Yu, S., & Shiue, Y. (2018). The performance of the P2P finance industry in China. <i>Electronic Commerce Research and Applications</i> , 30, 138–148	Peer-to-peer lending	<ul style="list-style-type: none"> • Listed companies, platforms with venture capital investment, and platforms funded by state-owned capital exhibit higher growth efficiency 	No	Business strategies
Ge, R., Feng, J., Gu, B., & Zhang, P. (2017). Predicting and deterring default with social media information in peer-to-peer lending. <i>Journal of Management Information Systems</i> , 34(2), 401–424	Peer-to-peer lending	<ul style="list-style-type: none"> • Borrowers' self-disclosure of their social media activities predicts default probability 	No	Business environment (users)
Geva, H., Barzilay, O., & Oestreicher-Singer, G. (2019). A potato salad with a lemon twist: Using a supply-side shock to study the impact of opportunistic behavior on crowdfunding platforms. <i>MIS Quarterly</i> , 43(4), 1227–1248	Crowdfunding	<ul style="list-style-type: none"> • Low-quality offerings decrease the revenue of successful campaigns on crowdfunding platforms 	No	Business environment (users)
Gleasure, R. (2015). Resistance to crowdfunding among entrepreneurs: An impression management perspective. <i>Journal of Strategic Information Systems</i> , 24(4), 219–233	Crowdfunding	<ul style="list-style-type: none"> • Entrepreneurs do not use crowdfunding because of fear of disclosure, fear of visible failure, and fear of projecting desperation 	No	Business environment (users)
Gleasure, R., Conboy, K., & Morgan, L. (2019). Talking up a storm: How backers use public	Crowdfunding	<ul style="list-style-type: none"> • Backers can construct a positive or 	No	Business environment (users)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
discourse to exert control in crowdfunded systems development projects. <i>Information Systems Research</i> , 30(2), 447–465		negative image around a crowdfunded project		
Gleasure, R., & Feller, J. (2016). Does heart or head rule donor behaviors in charitable crowdfunding markets? <i>International Journal of Electronic Commerce</i> , 20(4), 499–524	Crowdfunding	<ul style="list-style-type: none"> • Donations to organisations and individuals are influenced by outcome-related factors and interaction-related factors respectively 	No	Business environment (users)
Gleasure, R., & Morgan, L. (2018). The pastoral crowd: Exploring self-hosted crowdfunding using activity theory and social capital. <i>Information Systems Journal</i> , 28(3), 489–515	Crowdfunding	<ul style="list-style-type: none"> • Social norms, information channels, obligations and expectations influence crowdfunding activities 	No	Business environment (users)
Gleasure, R., O'Reilly, P., & Cahalane, M. (2017). Inclusive technologies, selective traditions: A socio-material case study of crowdfunded book publishing. <i>Journal of Information Technology</i> , 32(4), 326–343	Crowdfunding	<ul style="list-style-type: none"> • Plug-and-play crowdfunding technologies across diverse contexts result in different practices, managerial challenges and design requirements 	No	Business environment (users) Digital artifacts
Gomber, P., Kauffman, R., Parker, C., & Weber, B. (2018a). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. <i>Journal of Management Information Systems</i> , 35(1), 220–265	Fintech business models	<ul style="list-style-type: none"> • Fintech innovations impact market structure and customer experience 	No, but it briefly discusses financial inclusion for the poor in the context of peer-to-peer lending and remittances	Business strategies
Gozman, D., Liebenau, J., & Mangan, J. (2018). The innovation mechanisms of fintech start-ups: Insights from SWIFT's Innoribe competition. <i>Journal of Management Information Systems</i> , 35(1), 145–179	Fintech business models	<ul style="list-style-type: none"> • Fintech startups disrupt business models in the financial sector through different mechanisms 	No, but it mentions financial inclusion in relation to those business models that extend access to financial services	Business strategies Digital artifacts
Guan, X., Deng, W.-J., Jiang, Z.-Z., & Huang, M. (2020). Pricing and advertising for reward-based	Crowdfunding	<ul style="list-style-type: none"> • Creators on reward-based crowdfunding 	No	Business environment (users)

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
crowdfunding products in e-commerce. <i>Decision Support Systems</i> , 131, 113231		platforms prefer a low crowdfunding price for a big-end market		
Haferkorn, M. (2017). High-frequency trading and its role in fragmented markets. <i>Journal of Information Technology</i> , 32(3), 283–296	High-frequency trading	<ul style="list-style-type: none"> HFT increases market efficiency in the European financial markets 	No	Business environment (market dynamics)
Han, J., Chen, Q., Liu, J., Luo, X., & Fan, W. (2018). The persuasion of borrowers' voluntary information in peer to peer lending: An empirical study based on elaboration likelihood model. <i>Computers in Human Behavior</i> , 78, 200–214	Peer-to-peer lending	<ul style="list-style-type: none"> Loan description disclosure contributes to funding success 	No	Business environment (users)
Harrison, S. (2018). Data security and consumer trust in fintech innovation in Germany. <i>Information and Computer Security</i> , 26(1), 109–128	Mobile banking	<ul style="list-style-type: none"> Data security, customer trust and user interface influence the adoption of mobile banking 	No	Business environment (users) Digital artifacts
Hedman, J., & Henningsson, S. (2015). The new normal: Market cooperation in the mobile payments ecosystem. <i>Electronic Commerce Research and Applications</i> , 14(5), 305–318	Mobile payments	<ul style="list-style-type: none"> Competitors in the mobile payment market use technology for defensive strategies, offensive strategies or position improvement 	No	Business strategies
Herrero, A., Hernandez-Ortega, B., & San Martin, H. (2020). Potential funders' motivations in reward-based crowdfunding. The influence of project attachment and business viability. <i>Computers in Human Behavior</i> , 106, 106240	Crowdfunding	<ul style="list-style-type: none"> Funders' intentions are influenced by their attachment to the crowd-funded project 	No	Business environment (users)
Hong, Y., Hu, Y., & Burtch, G. (2018). Embeddedness, prosociality, and social influence: Evidence from online crowdfunding. <i>MIS Quarterly</i> , 42(4), 1211–1224	Crowdfunding	<ul style="list-style-type: none"> Pro-social crowdfunding campaigns benefit from social media when advocates exhibit greater levels of mutual connections 	No	Business environment (users)
Iman, N. (2018). Is mobile payment still relevant in the	Mobile payments	<ul style="list-style-type: none"> Lack of conducive regulation, limited 	No, but it mentions financial inclusion	Business environment

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
fintech era? <i>Electronic Commerce Research and Applications</i> , 30, 72–82		collaboration among stakeholders, poor infrastructure and security negatively impact mobile payment growth	as a national agenda objective in Brazil, Indonesia, and Kenya	(regulation and policymaking)
Jiang, Y., Ho, Y., Yan, X., & Tan, Y. (2018). Investor platform choice: Herding, platform attributes, and regulations. <i>Journal of Management Information Systems</i> , 35(1), 86–116	Peer-to-peer lending	• Macro-level herding behaviour is accentuated by platforms' market share and the cumulative amount funded	No	Business environment (users)
Jocovski, M., Ghezzi, A., & Arvidsson, N. (2020). Exploring the growth challenge of mobile payment platforms: A business model perspective. <i>Electronic Commerce Research and Applications</i> , 40, 100908	Mobile payments	• M-payment platforms should focus on relations with business partner, retailers, and the use of big data analytics	No	Business strategies
Jonker, N. (2019). What drives the adoption of crypto-payments by online retailers? <i>Electronic Commerce Research and Applications</i> , 35, 100848	Cryptocurrencies	• Lack of consumer demand is a major barrier to the users' acceptance of crypto payments	No	Business environment (users)
Kang, L., Jiang, Q., & Tan, C. (2017). Remarkable advocates: An investigation of geographic distance and social capital for crowdfunding. <i>Information & Management</i> , 54(3), 336–348	Crowdfunding	• Higher funding can be secured with advocates of crowdfunded projects who are of further geographical distance and of higher social capital	No	Business environment (users)
Kavanagh, D., & Miscione, G. (2019). Carnival in the global village: Re-imagining information infrastructures. <i>Information Society</i> , 35(5), 299–313	Cryptocurrencies	• Bitcoin embodies four characteristics of carnival: play; ambivalence towards authority; celebration of dissimulation; vulgar language; excessive consumption	No	Business environment (market dynamics)
Kazan, E., Tan, C., Lim, E., Sørensen, C., & Damsgaard, J. (2018). Disentangling digital	Mobile payments	• Mobile payment providers are digital platforms	No	Business strategies

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
platform competition: The case of UK mobile payment platforms. <i>Journal of Management Information Systems</i> , 35(1), 180–219		with different competitive architectures		
Kim, K., & Hann, I. (2019). Crowdfunding and the democratization of access to capital—an illusion? Evidence from housing prices. <i>Information Systems Research</i> , 30(1), 276–290	Crowdfunding	<ul style="list-style-type: none"> A decline in housing prices leads to a significant increase in the creation of crowdfunding projects 	No	Business environment (market dynamics)
Kim, K., & Viswanathan, S. (2019). The experts in the crowd: The role of experienced investors in a crowdfunding market. <i>MIS Quarterly</i> , 43(2), 347–372	Crowdfunding	<ul style="list-style-type: none"> Early investors with app development experience have greater influence on later investors 	No	Business environment (users)
Kim, T., Por, M., & Yang, S. (2017). Winning the crowd in online fundraising platforms: The roles of founder and project features. <i>Electronic Commerce Research and Applications</i> , 25, 86–94	Crowdfunding	<ul style="list-style-type: none"> Founder features and project features have a positive effect on successful fundraising 	No	Business environment (users)
Lee, C., Bian, Y., Karaouzene, R., & Suleiman, N. (2019). Examining the role of narratives in civic crowdfunding: Linguistic style and message substance. <i>Industrial Management & Data Systems</i> , 119(7), 1492–1514	Crowdfunding	<ul style="list-style-type: none"> Funding outcomes can be improved with psychological language dimensions 	No	Business environment (users)
Lee, C., & Chiravuri, A. (2019). Dealing with initial success versus failure in crowdfunding market: Serial crowdfunding, changing strategies, and funding performance. <i>Internet Research</i> , 29(5), 1190–1212	Crowdfunding	<ul style="list-style-type: none"> Successful serial creators are more likely to explore a new industry or product category in the crowdfunding market 	No	Business environment (users)
Lee, D., & Park, J. (2020). The relationship between a charity crowdfunding project's contents and donors' participation: An empirical study with deep learning methodologies. <i>Computers in Human Behavior</i> , 106, 106261	Crowdfunding	<ul style="list-style-type: none"> Charity crowdfunding project managers should not use either happy or too miserable pictures of recipients 	No	Business environment (users)
Lei, K., Zhang, B., Li, Y., Yang, M., & Shen, Y. (2020). Time-driven feature-aware jointly deep	Algorithmic trading	<ul style="list-style-type: none"> A deep reinforcement learning model 	No	Digital artifacts

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
reinforcement learning for financial signal representation and algorithmic trading. <i>Expert Systems with Applications</i> , 140, 112872		improves financial signal representation and decision-making in algorithmic trading		
Leong, C., Tan, B., Xiao, X., Tan, F., & Sun, Y. (2017). Nurturing a fintech ecosystem: The case of a youth microloan startup in China. <i>International Journal of Information Management</i> , 37(2), 92–97	Online microlending	<ul style="list-style-type: none"> Digital technologies offer new strategic capabilities and enable the use of alternative credit scoring 	No, but it mentions how microlending improves financial inclusion	Business strategies Digital artifacts
Li, G., & Wang, J. (2019). Threshold effects on backer motivations in reward-based crowdfunding. <i>Journal of Management Information Systems</i> , 36(2), 546–573	Crowdfunding	<ul style="list-style-type: none"> There is a sharp increase in the number of backers when the crowdfunding project approaches its funding threshold 	No	Business environment (market dynamics)
Li, X., & Wang, C. (2017). The technology and economic determinants of cryptocurrency exchange rates: The case of Bitcoin. <i>Decision Support Systems</i> , 95, 49–60	Cryptocurrencies	<ul style="list-style-type: none"> Early market exchange rates are driven by speculative investments 	No	Business environment (market dynamics)
Li, Y., Wu, J., Hsieh, C., & Liou, J. (2020). A social fundraising mechanism for charity crowdfunding. <i>Decision Support Systems</i> , 129, 113170	Crowdfunding	<ul style="list-style-type: none"> A recommendation mechanism promotes the spread of philanthropic fundraising 	No	Digital artifacts
Liu, D., Brass, D., Lu, Y., & Chen, D. (2015). Friendships in online peer-to-peer lending: Pipes, prisms, and relational herding. <i>MIS Quarterly</i> , 39(3), 729–742	Peer-to-peer lending	<ul style="list-style-type: none"> Friends' endorsements via bidding on a loan negatively affects subsequent bids by third parties 	No	Business environment (users)
Liu, J., Kauffman, R., & Ma, D. (2015). Competition, cooperation, and regulation: Understanding the evolution of the mobile payments technology ecosystem. <i>Electronic Commerce Research and Applications</i> , 14(5), 372–391	Mobile payments	<ul style="list-style-type: none"> Organisation-level factors (e.g., firms' competitive strategies) and industry-level factors (e.g., government regulation) jointly shape m-payments 	No	Business environment (regulation and policymaking) Business environment (market dynamics)
Liu, L., Suh, A., & Wagner, C. (2018). Empathy or perceived credibility? An empirical study	Crowdfunding	<ul style="list-style-type: none"> Empathy and the perceived credibility of a 	No	Business environment (users)

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
on individual donation behavior in charitable crowdfunding. <i>Internet Research</i> , 28(3), 623–651		charitable crowdfunding project are key determinants of donors' intentions		
Lukkarinen, A., Teich, J. E., Wallenius, H., & Wallenius, J. (2016). Success drivers of online equity crowdfunding campaigns. <i>Decision Support Systems</i> , 87, 26–38	Crowdfunding	<ul style="list-style-type: none"> Campaign success is associated with early funding collected from private networks, social media networks, and the size of the minimum allowed investment 	No	Business environment (users)
Luo, B., & Lin, Z. (2013). A decision tree model for herd behavior and empirical evidence from the online P2P lending market. <i>Information Systems and E-Business Management</i> , 11(1), 141–160	Peer-to-peer lending	<ul style="list-style-type: none"> Lenders are more likely to herd on listings with more bids and friends' bids 	No	Business environment (users)
Ma, B., Zhou, Z., & Hu, F. (2017). Pricing mechanisms in the online peer-to-peer lending market. <i>Electronic Commerce Research and Applications</i> , 26, 119–130	Peer-to-peer lending	<ul style="list-style-type: none"> P2P lending platforms should use the borrower pricing mechanism or platform pricing mechanism to improve efficiency 	No	Digital artifacts
Ma, T., & McGroarty, F. (2017). Social machines: How recent technological advances have aided financialisation. <i>Journal of Information Technology</i> , 32(3), 234–250	High-frequency trading ICT and financialisation	<ul style="list-style-type: none"> ICT innovations enable people to harness crowd wisdom and traders to produce accurate price estimations, as well as have better decision-making 	No	Digital artifacts Business environment (market dynamics)
Madrazo-Lemarroy, P., Barajas-Portas, K., & Labastida Tovar, M. (2019). Analyzing campaign's outcome in reward-based crowdfunding: Social capital as a determinant factor. <i>Internet Research</i> , 29(5), 1171–1189	Crowdfunding	<ul style="list-style-type: none"> Social network, shared vision and the development of trustworthiness increase the probability of achieving crowdfunding objectives 	No	Business environment (users)
Mai, F., Shan, Z., Bai, Q., Wang, X., & Chiang, R. (2018). How does social media impact bitcoin value? A test of the silent	Cryptocurrencies	<ul style="list-style-type: none"> Social media sentiment is an important predictor in 	No	Business environment (market dynamics)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
majority hypothesis. <i>Journal of Management Information Systems</i> , 35(1), 19–52		determining bitcoin value		
Majumdar, A., & Bose, I. (2018). My words for your pizza: An analysis of persuasive narratives in online crowdfunding. <i>Information & Management</i> , 55(6), 781–794	Crowdfunding	<ul style="list-style-type: none"> Rational and credible appeals in a message increase the likelihood of receiving a donation 	No	Business environment (users)
Malekipirbazari, M., & Aksakalli, V. (2015). Risk assessment in social lending via random forests. <i>Expert Systems with Applications</i> , 42(10), 4621–4631	Peer-to-peer lending	<ul style="list-style-type: none"> A random forest-based method of credit scoring outperforms FICO and Lending Club's proprietary credit risk 	No	Digital artifacts
Mamonov, S., & Malaga, R. (2018). Success factors in Title III equity crowdfunding in the United States. <i>Electronic Commerce Research and Applications</i> , 27, 65–73	Crowdfunding	<ul style="list-style-type: none"> Investors in informal risk capital markets focus on market risk, execution risk and agency risk 	No	Business environment (users)
Meiklejohn, S., Pomarole, M., Jordan, G., Levchenko, K., McCooy, D., Voelker, G., & Savage, S. (2016). A fistful of bitcoins: Characterizing payments among men with no names. <i>Communications of the ACM</i> , 59(4), 86–93	Cryptocurrencies	<ul style="list-style-type: none"> Bitcoin identities can be clustered into idioms of use 	No	Digital artifacts
Mendoza-Tello, J., Mora, H., Pujol-Lopez, F., & Lytras, M. (2019). Disruptive innovation of cryptocurrencies in consumer acceptance and trust. <i>Information Systems and E-Business Management</i> , 17(2–4), 195–222	Cryptocurrencies	<ul style="list-style-type: none"> Perceived trust, perceived risk and perceived ease of use are not strong predictors of the intention to use cryptocurrencies 	No	Business environment (users)
Narayanan, A., & Clark, J. (2017). Bitcoin's academic pedigree. <i>Communications of the ACM</i> , 60(12), 36–45	Cryptocurrencies	<ul style="list-style-type: none"> The technical components of bitcoin originated in the 1980–1990s academic literature on digital cash 	No	Digital artifacts
Parker, C., & Weber, B. (2014). Launching successful e-markets: A broker-level order-routing analysis of two options	Electronic trading	<ul style="list-style-type: none"> Brokers' order routing to an electronic exchange can be 	No	Business environment (users) Digital artifacts

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
exchanges. <i>Journal of Management Information Systems</i> , 31(2), 47–75		attributed to differences between the exchanges' affiliation structures and incentive schemes		
Polasik, M., Piotrowska, A., Wisniewski, T., Kotkowski, R., & Lightfoot, G. (2016). Price fluctuations and the use of bitcoin: An empirical inquiry. <i>International Journal of Electronic Commerce</i> , 20(1), 9–49	Cryptocurrencies	• Bitcoin returns are driven by its popularity, the news sentiment and the total number of transactions	No, but it mentions bitcoin's potential for financial inclusion	Business environment (market dynamics)
Riggins, F., & Weber, D. (2017). Information asymmetries and identification bias in P2P social microlending. <i>Information Technology for Development</i> , 23(1), 107–126	Peer-to-peer lending	• Distant upstream lenders make decisions based on identification biases	No, but it examines investors on the poverty-relief platform Kiva	Business environment (users)
Roma, P., Gal-Or, E., & Chen, R. (2018). Reward-based crowdfunding campaigns: Informational value and access to venture capital. <i>Information Systems Research</i> , 29(3), 679–697	Crowdfunding	• Running a crowdfunding campaign before approaching VC is the right choice for small entrepreneurial projects	No	Business strategies (financing)
Roussou, I., Stiakakis, E., & Sifaleras, A. (2019). An empirical study on the commercial adoption of digital currencies. <i>Information Systems and E-Business Management</i> , 17(2–4), 223–259	Cryptocurrencies	• Perceived security and usefulness are the main factors influencing users' adoption of digital currencies	No	Business environment (users)
Ryu, S., & Kim, Y. (2016). A typology of crowdfunding sponsors: Birds of a feather flock together? <i>Electronic Commerce Research and Applications</i> , 16, 43–54	Crowdfunding	• There are four types of crowdfunding sponsors: angelic backer, reward hunter, avid fan and tasteful hermit	No, but it mentions angelic backers' philanthropic motivation	Business environment (users)
Ryu, S., & Kim, Y. (2018). Money is not everything: A typology of crowdfunding project creators. <i>Journal of Strategic Information Systems</i> , 27(4), 350–368	Crowdfunding	• There are four types of crowdfunding project creators: social entrepreneur, fund seeker, indie producer and daring dreamer	No, but it mentions social entrepreneurs' pro-sociality motivations	Microfoundations (entrepreneurial motivations)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
Ryu, S., Park, J., Kim, K., & Kim, Y. (2020). Reward versus altruistic motivations in reward-based crowdfunding. <i>International Journal of Electronic Commerce</i> , 24(2), 159–183	Crowdfunding	<ul style="list-style-type: none"> Altruistic motivations are associated with early funding, while reward motivations are associated with late and larger funding 	No	Business environment (users) Business strategies (financing)
Schuetz, S., & Venkatesh, V. (2020). Blockchain, adoption, and financial inclusion in India: Research opportunities. <i>International Journal of Information Management</i> , 52, 101936	Blockchain	<ul style="list-style-type: none"> Blockchain can overcome the challenges preventing the financial exclusion of poor Indians 	Yes	Digital artifacts
Serrano-Cinca, C., & Gutierrez-Nieto, B. (2016). The use of profit scoring as an alternative to credit scoring systems in peer-to-peer (P2P) lending. <i>Decision Support Systems</i> , 89, 113–122	Peer-to-peer lending	<ul style="list-style-type: none"> Lenders can use a no profit scoring system instead of a credit scoring system 	No	Digital artifacts Business environment (users)
Siering, M., Koch, J., & Deokar, A. (2016). Detecting fraudulent behavior on crowdfunding platforms: The role of linguistic and content-based cues in static and dynamic contexts. <i>Journal of Management Information Systems</i> , 33(2), 421–455	Crowdfunding	<ul style="list-style-type: none"> Linguistic and content-based cues are useful to identify fraudulent behaviours on crowdfunding platforms 	No	Digital artifacts
Staykova, K., & Damsgaard, J. (2015). The race to dominate the mobile payments platform: entry and expansion strategies. <i>Electronic Commerce Research and Applications</i> , 14(5), 319–330	Mobile payments	<ul style="list-style-type: none"> The timing of entry and the timing of expansion are important to gain a first-move advantage as a digital payment provider 	No	Business strategies
Tang, H., Shi, Y., & Dong, P. (2019). Public blockchain evaluation using entropy and TOPSIS. <i>Expert Systems with Applications</i> , 117, 204–210	Cryptocurrencies	<ul style="list-style-type: none"> Bitcoin, Ethereum, and EOS are ranked in the top three public blockchains based on technology, market capitalisation and activity 	No	Business environment (market dynamics)
Tao, Q., Dong, Y., & Lin, Z. (2017). Who can get money? Evidence	Peer-to-peer lending	<ul style="list-style-type: none"> Borrowers earning a higher income or 	No	

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TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
from the Chinese peer-to-peer lending platform. <i>Information Systems Frontiers</i> , 19(3), 425–441		owning assets are more likely to receive a loan, pay lower interest rates, and are less likely to default		Business environment (users)
Thies, F., Wessel, M., & Benlian, A. (2016). Effects of social interaction dynamics on platforms. <i>Journal of Management Information Systems</i> , 33(3), 843–873	Crowdfunding	<ul style="list-style-type: none"> Electronic word-of-mouth and popularity influence consumers' decision-making in crowdfunding platforms 	No	Business environment (users)
Thies, F., Wessel, M., & Benlian, A. (2018). Network effects on crowdfunding platforms: Exploring the implications of relaxing input control. <i>Information Systems Journal</i> , 28(6), 1239–1262	Crowdfunding	<ul style="list-style-type: none"> Platform providers should pay more attention to the supply side (entrepreneurs) instead of the demand side (funders) to achieve platform growth 	No	Business environment (users) Business strategies
Wang, C., Zhang, W., Zaho, X., & Wang, J. (2019). Soft information in online peer-to-peer lending: Evidence from a leading platform in China. <i>Electronic Commerce Research and Applications</i> , 36, 100873	Peer-to-peer lending	<ul style="list-style-type: none"> Borrowers who possess more assets and higher income are more likely to get their listings fully funded 	No	Business environment (market dynamics)
Wang, N., Li, Q., Liang, H., Ye, T., & Ge, S. (2018). Understanding the importance of interaction between creators and backers in crowdfunding success. <i>Electronic Commerce Research and Applications</i> , 27, 106–117	Crowdfunding	<ul style="list-style-type: none"> Comment quantity, comment sentiment, reply length and reply speed are positively associated with the fundraising success 	No	Business environment (market dynamics)
Wang, Z., Jiang, C., Zhao, H., & Ding, Y. (2020). Mining semantic soft factors for credit risk evaluation in peer-to-peer lending. <i>Journal of Management Information Systems</i> , 37(1), 282–308	Peer-to-peer lending	<ul style="list-style-type: none"> Extracting semantic soft factors improves credit risk evaluation 	No	Digital artifacts
Wang, Z., Guan, Z., Hou, F., Li, B., & Zhou, W. (2019). What determines customers'	Wealth management	<ul style="list-style-type: none"> System quality, situational normality and 	No	Business environment (users)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
continuation intention of fintech? Evidence from YuEbao. <i>Industrial Management & Data Systems</i> , 119(8), 1625–1637		subjective norm can boost users' continuation intention of Alibaba's money-market fund		
Wessel, M., Adam, M., & Benlian, A. (2019). The impact of sold-out early birds on option selection in reward-based crowdfunding. <i>Decision Support Systems</i> , 117, 48–61	Crowdfunding	• Sold-out 'early birds' reward offers significantly influence backers' decision-making	No	Business environment (users)
Wessel, M., Thies, F., & Benlian, A. (2016). The emergence and effects of fake social information: Evidence from crowdfunding. <i>Decision Support Systems</i> , 90, 75–85	Crowdfunding	• Fake social information has a very short-term positive effect on campaign funding	No	Business environment (market dynamics)
Wessel, M., Thies, F., & Benlian, A. (2017). Opening the floodgates: The implications of increasing platform openness in crowdfunding. <i>Journal of Information Technology</i> , 32(4), 344–360	Crowdfunding	• Increasing platform openness for third-party offerings can destabilise a platform's ecosystem	No	Business environment (market dynamics)
Xia, Y., Liu, C., & Liu, N. (2017). Cost-sensitive boosted tree for loan evaluation in peer-to-peer lending. <i>Electronic Commerce Research and Applications</i> , 24, 30–49	Peer-to-peer lending	• A cost-sensitive boosted tree model helps discriminate potential borrowers' defaults	No	Digital artifacts
Xiao, S., & Yue, Q. (2018). Investors' inertia behavior and their repeated decision-making in online reward-based crowdfunding market. <i>Decision Support Systems</i> , 111, 101–112	Crowdfunding	• Backers' reward tier selection and investment timing selection are affected by project attributes and their own inertia behaviour.	No	Business environment (users)
Xu, J., & Chau, M. (2018). Cheap talk? The impact of lender-borrower communication on peer-to-peer lending outcomes. <i>Journal of Management Information Systems</i> , 35(1), 53–85	Peer-to-peer lending	• The more responses a borrower makes to lenders' comments, the more likely the listing will attract funding	No	Business environment (users)
Yang, Q., Gong, X., Zhang, K., Liu, H., & Lee, M. (2020). Self-disclosure in mobile payment	Mobile payments	• Perceived benefits, perceived	No	Business environment (users)

(Continues)

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
applications: Common and differential effects of personal and proxy control enhancing mechanisms. <i>International Journal of Information Management</i> , 52, 102065		effectiveness of privacy setting, and perceived risks predict the perceived value of consumers' self-disclosure		
Yin, C., Liu, L., & Mirkovski, K. (2019). Does more crowd participation bring more value to crowdfunding projects? The perspective of crowd capital. <i>Internet Research</i> , 29(5), 1149–1170	Crowdfunding	<ul style="list-style-type: none"> Project updates, reward levels and on-site communication positively influence degree of project success 	No	Business environment (market dynamics)
Yin, H., Langenheldt, K., Harlev, M., Mukkamala, R., & Vatrappu, R. (2019). Regulating cryptocurrencies: A supervised machine learning approach to de-anonymizing the bitcoin blockchain. <i>Journal of Management Information Systems</i> , 36(1), 37–73	Cryptocurrencies	<ul style="list-style-type: none"> A supervised machine learning approach can de-anonymize the bitcoin blockchain 	No	Digital artifacts Business environment (regulation and policymaking)
Yuan, H., Lau, R., & Xu, W. (2016). The determinants of crowdfunding success: A semantic text analytics approach. <i>Decision Support Systems</i> , 91, 67–76	Crowdfunding	<ul style="list-style-type: none"> Entrepreneurs can apply a text analytics-based framework to promote their projects and improve funding success 	No	Digital artifacts Business strategies (financing)
Yum, H., Lee, B., & Chae, M. (2012). From the wisdom of crowds to my own judgment in microfinance through online peer-to-peer lending platforms. <i>Electronic Commerce Research and Applications</i> , 11(5), 469–483	Peer-to-peer lending	<ul style="list-style-type: none"> Lenders seek the wisdom of crowds when information on creditworthiness is extremely limited in microfinance 	No, but it examines the case of borrowers with limited credit history	Business environment (users)
Zachariadis, M., Hileman, G., & Scott, S. (2019). Governance and control in distributed ledgers: Understanding the challenges facing blockchain technology in financial services. <i>Information and Organization</i> , 29(2), 105–117	Blockchain	<ul style="list-style-type: none"> Governance arrangements in blockchain systems have limitations concerning scalability, openness, interoperability and standards, liability and resilience, 	No, but it mentions blockchain's potential to improve financial inclusion	Digital artifacts

TABLE A1 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
		transparency and privacy, security		
Zheng, H., Li, D., Wu, J., & Xu, Y. (2014). The role of multidimensional social capital in crowdfunding: A comparative study in China and US. <i>Information & Management</i> , 51(4), 488–496	Crowdfunding	<ul style="list-style-type: none"> An entrepreneur's social capital has significant effects on crowdfunding performance in both China and the US 	No	Business environment (users)
Zheng, H., Xu, B., Wang, T., & Chen, D. (2017). Project implementation success in reward-based crowdfunding: An empirical study. <i>International Journal of Electronic Commerce</i> , 21(3), 424–448	Crowdfunding	<ul style="list-style-type: none"> Reward delivery timeliness and meeting product specifications are of great importance to increase sponsor satisfaction 	No	Business environment (users) Business strategies
Zheng, H., Xu, B., Zhang, M., & Wang, T. (2018). Sponsor's cocreation and psychological ownership in reward-based crowdfunding. <i>Information Systems Journal</i> , 28(6), 1213–1238	Crowdfunding	<ul style="list-style-type: none"> Psychological ownership is an important mental state for sponsors in crowdfunding 	No	Business environment (users)
Total articles reviewed: 121				

TABLE A2 ICT4D studies on financial inclusion, 2000 to 2020

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
Adaba, G., & Ayoung, D. (2017). The development of a mobile money service: An exploratory actor-network study. <i>Information Technology for Development</i> , 23(4), 668–686	Mobile money	<ul style="list-style-type: none"> An alliance of stakeholders and aligned interests led to the development and delivery of mobile money services in Ghana 	Yes	Business environment of financial inclusion
Asamoah, D., Takeddine, S., & Amedofu, M. (2020). Examining the effect of mobile money transfer (MMT) capabilities on business growth and development impact. <i>Information Technology for Development</i> , 26(1), 146–161	Mobile money	<ul style="list-style-type: none"> Developing mobile money transfer capabilities has a positive impact on microenterprise growth and the well-being of micro-entrepreneurs 	Yes	Developmental impacts of fintech
Bisht, S., & Mishra, V. (2016). ICT-driven financial inclusion initiatives for urban poor in a developing	ICT-enabled financial services	<ul style="list-style-type: none"> ICT-enabled financial services play a key role in 	Yes	Developmental impacts of fintech

(Continues)

TABLE A2 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
economy: Implications for public policy. <i>Behaviour & Information Technology</i> , 35(10), 817–832		users' well-being and services should be designed to allow users' appropriation		Digital artifacts of financial inclusion
Chatterjee, A. (2020). Financial inclusion, information and communication technology diffusion, and economic growth: A panel data analysis. <i>Information Technology for Development</i> . doi: https://doi.org/10.1080/02681102.2020.1734770	ICT and financial inclusion	• Development of ICT capabilities is an important determinant of financial inclusion and per capita growth	Yes	Developmental impacts of fintech
De', R., & Ratan, A. (2009). Whose gain is it anyway? Structural perspectives on deploying ICTs for development in India's microfinance sector. <i>Information Technology for Development</i> , 15(4), 259–282	ICT and microfinance	• The development impact is greater when clients' contexts are taken into account during implementation	Yes, although it does not use the 'financial inclusion' term	Business environment of financial inclusion Developmental impacts of fintech
Diniz, E., Birochi, R., & Pozzebon, M. (2012). Triggers and barriers to financial inclusion: The use of ICT-based branchless banking in an Amazon county. <i>Electronic Commerce Research and Applications</i> , 11(5), 484–494	Branchless banking	• Financial inclusion through the correspondent-banking model positively contributes to local socio-economic development	Yes	Developmental impacts of fintech
Ghosh, I., & O'Neill, J. (2020). The unbearable modernity of mobile money. <i>Computer Supported Cooperative Work</i> . doi: https://doi.org/10.1007/s10606-020-09373-1	Mobile money	• The interaction of two different infrastructural systems enables mobile payments to work	Yes	Digital artifacts of financial inclusion Business environment of financial inclusion
Gupta, S., Yun, H., Xu, H., & Kim, H. (2017). An exploratory study on mobile banking adoption in Indian metropolitan and urban areas: A scenario-based experiment. <i>Information Technology for Development</i> , 23(1), 127–152	Mobile banking	• Perceived risk and control influence mobile banking adoption by customers in urban areas	Yes	Business environment of financial inclusion
Hayes, N., & Westrup, C. (2012). Context and the processes of ICT for development. <i>Information and Organization</i> , 22(1), 23–36	Mobile money	• Different groups formulated specific strategies to develop M-Pesa in Kenya	Yes, although it does not use the 'financial inclusion' term	Business environment of financial inclusion
Jayo, M., Diniz, E., Zambaldi, F., & Christopoulos, T. (2012). Groups of	Branchless banking	• The bank-centred branchless-	Yes	Business environment

TABLE A2 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
services delivered by Brazilian branchless banking and respective network integration models. <i>Electronic Commerce Research and Applications</i> , 11(5), 504–517		banking model is the more suited to deliver pro-poor services		of financial inclusion
Joia, L., & Dos Santos, R. (2019). ICT-equipped bank boat and the financial inclusion of the riverine population of Marajó Island in the Brazilian Amazon. <i>Information Systems Journal</i> , 29(4), 842–887	Branchless banking	<ul style="list-style-type: none"> The lack of financial education and ICT infrastructure issues hindered the developmental impacts of Agência Barco 	Yes	Developmental impacts of fintech Business environment of financial inclusion Digital artifacts of financial inclusion
Kemal, A. (2019). Mobile banking in the government-to-person payment sector for financial inclusion in Pakistan. <i>Information Technology for Development</i> , 25(3), 475–502	Mobile banking (government-to-person payments)	<ul style="list-style-type: none"> Mobile banking enables women's financial inclusion, but also imposes socio-economic and technological constraints 	Yes	Developmental impacts of fintech
Leonardi, P., Bailey, D., Diniz, E., Sholler, D., & Nardi, B. (2016). Multiplex appropriation in complex systems implementation: The case of Brazil's correspondent banking system. <i>MIS Quarterly</i> , 40(2), 461–473	Branchless banking	<ul style="list-style-type: none"> Poor clients in remote areas in Brazil rely upon banking correspondents to appropriate financial technologies on their behalf 	Yes	Digital artifacts of financial inclusion Business environment of financial inclusion
Mwangi, B., & Brown, I. (2015). A decision model of Kenyan SMEs' consumer choice behaviour in relation to registration for a mobile banking service: A contextual perspective. <i>Information Technology for Development</i> , 21(2), 229–252	Mobile banking	<ul style="list-style-type: none"> Kenyan SMEs owners choose mobile banking because it is convenient, accessible and time saving 	Yes	Business environment of financial inclusion
Pal, A., De', R., & Herath, T. (2020). The role of mobile payment technology in sustainable and human-centric development: Evidence from the post-demonetization period in India. <i>Information Systems Frontiers</i> , 22(3), 607–631	Mobile payments	<ul style="list-style-type: none"> Mobile payment technology can afford creative uses such as reflection on past expenses 	Yes	Business environment of financial inclusion
Pal, A., Herath, T., De', R., & Rao, H. (2020). Contextual facilitators and barriers influencing the continued use of mobile payment services in a developing country: Insights from	Mobile payments	<ul style="list-style-type: none"> Network externalities, trust, and habit facilitate mobile payment 	Yes	Business environment of financial inclusion

(Continues)

TABLE A2 (Continued)

Papers	Topics	Findings	Focus on financial inclusion	Thematic areas
adopters in India. <i>Information Technology for Development</i> , 26(2), 394–420		usage intention in India		
Potnis, D., Gaur, A., & Singh, J. (2020). Analysing slow growth of mobile money market in India using a market separation perspective. <i>Information Technology for Development</i> , 26(2), 369–393	Mobile money	<ul style="list-style-type: none"> Ownership of a SIM card and a bank account, awareness of mobile money services, age, gender and location influence the use of mobile money services 	Yes	Business environment of financial inclusion
Rahman, S., Didarul Alam, M., & Taghizadeh, S. (2020). Do mobile financial services ensure the subjective well-being of micro-entrepreneurs? An investigation applying UTAUT2 model. <i>Information Technology for Development</i> , 26(2), 421–444	Mobile financial services	<ul style="list-style-type: none"> Price value predicts small entrepreneurs' intention to use mobile financial services in Bangladesh 	Yes	Business environment of financial inclusion
Uwamariya, M., & Loebbecke, C. (2020). Learning from the mobile payment role model: Lessons from Kenya for neighbouring Rwanda. <i>Information Technology for Development</i> , 26(1), 108–127	Mobile payments	<ul style="list-style-type: none"> Technological, organisational and environmental factors shape the implementation and adoption of mobile payments in Kenya and Rwanda 	Yes	Business environment of financial inclusion Developmental impacts of fintech
Wenner, G., Bram, J., Marino, M., Obeysekare, E., & Mehta, K. (2018). Organisational models of mobile payment systems in low-resource environments. <i>Information Technology for Development</i> , 24(4), 681–705	Mobile payments	<ul style="list-style-type: none"> There are 12 organisational models for mobile payment systems 	Yes	Business strategies for financial inclusion Business environment of financial inclusion

Total articles reviewed: 20

In the third phase, we studied the research findings advanced by the ICT4D literature on financial inclusion and synthesised four broad themes: business strategies for financial inclusion; digital artifacts of financial inclusion; business environment of financial inclusion; developmental impacts of fintech. Similar to the IS literature on fintech (Appendix A), we built on Webster and Watson's (2002, p. xvi) suggestion for a concept-centric review.