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RESEARCH PAPER

Fintech: A content analysis of the finance and information systems literature

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Abstract

The amount of research related to financial technologies (fintech) has grown rapidly since these modalities have been implemented. A review of this literature base will help identify the topics that have been explored and identify topics for further research. This research project collects, synthesizes, and analyzes both the research strategies (i.e., methodologies) and content (e.g., topics, focus, categories) of the literature, and then discusses an agenda for future research efforts. We searched for fintech research published in the last 20 years and analyzed 146 articles published in Finance and 70 articles published in Information Systems (IS) during this period in their respective A*, A, and B journals in the 2019 Australian Business Deans Council list. We found an increasing level of activity during the most recent 6-year period and a biased distribution of fintech articles focused on exploratory methodologies. We also found several research strategies that were either underrepresented or absent from the pool of fintech research and identified several subject areas that need further exploration. We also created four fintech topic categories to organize and classify this diverse research stream.

Keywords FinTech · Qualitative · Literature review · Content analysis

JEL classification G10 · G20 · G30 · G40

Introduction

With the continuous advancements in technology, the current interest in fintech in both academia and in practice is more prevalent than ever. Typically, a portmanteau for "financial technology", fintech has been referenced for more than 40 years in more than 200 scholarly articles (Schueffel, 2016). Throughout the years, different definitions of fintech have been proposed for different contexts and across countries, while the origin of the term "fintech" remains to be a point of contention. Only until recently, Schueffel (2016) reconciles various existing definitions and defines fintech as "a new financial industry that applies technology to improve financial activities." As a joint evolution of finance and technology, fintech encompasses cryptocurrencies, Internet banking, mobile payments, crowdfunding, peer-to-peer lending, Robo-Advisory, online identification, and many other important innovations (Lagna & Ravishankar, 2022). Nonetheless, fintech is still a relatively undiscovered academic field and expects its definition to continue to evolve. To date, no study has examined neither the methodologies employed nor the content thereof. The purpose of this study is to synthesize the methodologies and content of all fintech article from the past 20 year encompassing all journals on the Australian Business Deans list that have a rating of A*, A, and B. In doing so, we hope to find a synthesis of keywords and methodological advances that can be used in further exploration of fintech research.

Studies which systematically review the literature, such as Farooq and Jibran (2018), have been shown to be valuable contributions to understanding the scope, measurements, impact size, and determinants of a particular area to synthesize with the area's future research agenda. In this paper, we performed a meta-analysis of research methods employed in

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the data stream of fintech research. In the literature stream, there has not been a comprehensive survey of the methodologies employed in fintech literature. In fact, there have been very few studies reviewing the methodologies employed in finance research in the past 15 years, with Kim and Ji (2015) and Adams et al. (2019) being the closest examples. Lagna and Ravishankar (2022) illustrated the growing interest that IS researchers have shown in the fintech research domain. Alt et al. (2018) called fintech a revolution that had evolved from offline, hierarchical, process-oriented organizations to digital, agile, customer-centric system and stated, "FinTech businesses are more IT companies than financial providers were before."

The following sections of the paper will examine the current literature to determine what is known about the concept of fintech. The remainder of this paper is organized as follows: a description of the methodology for the analysis of the fintech research is presented. This is followed by the results. Finally, the research is summarized with a discussion of the limitations of this project and suggestions for future research.

Literature review

One focus in the fintech literature is about how fintech companies provide new and improved financial services. As Thakor (1999) discusses, the development of information technology enables new financial firms to be highly specialized and provides products and services which are tailored to customer preferences. As new players in the financial market, fintech companies have the potential to reduce financial contracting frictions and increase consumer welfare (Philippon, 2015). For example, Fuster et al. (2019) find evidence that fintechs have improved the productivity of mortgage lending.

These additional values which fintechs may bring to the finance industry come from the fact that these firms are different from traditional financial institutions. Thakor (2020) discusses that fintech firms bare lower operating costs than traditional banks. For instance, Lending Club, a fintech firm, has operating costs as a percentage of outstanding loans at 2.70% compared to those of banks at almost 7%. According to Benoit et al. (2019), fintechs also have lower regulatory costs than banks. In the USA, even though peer-to-peer (P2P) lending is subject to the US Securities and Exchange Commission (SEC)'s regulation and state laws, these regulatory burdens are much lighter than that of banks.

Much of the recent fintech research is concerned with how fintechs impact traditional banks. Christensen (2016) provides the "disruptive theory" in which new entrants effectively compete with traditional players by providing accessible and cost-effective goods and services to customers. Boyd and De Nicolo (2005) posit that banks become more competitive by providing cheaper loans. In turn, borrowers have less incentive to risk shift which results in banks having less default risk. Similarly, Goetz (2018) finds that the increased competition forces banks to be more efficient by reducing over-lending and engaging in relationship lending. On the other hand, Bertsch et al. (2020) find that banks' increased misconduct is related to the emergence of the US online lending market. Large banks can also choose to acquire fintech firms. For instance, in 2015, Capital One acquired Level Money to strengthen its capabilities in digital banking technologies (Li et al., 2017). Hornuf et al. (2021) find that many banks acknowledge the technical superiority of fintech start-ups and have incorporated these firms' products and services into their own business models.

Thakor (2020) and other survey papers review the fintech literature's research contents of what we currently know about fintech and the research directions that have been taken. On the other hand, this paper focuses on reviewing the research methodologies. Studies which systematically review the literature, such as Farooq and Jibran (2018), have been shown to be valuable contributions to understanding the scope, measurements, impact size, and determinants of a particular area in order to synthesize with the area's future research agenda. There has not been a comprehensive survey of the methodologies employed in fintech literature. In fact, there have been very few studies reviewing the methodologies employed in finance research in the past 15 years, with Kim and Ji (2015) and Adams et al. (2019) being the closest examples.

For the purpose of reviewing the practice of significance testing, Kim and Ji (2015) survey recently published articles in four top-ranking finance journals. They find that finance researchers almost exclusively use the conventional significance levels (1%, 5%, and 10%) while paying little attention to the sample size, power of the test, and expected losses. The authors also suggest using more often the Bayesian method or revised standards for evidence (0.1% or 0.5%). Adams et al. (2019) review the articles published in the same four top-ranking finance journals from 1988 to 2017 in order to investigate whether outliers are treated appropriately in these studies. The authors document that each year, 30–70% of these articles use OLS. To encourage finance researchers to utilize other useful econometric methods, they propose a multivariate outlier identification strategy. As the authors explain, this technique can minimize frictions which hinder the adoption of these methods. Due to their purposes of addressing very specific problems, these two articles provide method surveys that are non-comprehensive. Table 1 summarizes the differences between this paper and the other surveys of fintech methods.

Methodology

The approach to the analysis of the fintech research is to first identify trends in the Finance and Information Systems (IS) literature because fintech is the intersection between

Table 1 The surveys of fintech methods

Article	Purpose	Journals covered	Time period
Kim and Ji (2015)	To review the practice of significance testing	Journal of Finance (JF), Journal of Financial Economics (JFE), Journal of Financial and Quantitative Analysis (JFQA), and The Review of Financial Studies (RFS)	2012
Adams et al. (2019)	To investigate whether outliers are treated appropriately	Journal of Finance (JF), Journal of Financial Economics (JFE), Journal of Financial and Quantitative Analysis (JFQA), and The Review of Financial Studies (RFS)	1988–2017
This paper	To analyze both the research strategies and content of the fintech literature in order to provide an agenda for future research efforts	Finance and Information Systems (IS) journals classified as A*, A, and B in the 2019 Australian Business Dean's Council (ABDC) list	2002–2021

financial services and information systems. Specifically, we wished to capture the trends pertaining to (1) the number and distribution of fintech articles published in the leading journals, (2) methodologies employed in fintech research, and (3) the research topics being published in this research. During the analysis of this literature, we attempted to identify gaps and needs in the research and therefore enumerate and discuss a research agenda which allows for the progression of research (Webster & Watson, 2002). Systematic literature reviews are a meta-analysis technique designed to collect, organize, analyze, and categorize existing knowledge and concepts in the research literature of a given category (Briner et al., 2009). In short, we hope to paint a representative landscape of the current fintech literature base to influence the direction of future research efforts in this important area of study.

To examine the current state of research on fintech in the top Finance and IS journals, the authors conducted a literature review and analysis in three phases. Phase 1 accumulated a representative pool of articles. Phase 2 classified the articles by research method. Phase 3 classified the research by topic. Each of the three phases is discussed in the following paragraphs.

Phase 1: Accumulation of article pool

We used the Web of Science (WoS) citation database, Scopus citation database, and Google Scholar to search for research articles with a focus on fintech. The search parameters were constrained based on (a) a list of top ranked journals, (b) a specific time range, and (c) key search terms. Figure 1 illustrates steps in the content analysis process adapted from Neuendorf (2002) and successfully employed by several similar research studies in Internet marketing (Corley et al., 2013), Business Intelligence (Jourdan et al., 2008), and Enterprise Resource Planning systems (Cumbie et al., 2005).

First, the researchers chose to use the journals from the Australian Business Dean's Council ABDC list (ABDC, 2019). Then, we filtered the ranking of journals to include only Finance (Code 1502) and collected the list of A* (see Table 2), A (see Table 3), and B (see Table 4) journals. Then, we filtered the ranking of journals to include only Information Systems (Code 0806) and collected the list of A* (see Table 5), A (see Table 6), and B (see Table 7) journals. Many of the Finance and IS journals in the sample contained no fintech articles and were deleted from the tables.

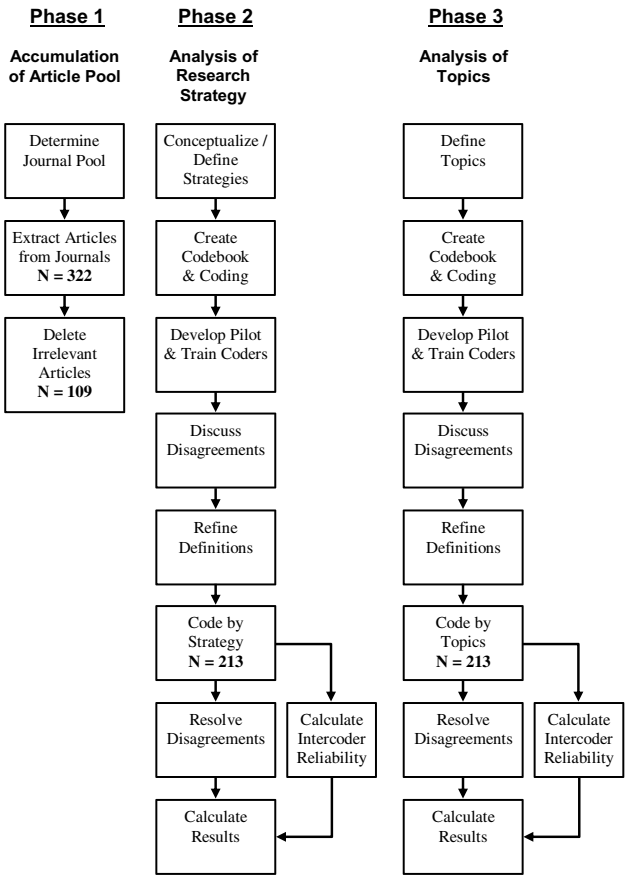

Fig. 1 Overview of literature analysis

Table 2 Number of fintech articles in A* Finance journals

A* Finance journals	#
Journal of Banking & Finance	2
Journal of Corporate Finance	5
Journal of Financial and Quantitative Analysis	2
Journal of Financial Economics	3
Journal of Financial Intermediation	1
Review of Finance	1
The Review of Financial Studies	4
Number of Articles	**18**

Table 3 Number of fintech articles in A Finance journals

A Finance journals	#
Australian Journal of Management	1
Emerging Markets Review	1
European Financial Management	1
Finance Research Letters	9
Financial Management	3
International Journal of Managerial Finance	1
International Review of Economics & Finance	1
International Review of Finance	1
International Review of Financial Analysis	4
Journal of Applied Corporate Finance	1
Journal of Behavioral and Experimental Finance	4
Journal of Empirical Finance	3
Journal of Financial Services Research	1
Journal of International Financial Markets, Institutions and Money	3
Pacific-Basin Finance Journal	5
Quantitative Finance	1
The European Journal of Finance	9
Number of articles	**49**

Table 4 Number of fintech articles in B Finance journals

B Finance journals	#
Asia-Pacific Journal of Financial Studies	2
Emerging Markets Finance and Trade	4
Financial History Review	1
Financial Markets and Portfolio Management	1
International Journal of Finance & Economics	4
International Journal of Financial Studies	4
International Journal of Islamic and Middle Eastern Finance and Management	5
Investment Analysts Journal	1
Investment Management and Financial Innovations	11
JASSA: The Finsia Journal of Applied Finance	1
Journal of Insurance Issues	1
Journal of Investing	1
Journal of Multinational Financial Management	1
Journal of Risk and Financial Management	11
Managerial Finance	4
Qualitative Research in Financial Markets	7
Research in International Business and Finance	5
Risks	6
The Geneva Papers on Risk and Insurance—Issues and Practice	1
The Journal of Alternative Investments	2
The Journal of Asset Management	1
The Journal of Risk Finance	3
The Journal of Wealth Management	1
Venture Capital	1
Number of articles	**79**

Table 5 Number of fintech articles in A* Information Systems journals

A* Information Systems journals	#
Decision Support Systems	1
European Journal of Information Systems	1
Information & Management	1
Information Systems Journal	2
Information Systems Research	4
International Journal of Information Management	2
Journal of Information Technology	1
Journal of Management Information Systems	8
Journal of Strategic Information Systems	1
Journal of the Association for Information Systems	2
MIS Quarterly	1
Number of articles	**24**

The search parameters were further constrained to a specific timeframe. As previously discussed, the term fintech was first coined by Citicorp in 1993 (Schueffel, 2016). The search parameters were further constrained based on the historical timeframe in which technologies capable of facilitating the Finance function were first introduced, and the years of publications for articles in our search sample were constrained to the years of 2002 through December of 2021.

The final constraint was based on the key search term "fintech." In WoS, Scopus, and Google Scholar the search engine scanned for the term "fintech" and close variations of this term found in the title, abstract, and keywords of articles published in the top Finance journals between January of 2002 and December of 2021 when the search was executed. There was a considerable overlap in the pool of articles returned from the three search engines (WoS, SCOPUS, and Google Scholar). Of the 322 (227 Finance and 95 IS) total articles in the initial search, 83 articles (67 Finance and 16 IS) were removed because the articles' publication year was 2022. This further shows the explosive

Table 6 Number of fintech articles in A Information Systems journals

A Information Systems journals	#
Business & Information Systems Engineering	1
Communications of the ACM	1
Computers & Security	1
Electronic Markets	7
Enterprise Information Systems	1
Industrial Management & Data Systems	6
Information Systems Frontiers	2
Information Technology & People	1
International Journal of Electronic Commerce	1
Internet Research	1
Journal of Computer Information Systems	1
Journal of Enterprise Information Management	2
Knowledge-Based Systems	1
Number of articles	**26**

Table 7 Number of fintech articles in B Information Systems journals

B Information Systems journals	#
Business Process Management Journal	1
Digital Policy Regulation and Governance	2
Information and Computer Security	1
Information Processing & Management	2
Information Systems and e-Business Management	3
Information Technology for Development	1
International Journal of Human-Computer Interaction	1
International Journal of Web Based Communities	1
Journal of Systems and Information Technology	3
Journal of Theoretical and Applied Electronic Commerce Research	4
Science Technology and Society	1
Number of articles	**20**

growth of this research topic's popularity as the search was conducted in late February of 2022. Once duplicate entries and non-research articles (book reviews, editorials, commentary, etc.) were removed, another 26 (17 Finance and 9 IS) articles were removed. As a result of this process, 216 (146 Finance and 70 IS) articles remained in the composite data pool for analysis. All 216 article files were collected in Adobe Acrobat PDF format and loaded into NVivo 11 to run a word frequency query of the content without numbers and extemporaneous words (i.e. "a," "and," "the," etc.). Figure 2 shows the word cloud that resulted from this query.

Phase 2: Classification by research strategy

Once the researchers identified the articles for the final data pool, each article was examined and categorized according

Fig. 2 Word cloud of fintech research created in NVivo

to its research strategy. Due to the subjective nature of research strategy classification, content analysis methods were used for the categorization process (Neuendorf, 2017).

First, the research categories were adopted from Scandura and Williams (2000) (see Table 8), who extended the research strategies initially described by McGrath (1982). Specifically, nine categories of business research strategies were selected including: Formal theory/literature reviews, sample survey, laboratory experiment, experimental simulation, field study (primary data), field study (secondary data), field experiment, judgment task, and computer simulation.

Second, to guard against the threats to reliability (Neuendorf, 2017), we performed a pilot test on articles not included in the final data pool for this study. Researchers independently categorized the articles in the pilot test based on the best fit among the nine research strategies. After all articles in the pilot test were categorized, the researchers compared their analyses. In instances where the independent categorizations did not match, the researchers re-evaluated the article collaboratively by reviewing the research category definitions, discussing the disagreement thoroughly, and collaboratively assigning the article to a single category. This process allowed the researchers to develop a collaborative interpretation of the research category definitions. This pilot test served as a training session for accurately categorizing the articles for this study.

Each research strategy is defined by a specific design approach, and each is also associated with certain tradeoffs that researchers must make when designing a study. These tradeoffs are inherent flaws that limit the conclusions that can

Table 8 Fintech research strategies fromScandura and Williams (2000)

Research strategy	Definition
Formal theory/lit review	For the first research strategy, formal theory and literature reviews were combined. In both approaches, researchers often summarize the literature in an area of research in order to conceptualize models for empirical testing
Sample survey	The sample survey maximizes the representative sampling of the population units studied. If other research strategies are used in addition to surveys, the article is classified as a primary field study
Lab experiment	The laboratory experiment brings participants into an artificial setting for research purposes. An attempt is usually made to create a universal setting that will not have a significant effect on the results
Experimental simulation	Experimental simulation refers to a situation contrived by the researcher in which there is an attempt to retain some realism of context through use of simulated situations or scenarios (McGrath, 1982)
Field—primary	The field study investigates behavior in its natural setting. Obtrusive primary data collections involve data that are collected by researchers. This strategy frequently combines a variety of other strategies
Field—secondary	Field studies that use secondary data (data collected by a person, agency, or organization other than the researchers) are archival studies. Archival studies might include meta
Field experiment	A field experiment involves collecting data in a field setting but manipulating behavioral variables
Judgment task	In judgment tasks, participants judge or rate behaviors. Sampling is systematic rather than representative, and the setting is contrived
Computer simulation	Computer simulation involves artificial data creation or simulation of a process. One method used is the Monte Carlo method, a technique in which an estimate of a parameter is obtained by random sampling

be drawn from a particular research strategy. These tradeoffs refer to three aspects of a study that can vary depending on the research strategy employed. These variable aspects include generalizability from the sample to the target population (external validity), precision in measurement and control of behavioral variables (internal and construct validity), and the issue of realism of context (Scandura & Williams, 2000).

Campbell and Cook (1976) stated that a study has generalizability when the study has external validity across times, settings, and individuals. Formal theory/literature reviews and sample surveys have a high degree of generalizability by establishing the relationship between two constructs and illustrating that this relationship has external validity. A research strategy that has low external validity, but high internal validity is a benefit of the laboratory experiment. In the laboratory experiment, where the degree of measurement precision is high, cause and effect relationships may be determined, but these relationships may not be generalizable for other times, settings, and populations. While the formal theory/literature reviews and sample surveys have a high degree of generalizability and the laboratory experiment has a high degree of precision of measurement, these strategies have low degree of contextual realism. The only two strategies that maximize degree of contextual realism are field studies that use either primary or secondary data because the data is collected in an organizational setting (Scandura & Williams, 2000). The other four strategies maximize neither generalizability, nor degree of precision in measurement, nor degree of contextual realism. This point illustrates the futility of using only one strategy when conducting fintech research. Because no single strategy can maximize all types of validity, it is best for researchers to use a variety of research strategies.

Two coders independently reviewed and classified each article according to research strategy. Only a few articles were reviewed at one sitting to minimize coder fatigue and thus protect intercoder reliability (Neuendorf, 2017). Upon completion of the classification process, agreements and disagreements were tabulated. The percent agreement was 87.5% ($N=216$). Then, intercoder reliability ($\kappa=0.874$) using Cohen's Kappa (Cohen, 1960) and Krippendorf's Alpha (Krippendorff, 2013) for each methodology ($\alpha=0.859$) was calculated. Neuendorf (2017) suggests that a Cohen's kappa greater than 0.800 is considered acceptable. Krippendorff (2013) stated that researchers could use reliability scores greater than 0.800. Therefore, the calculations for intercoder reliability were well within the acceptable ranges. We calculated the reliability measures prior to discussing disagreements as mandated by Weber (1990). If the original reviewers did not agree on how a particular article was coded, a third reviewer arbitrated the discussion of how the disputed article was to be coded. This process resolved the disputes in all cases.

Phase 3: Categorization by fintech research topic

Typically, the process of categorizing research articles by a specific research topic involves an iterative cycle of brainstorming and discussion sessions among the researchers. This iterative process helps to identify common themes within the data pool of articles. Through the collaborative discussions during this process researchers can synthesize a hierarchical structure within the literature of overarching research topics and more granular level subtopics. The outcome is a better understanding of the current state of a particular stream of research. This

iterative process was modified for this specific study on the topic of fintech.

This process resulted in four research topics: Enhance, Impact, Innovate, and Research. The Enhance topic was research that investigates how traditional financial products and services are implemented and improved by using fintech. Examples include using fintech to improve the traditional activities of making personal consumer loans (Di Maggio & Yao, 2021; Gerrans et al., 2021), analyzing the creditworthiness of borrowers (Jagtiani & Lemieux, 2019), and enhancing customer experience in traditional wealth management (Kim et al., 2020). The Impact topic analyses fintech's influence on industries, governments, and economies and includes the impact of technology on banking industry misconduct (Bertsch et al., 2020), fragility of financial institutions that use various technologies (Fung et al., 2020), how various technologies are affecting the insurance industry (Stoeckli et al., 2018), and the new regulatory models necessary from fintech (Jiang et al., 2021). The Innovate topic explores financial products and services that were created by or made possible by the implementation of fintech with financial products and services such as blockchain, initial coin offerings (ICOs), and cryptocurrencies (Zhao et al., 2021), digital tokens (Benedetti & Nikbakht, 2021), peer to peer lending (Fu, Huang, & Singh, 2021), mobile payments (Du, 2018), crowdfunding (Lin & Pursiainen, 2021), and the analysis of the new business models created by innovations in fintech (Gomber, Kauffman, Parker, & Weber, 2018). The Research topic illustrates the importance and impact of fintech on individuals and society up to and including research on fintech itself. Research that represents this topic include financial literacy (Philippas & Avdoulas, 2020), financial inclusion (Hua & Huang, 2021; Kanga et al., 2021; Senyo, Osabutey, & Kan, 2021), the use of fintech as a research tool (Bradbury et al., 2019), and research on the concept of fintech itself (Bollaert et al., 2021). The authors used these four topics to successfully categorize all 216 articles in the research sample.

To guard against the threats to reliability (Neuendorf, 2017), we once again performed a pilot test on articles not included in the final data pool for this study. Following the adoption of the four research topics, this second pilot study was used as a training session for categorizing articles by research topic. Researchers independently categorized the articles in the pilot test based on the best fit among the four research topics. After all articles in the pilot test were categorized, the researchers compared their analyses. In instances where the independent categorizations did not match, the researchers re-evaluated the article collaboratively by reviewing the research category definitions, discussing the disagreement thoroughly, and collaboratively assigning the article to a single category. This process allowed the researchers to develop a collaborative interpretation of the research topic definitions (see Table 9). Once we established the topic definitions, we independently placed each article in one fintech category. As before, we categorized only a few articles at a time to minimize coder fatigue and thus protect intercoder reliability (Neuendorf, 2017).

Upon completion of the classification process, agreements and disagreements were tabulated. The percent agreement was 86.1% ($N=216$). Then, intercoder reliability ($\kappa=0.860$) using Cohen's Kappa (Cohen, 1960) and Krippendorf's Alpha (Krippendorff, 2013) for each methodology ($\alpha=0.815$) was calculated. Neuendorf (2017) suggests that a Cohen's kappa greater than 0.800 is considered acceptable. Krippendorff (2013) stated that researchers could use reliability scores greater than 0.800. Therefore, the calculations for intercoder reliability were well within the acceptable ranges. We calculated the reliability measures prior to discussing disagreements as mandated by Weber (1990). If the original reviewers did not agree on how a particular article was coded, a third reviewer arbitrated the discussion of how the disputed article was to be coded. This process resolved the disputes in all cases.

Results

To identify gaps and needs in the research (Webster & Watson, 2002), we hope to paint a representative landscape of the current fintech literature base. To examine the current state of this research, the authors conducted a literature review and analysis in three phases. Phase 1 accumulated a representative pool of fintech articles, and the articles were then analyzed with respect to year of publication, journal, and author. Phase 2 briefly discussed the research strategies

Table 9 Fintech research topics

Topic	Definition
Enhance	Investigates how traditional financial products and services are implemented and improved by using fintech
Impact	Analyzes fintech's influence on industries, governments, and economies
Innovate	Explores financial products and services that were created by or made possible by the implementation of fintech
Research	Illustrates the importance and impact of fintech on individuals and society up to and including research on fintech itself

set forth by Scandura and Williams (2000) and the results of the classification of the articles by those research strategies. Phase 3 involved the creation and use of four fintech topics, a short discussion of each topic, and the results of the classification of each article within the research topics. These results are discussed in the following paragraphs.

Results of Phase 1

Using the described search criteria within the selected journals, we collected a total of 216 articles. For the complete list of Finance articles in our sample ($N=146$), see Appendix 1. For the complete list of Information Systems articles in our sample ($N=70$), see Appendix 2. In phase 1, we further analyzed the articles' year of publication, journal, and author. Figure 3 shows the number of articles per year in our sample. Although no articles were collected prior to 2016, there is a dramatically increasing trend over the 6-year period of 2016 through 2021. From 2020 to 2021, the number of articles more than doubled, with $N=52$ in 2020 and $N=105$ in 2021. With fintech issues becoming ever more important to researchers and practitioners, this drastic increase comes as no surprise.

We analyzed the productivity of authors who published in this line of research by assigning scores based on each author's share of each article. For projects with multiple authors, each co-author was given an equal share of the credit. An author who published an article alone was assigned a score of 1.0. For a two-author article, each author earned a score of 0.500, three authors shared 0.333, and so on. Authorship order was not calculated into this formula. We totaled the scores for each Finance author, then ranked the authors according to their totaled scores in descending order. The results of the top 43 fintech authors in Finance are displayed in Table 10. This system rewards both quantity of research and ownership of research. The top ranked Finance researcher (Schwienbacher, A.) and the second ranked research (Selim, M.) both had a sole-author paper and co-authorship on another article in the Finance sample. All others who wrote a sole-author research article tied for third place. All of the remaining authors in this list co-authored more than one fintech research article published in Finance, so their scores are above 0.500.

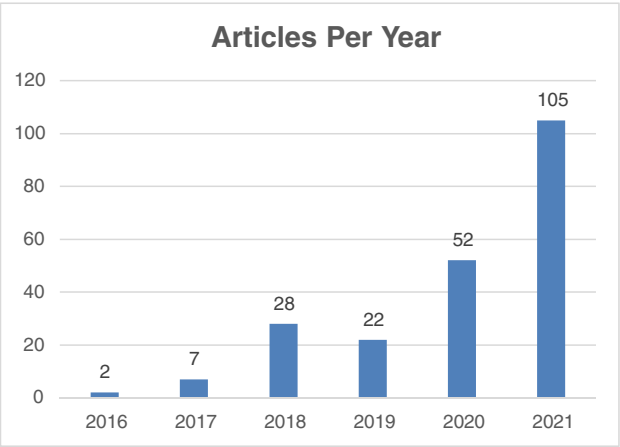

Fig. 3 Number of fintech articles published per year

Similarly, the scores for each Information Systems author were totaled, and the authors were sorted from highest to lowest scores. The results of the top 13 fintech authors in the Information Systems sample are displayed in Table 11. This system rewards both quantity of research and ownership of research. The top ranked researcher (Gozman, D.) had co-authorship on many articles in the Information Systems sample. All the second-ranked authors had a sole author paper (score = 1.0). The remaining authors who had a score greater than 0.500 were also ranked in the sample. A score greater than 0.500 indicates having more than one co-authorship in the sample.

Table 10 Fintech finance authors ranked by score

Author	Score	Rank	Author	Score	Rank
Schwienbacher, A	1.333	**1**	Hassan, M. K	0.833	**4**
Selim, M	1.25	**2**	Johan, S	0.833	
Ascarya, A	1	**3**	Yarovaya, L	0.833	
Baber, H	1		Zhang, J	0.75	**5**
Chong, F. H. L	1		Zhang, X	0.75	
Chuen, D. L. K	1		Ahmed, S	0.667	**6**
Das, S. R	1		Sapkota, N	0.667	
Elsaid, H. M	1		Grobys, K	0.666	
Gonzalez, L	1		Talavera, O	0.585	**7**
Grabowski, M	1		Caglayan, M	0.583	
Harasim, J	1		Corbet, S	0.583	
Hudaefi, F. A	1		Kuvvet, E	0.583	
Huibers, F	1		Bhatia, A	0.533	**8**
Iman, N	1		Chandani, A	0.533	
Koziuk, V	1		Li, J. P	0.533	
Leinweber, D	1		Yao, Y. H	0.533	
Loo, M. K. L	1				
Mhlanga, D	1				
Miglo, A	1				
Ozili, P. K	1				
Santosa, P. W	1				
Semko, R	1				
Sheng, T. X	1				
Shrestha, K	1				
Stulz, R. M	1				
Tantri, P	1				
Thakor, A. V	1				

Table 11 Fintech information systems authors ranked by score

Author	Score	Rank
Gozman, D	1.166	1
Du, K	1	2
Haitao, S	1	
Ozili, P. K	1	
Puschmann, T	1	
Ryu, H. S	1	
Ben, S	0.833	3
Wang, Z	0.833	
Tan, B	0.7	4
Huang, Y	0.666	5
Kauffman, R. J	0.583	6
Senyo, P. K	0.583	
Sun, Y	0.533	7

Results of Phase 2

The results of the categorization of the 216 articles according to the nine research strategies described by Scandura and Williams (2000) are summarized in Table 12. Of the 216 articles, 104 articles (48.15%) were classified as Field Study—Secondary Data making this category the most used research strategy. With 62 articles (28.70%), Formal Theory/Literature Review was the second most prevalent research strategy. Following were Sample Survey with 23 articles (10.65%) and Field Study—Primary Data with 20 articles (9.26%). The remaining categories had three or fewer articles. These top four research strategies composed of 96.76% of the articles in the sample. No articles were classified as a Judgment Task nor a Field Experiment. These four strategies are exploratory in nature and indicate the beginnings of a body of research (Scandura & Williams, 2000). Further categorization and analysis of the articles with respect to fintech topic categories were conducted in the third phase of this research project.

Table 12 Articles per fintech research strategy

Research strategy	#	%
Formal theory/lit r0065view	62	28.70%
Sample survey	23	10.65%
Lab experiment	2	0.93%
Experimental simulation	3	1.39%
Field—primary	20	9.26%
Field—secondary	104	48.15%
Field experiment	0	0.00%
Judgment task	0	0.00%
Computer simulation	2	0.93%
	216	**100.00%**

Results of Phase 3

Table 13 shows the number of articles per fintech research topic category. These four categories provided a topic area classification for all the 216 articles in our research sample. Of the 216 articles, 38.43% were classified as "Research," making it the most prevalent fintech topic category. This result is not surprising because the content analyzed was collected from research publishing outlets. Closely following were "Impact" and "Innovate" (21.76%) tying for second place. "Enhance" was the least popular with 18.06% of the articles. These four research strategies accounted for 100% of the articles in the sample. This illustration of the share of fintech research that is represented by each topic reveals the amount of attention fintech is receiving in Finance journals across a new, yet diverse, research stream.

Fintech research strategies versus topics

By plotting fintech research topics against research strategies (Table 14), many of the gaps in fintech research are exposed. In our minds, these gaps exist for two reasons. First, some of these research strategies are not prevalent in Finance and IS research. Because some top research journals do not accept papers that use non-traditional or qualitative research strategies, researchers tend to avoid unorthodox strategies. Second, some of these categories have not been studied because they represent a relatively new phenomenon, of which the research has not caught up with the business reality. The great news for researchers interested in fintech is that this domain should provide research opportunities for years to come.

Almost half (48.15%) of the journal articles in this study use the Field Study—Secondary Data research strategy across all research topics. Therefore, classifying the sources of the secondary data used in this research may be valuable for new researchers by providing them insights and sources for future research. The use of Formal Theory/Literature Review (28.7%) and Sample Survey (10.65%) research strategies indicates the exploratory nature of the current state of fintech research. We speculate four reasons for the top three strategies used to study fintech to be prevalent and appropriate for the early stages of research. First, secondary data is common in Finance research with the common practice

Table 13 Articles per fintech research topic

Topic	#	%
Enhance	39	18.06%
Impact	47	21.76%
Innovate	47	21.76%
Research	83	38.43%
	216	100.0%

Table 14 Fintech research strategies vs. topics

	Fintech categories					
Research strategy	Enhance	Impact	Innovate	Research	Total	%
FT/LR	8	17	6	31	**62**	**28.70%**
Sample survey	4	2	2	15	**23**	**10.65%**
Lab experiment			1	1	**2**	**0.93%**
Exp. simulation		1	1	1	**3**	**2.04%**
Field—primary	3	6	8	3	**20**	**13.61%**
Field—secondary	24	21	29	30	**104**	**70.75%**
Field experiment					**0**	**0.00%**
Judgment task					**0**	**0.00%**
Comp. simulation				2	**2**	**1.36%**
Total	**39**	**47**	**47**	**83**	**216**	**100.00%**
Percentage	**18.06%**	**21.76%**	**21.76%**	**38.43%**	**100.00%**	

of using freely available data from financial markets. This abundance of financial data is augmented by the availability of premium financial information services as a source of data for research projects. Second, in these exploratory years of fintech research, formal theory/literature reviews are appropriate to determine what other strategies are being used in the research and to find reference disciplines that are conducting related research. Third, researchers in business schools tend to be more skilled in administering literature reviews, field studies (with primary and secondary data), and sample surveys than in the strategies of laboratory experiment, field experiments, experimental simulation, judgment task, and computer simulation. Finally, organizations are less likely to commit to certain strategies (e.g., primary field studies and field experiments) because these strategies are more expensive for the organizations. These types of research strategies are very labor intensive to the organization being studied because they require records to be examined, personnel to be interviewed, and senior managers to devote large amounts of their expensive time to help facilitate the research project.

Contributions

To date, no study has examined fintech research topics in words, content, or methodologies. The purpose of this study is to synthesize the methodologies and content of all fintech article from the past 20 year encompassing all journals on the Australian Business Deans list that have a rating of A*, A, and B. This study finds that the majority of fintech research has been conducted over the past 4 years, with the number of articles significantly increasing during that period. The majority of this research is focused on banking, credit, lending, and intermediaries. However, many other subjects are yet to be covered in a robust manner. Despite the proliferation of fintech research, there unfortunately is no standard set of best practices or methodological norms that researchers can use as of yet. Our findings show that fintech research is in its infancy.

Limitations

The current analysis of the fintech literature in this study has limitations and should be enhanced with future research efforts. Future literature reviews could expand article searches to full article text searches, search a broader domain of research outlets (such as adding the C journals in the ABDC journal list), and include other fintech related search terms. Our literature analysis is meant to serve as a representative sample of articles and not a comprehensive and exhaustive analysis of the entire population of articles published on the topic of fintech.

This study provided a content analysis of the current state of the research with respect to research strategy and topic at the journals on the ABDC list. Other publication outlets may be publishing greater quantities of fintech research with similar quality as the journals in our sample.

Directions for future research

For researchers to continue to attempt to answer the important questions in fintech, future studies need to employ a wider variety of research strategies to investigate these important issues. Scandura and Williams (2000) stated that looking at research strategies employed over time by triangulation in each subject area can provide useful insights into how theories are developing. In addition to the lack of variety in research strategy, very little triangulation has occurred during the timeframe used to conduct this literature review. This absence of coordinated theory development causes the research in fintech to appear haphazard and unfocused.

Clearly, future studies should consider the identified gaps and consider the future research role relative to generalizability, precision of measure, and realism of context.

Future efforts should also consider the four research topics with respect to the research strategies. To further investigate this body of research, future studies could explore the fintech topics in depth by creating subtopics within the four topics in the study. For example, fintech will be deployed by organizations to improve their current business processes for future study under the Enhance topic. For the Impact, many of these fintech modalities have not been in place long enough for researchers, practitioners, governments, and other stakeholders to collect analyze data on how industries, governments, and economies are affected on a short or long-time horizon. As previously unknown business models and technologies combine fintech and artificial intelligence, new opportunities for research will be presented for researchers and practitioners alike to explore Innovate topic. As the number and quality of research grows in Enhance, Impact, and Innovate grows, this will give researchers in disciplines as varied as Economics, Engineering, Psychology, Sociology, and others to contribute to the research body of fintech and how this concept is progressing across time and a variety of research streams.

Future studies could take a more in-depth look at the various business models or fintech strategies associated with this research stream. Moreover, much of the research in our sample reports the new technologies and issues in fintech without attempting to explain the fundamental issues of the technology implemented or the effects of these technologies on individuals, organizations, and society. This is to be expected in the exploratory stages of research in a subject area.

Conclusion

This study used the content analysis methodology to create a current, cross-disciplinary image of the current state of fintech research in the top Finance and Information Systems journals across time, research strategy, and topic to classify this concept of financial technologies. Further, this study illustrates the future potential of fintech domain across both research strategy and topic. Despite the efforts of the researchers in the article sample, fintech is in the beginning stages of the research stream. The bad news is that much research needs to take place in this domain using a variety of research strategies over time to develop best practices for practitioners and theory for the research domain. In this sample, most of the research had been published in the previous four years, and the good news for researchers and practitioners alike is that many of the topics and research strategies in this research are open for future research efforts including some research strategy and topic areas that are completely unresearched (Table 14). As more practitioners deploy more fintech modalities, researchers will have the opportunity to create even more novel and rigorous research studies. We hope that this content analysis has laid the foundation for such efforts that will enhance the body of knowledge and theoretical progression relative to fintech.

Appendix 1 Sample of 146 fintech finance articles

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Akyildirim, E., Corbet, S., Sensoy, A., & Yarovaya, L. (2020). The impact of blockchain related name changes on corporate performance. *Journal of Corporate Finance, 65*. https://doi.org/10.1016/j.jcorpfin.2020.101759

Akyildirim, E., Sensoy, A., Gulay, G., Corbet, S., & Salari, H. N. (2021). Big data analytics, order imbalance and the predictability of stock returns. *Journal of Multinational Financial Management, 62*. https://doi.org/10.1016/j.mulfin.2021.100717

Albarrak, M. S., & Alokley, S. A. (2021). Fintech: Ecosystem, opportunities and challenges in Saudi Arabia. *Journal of Risk and Financial Management, 14*(10). https://doi.org/10.3390/jrfm14100460

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Appendix 2 Sample of 70 Fintech IS articles

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