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Fintech Innovations in the Financial Service Industry

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Abstract: Digital transformation underscored by the fourth industrial revolution has led to the emergence of sophisticated technology-enabled financial services known as fintech, that has swiftly altered traditional financial services space. Global adoption of fintech is rapidly increasing due to its disruptive nature and is largely embraced by participants who are underserved by traditional financial service providers. Global investments in fintech are growing rapidly year by year owing to increased interconnectivity with the digital revolution. Fintech is expansive, engulfing a plethora of innovative applications in various services including payments, financing, asset management, insurance, etc. There exists a gap in the literature and visualization research on impact and future pathway of fintech innovations in payments and financial services and role of financial regulations. This study aims to enrich the understanding of fintech innovations in payments and financing and investigate the correlation and significance of regulatory framework in maintaining a fair ecosystem. With this objective, an extant systematic review was performed using research articles published in peer-reviewed journals for the period 2014–2022 when there has been a burgeoning of interest in 'fintech' globally. The findings of this study contribute to the theoretical constructs of fintech innovations in the financial services industry and show that such innovations play a crucial role in shaping the nature of future of business. The results of this study have implications for researchers who could deploy this research as a reference point to get a holistic insight and a detailed mapping of innovations in fintech.

Keywords: fintech; innovations; payments; financing; financial services

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1. Introduction

Fintech has influenced the overall economic growth in many countries. The new generation firms for both investment banking and retail trading have aptly coupled the power of internet and user-friendly smart phones. Banking apps have empowered customers to engage in digital technological transactions and shriveled banking protocols, largely making banks more approachable online than through traditional methods (Wang 2021). The fourth industrial revolution has created an emerging environment in which more disruptive and digital transformational technologies such as the Internet of Things, extended reality, artificial intelligence, etc., are changing our way of life (Schulte and Liu 2018). This revolution has also penetrated financial industry, leading to the emergence of fintech, predominantly characterized by the advent of technological innovations that help in developing new profitable business ideas related to financial services (Stern et al.

2017). Wonglimpiyarat (2017a) described fintech as financial services backed by technology that uses integrated IT to improve key performance. Compared to traditional financial services, fintech generates fast revenue, provides quality service and reduces expenses that reconfigure the financial industry, thus stabilizing the financial system (Shin and Choi 2019). A prompt adaptation from investigation stage to the application stage in the financial service industry was observed with technology integration, forecasting, and process optimizations in various finance activities serving as evidence (Kou 2020). Under fintech, almost every financial activity is being performed, such as applying for credit by bypassing a bank branch, raising capital to start a business, investment managements, and cashless payments.

Fintech firms are usually start-ups with small equity, being largely SMEs that have a clear knowledge of an innovative product or know how to improve an existing service (Saksonova and Kuzmina-Merlino 2017). Innovation has transformed the performance and product of various industries leading to increased profitability. Arner et al. (2016) conducted a literature review of articles published prior to 2015 on evolution of fintech, wherein they concluded that fintech 1.0 (1866–1967) was a transformation of digital practices from analog, fintech 2.0 (1967–2008) was growth of conventional digital financial services leading to digitalization as well as globalization of finance, fintech 3.0 (2008–present) is about making digital financial services available to all people. Other relevant review papers published from 2010 to 2019 give a similar explanation: (Alt et al. 2018; Das and Ali 2020; Gomber et al. 2018; Hua et al. 2019; Ng and Kwok 2017; Puschmann 2017; Wilamowicz 2019).

The significance of financial services grew multifold in the aftermath of the global financial crisis of 2008. Until then, traditional financial services were a bastion of safe employment and corporate stability (Gomber et al. 2018). Saksonova and Kuzmina-Merlino (2017) reported that the growth of fintech companies marked by the limitations of traditional banking system that have led consumers in catastrophic situations on the one hand and technological innovations leading to improved performance, customer experience and convenience on the other hand (Gassot et al. 2016; Haddad and Hornuf 2019; Haikel-Elsabeh et al. 2016; Soulé 2016). Traditional sources have failed to meet the diversified need of finance; these innovations in financing may have arisen in one part of the world, but they quickly diffused across the globe with varieties of options such as microfinance, venture capital, crowdfunding, peer to peer lending and SME stock exchange and other financial innovations (Drummer et al. 2017; Ibrahim 2018). However, growth and innovations in fintech are ever increasing leading to the unlocking of many hidden potential solutions to problems faced in the financial service industries (Lu 2018). The Internet has played a vital role in the rapid emergence of fintech and its expansion to unbanked sectors rendering financial services accessible to people in an easier way (Popkin 2019). An extant systematic review is needed for an in-depth analysis of innovations in fintech in financial services around the world. This study promises to lay out a brief theoretical basis on fintech innovations and regulations governing the same.

Fintech can be the game-changer for fast-developing economies of the world. Luo et al. (2022) find that application of the technologies in fintech has created efficiency at both customized and regional level. This study conducted in China revealed that fintech has stimulated a lot of innovation efficiency without affecting the R&D phase of the technology implementation. The results show that the fintech technology and household consumption are positively related in the territories of China. Growth in entrepreneurial innovation and income were two major outcomes of the fintech revolution.

Fintech has not replaced traditional financing but has resolved many complex issues that operated as barriers to accessibility of financial products by the needy population. The synergy of fintech power along with traditional finance methods have improved cash flow and positive growth especially during COVID pandemics (Zhang et al. 2022). Rabbani et al. (2021) in their research investigated the importance of fintech advancements that facilitated a faster recovery of economic aftershocks generated by COVID-19 pandemics.

Figure 1 provides a snapshot on the number of research articles being published in the field of fintech in the last one decade. It is evident that in the last few years fintech has become the most spelt buzz-word in the finance industry. Innovations in fintech enabled achievement of financial stability and social responsibility in a pandemic-struck world.

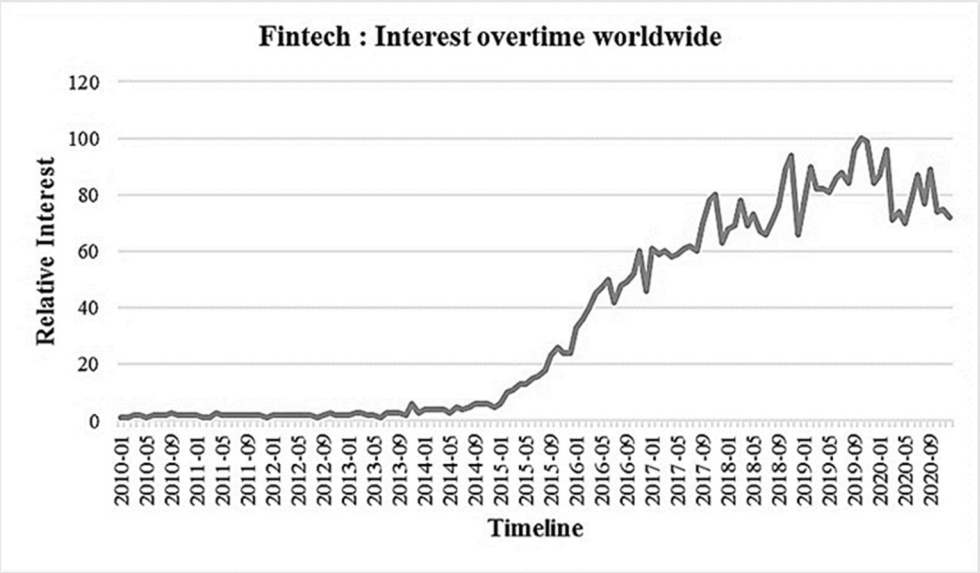

Figure 1. Worldwide interest over time for the term fintech. Source: Researchers' own source.

2. Methodology

A systematic literature review is usually adopted for research based on information systems and in analyzing the current trend of the research topic. A literature review serves as a foundation for building all types of research (Snyder 2019). A systematic review of literature protocol has been followed to develop an insight into the articles citing fintech innovations in the financial services industry. Systematic review seeks summarizing conceptual information from the available published articles and formulation of research questions for the study. The below stated steps were carefully adapted to assess that the literature confirms to and addresses the requirements of the study. At the preliminary stage research questions suitable to the title and purpose of the study were framed. Subsequently relevant research was conducted through electronic databases. The third stage was to critically evaluate the criteria for inclusion and exclusion of the articles those were collected for the research. The final stage was to review, aggregate and summarize the information from the included repository of published research articles. This scheme of methodical literature review is more expedient in creating a gold standard that obligates better than other approaches of review research (Davis et al. 2014).

2.1. Research Philosophy

The philosophy of research is the guideline that indicates the sources, compounds and application of research knowledge. Philosophy of research is the designed pathway to indicate on how data were accumulated, chronicled, summarized and applied to achieve the desired objectives (Holden and Lynch 2004). Bearing in mind the title and objectives of this research article, this study has amended interpretative philosophy to comprehend the insights of the articles allude to fintech innovations in the financial services industry.

2.2. Research Questions

A literature review based on specific research questions makes it a systematic literature review that helps to provide an in-depth understanding of the concept. This study tries to give an overview of innovations done by fintech in easing and smoothening the traditional

financial services, especially in financing and payments. This review study presents the following research questions:

RQ1. What are the fintech innovations in financing and payments in the financial service industry?

RQ2. What is the significance of regulatory framework in fintech innovation?

2.3. Strategies in Articles Selection

Articles published in English language in various databases such as EBSCO, ProQuest and Google Scholar, research articles were collected for a systematic review. Inclusion criteria involved articles that discussed fintech innovations in financial service industries. Considering exclusion criteria, articles were removed after careful examination of title, abstract and conclusion. The keywords used to retrieve research articles were "fintech innovations", "fintech regulations", "digital finance". Figure 2 explains that among 1023 articles those were retrieved, after removing duplicates, 772 records were eligible for the screening process. After general screening based on title and abstract, 346 records were left, and from that full-text articles assessed for eligibility were 235. The final sample consisted of 153 research articles with a core focus based on our objective.

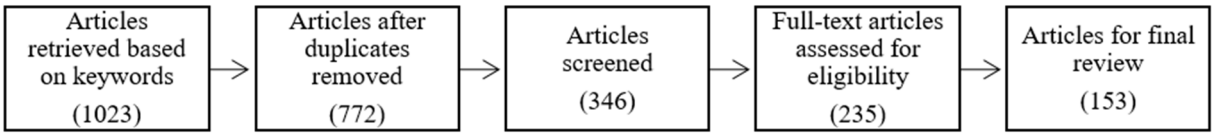

Figure 2. Article selection process. Source: Researchers' own source.

2.4. Research Gap

The study identified research questions based on the research gaps in the existing literature. Some of the niche segments of fintech still have a large room for research and development. Rabbani (2022) cites that fintech had been a great motivator for finance innovations amidst of COVID-19 pandemics that brought the world to a grinding halt and finances experienced a grueling loss all over the world. The state-of-the-art technology implementation in the select Islamic economies had solved many unique problems that existed in the industry. However, there is still a lot of scope for fintech literature inclusion in the financial sector of the select highly populated geographies all over the world. This study aims to address few key questions such as fintech innovations and its impact in the payments and financial services, technology transfers, financial regulations, etc., which are key driving factors in the industry. However, there is still shortage of literature analysis and visualization research to define the future pathway in the fintech field (Sun et al. 2022).

3. Result

Based on the systematic review of the published 153 research studies of fintech from 2014 to 2022, the key findings were reported based on the research questions.

3.1. RQ1: What Are the Fintech Innovations in Financing and Payments in Financial Service Industry?

Financial services usually refer to services offered by financial institutions such as banks to facilitate financial transactions and other related activities in the finance world. Leong and Sung (2018) noted that fintech uses innovative ideas to propose technology solutions that help in improving financial service according to different business situations, leading to new business approaches. Alt et al. (2018) report that fintech brings a new transformation in existing organizations by enhancing innovation in business models. A huge transformation of internal business activities into customer-centric models is observed at the internal organizational level (Puschmann 2017). Lee and Lee (2016) pointed out that financial services provided by fintech can be categorized into various service types such as payment, e-money, data analysis, platform, etc. Additionally, several papers have

discussed the innovations in financial services including, (Minto et al. 2017; Paripunyapat and Kraiwanit 2018; Petrushenko et al. 2018; Rühl and Zurdo 2020; Yin et al. 2019).

3.1.1. Financing

Financial crisis resulted in shortage of money and made many businesses struggle to obtain credit. Fintech recognized discrepancies in the market and designed a new method of funding/crediting (Golubić 2019). Various other innovative techniques were introduced by fintech in financing operations leading to a reduction in credit shortage around the world. Klein et al. (2020) provided evidence that the possibility to generate funding and venture quality characteristics are served by human capital and strategic assimilation of fintech. Leong and Sung (2018) stated that most of the alternative ways of financing in helping financing channels do not follow conventional procedures. The most popular and successful methods of fintech financing that are predominantly followed all over the world are crowdfunding and P2P lending. Start-ups build their own online platforms to provide the mentioned financing services.

A. Crowdfunding

Ibrahim (2018) defined crowdfunding as the process of raising capital for the purpose of financing commercial projects through online platforms by making collective decisions among a group of participants. Crowd test is a business concept of crowdfunding, in which entrepreneurs pitch their innovative idea to a crowd predominantly consisting of financiers (Borrero-Domínguez et al. 2020; Rossi and Vismara 2018; Zetzsche and Preiner 2018). Crowdfunding helps small business owners who are unable to borrow from banks due to lack of resources to raise funds, thus removing barriers to getting money to start their own business and reduces banking problems (Bruckner 2018; Ibrahim 2018; Martínez-Climent et al. 2018; Wonglimpiyarat 2017b).

The Crowdfunding ecosystem consists of a huge number of stakeholders, leading to the need for regulation which will help startups to enter the market and improve the growth of the economy (Abdullah and Oseni 2017; Lee and Kim 2015). Credibility and trust among the public are the major factors that the government must take into consideration before framing a regulation for crowdfunding to improve opportunities and to reduce risks (Ibrahim 2018; Martínez-Climent et al. 2018; Wonglimpiyarat 2017a). Costa-Climent and Martínez-Climent (2018) described that P2P lending as well as equity crowdfunding are emerging topics and generate a huge financial return. Investors who are going to invest money in crowdfunding need to consider the project type as it determines the favorable outcome (Borrero-Domínguez et al. 2020). Other relevant scholarly articles published from 2014 to 2020 having a similar explanation are (Abdullah and Oseni 2017; Gomber et al. 2017; Ibrahim 2018; Rao and Anand 2019; Venturelli et al. 2020; Wonglimpiyarat 2017a).

The growth of crowdfunding platforms depends upon the type of services and the nature of participants they provide to the key stakeholders. For example, Rossi and Vismara (2018) noted that the investment based crowdfunding platform should offer post-campaign services to the demand side participants to increase their interest and number of future campaigns. In addition, Venturelli et al. (2020) also noted that the amount invested is being affected by ethnic and gender similarity on both sides of the platform, investors and entrepreneurs.

B. Peer-to-Peer (P2P) Lending

P2P (Peer-to-Peer) Lending is described as a money lending service practiced through online platforms that helps in matching lenders directly to borrowers (Adriana and Dhewantoa 2018; Stern et al. 2017). Increasing capital via P2P lending helps in reducing various transaction costs due to the utilization of innovative communication technologies and in this way many investors get a chance to contribute some funds (Gomber et al. 2018; Huang 2018; Rosavina et al. 2019). Loan default rate is one of the risks involved in P2P lending that depends on two factors: loan terms and conditions and characteristics of

borrower and thus need regulations to balance the risks and return (Funke et al. 2019; Lee 2020; Marot et al. 2017). P2P lending is adopted in a significant rate due to the increase in the mobile phone users in the country, as it notably impacts business growth (Stern et al. 2017). Investors who invest money in this platform are subjected to high risks but are compensated by high returns which improve their portfolio efficiency (Marot et al. 2017). The expansion of P2P lending platforms affects the performance of banks, as this platform penetrates the unbanked sectors and covers more people compared to banks (Funke et al. 2019; Yeo and Jun 2020). The COVID-19 pandemic has switched old market philosophies with turn-around strategies such as P2P lending platforms which are inclusive financing strategies for rural borrowers who otherwise have limited access to finance (Najaf et al. 2022). Fintech P2P lending has begun as the most viable alternative method to traditional banking finance system in the world.

3.1.2. Payments

Payments are practiced as an act of transferring value in the form of currency or valuable things from one person to another due to an obligation in a contract. The traditional way of payments needs fiat currencies and physical locations to takes place, whereas fintech removes various formalities in a payment process. Fintech aided with smart phones and easy technologies has made financial services such as digital payments efficient and swift in the recent years. The advantage of fintech is that users do not require any financial literacy to utilize any of the fintech technologies which is the unique feature as compared to any other transitional parameters. The support from governmental system and the basic understanding of risk diversification have played the triumph card for the fintech advancements (Nathan et al. 2022)

Fintech provides payments services digitally through online platforms, which serves a huge business need in the market (Lee and Teo 2015; Lee and Lee 2016; Romanova et al. 2018; Soutter et al. 2019). Fintech payments serve people across various income levels and transaction values vary accordingly (Teja 2017). The reason for the adoption of digital payment systems by customers depends on many factors, which influence the success rate of fintech payment models (Eka Putri et al. 2019; Golubić 2019). The development of innovative technologies has made transactions amazingly fast and easy and results in the development of innovative methods of practicing prevailing functions digitally (Dermaku 2018; Vanatta 2018).

Various innovative ways ensure that fintech differs from traditional payment methods in speed, ease, and availability. The payment sector is predominantly dominating the financial sector as the number of transactions happening daily increases due to digitization and leads to a cashless economy (Azali 2016). The payment systems followed by banks are outdated and less innovative; they need to find some solutions to overcome this problem (Hendriyani and Raharja 2019; Rosavina et al. 2019; Soutter et al. 2019).

Fintech payments help in creating huge opportunities for many startups to start a new business model, which would further help in attaining new customers in this payment segment (Raharja et al. 2020). Regarding digital payments and the benefits for startups, several case studies were conducted to understand the actual status of payment systems (Altamirano and Beers 2018; Hendriyani and Raharja 2019; Kang 2018; Lee and Lee 2016; Olsen et al. 2018; Son and Kim 2018).

Chen et al. (2022) cite in their article that Fintech Exchange Traded Fund (ETF) has a fast-growing phase compared with the traditional ETF, which is still the dominant sector in the finance industry. At the same time, Fintech ETF has proven itself to be less volatile and a more stable mechanism that the traditional methods, especially in times of global crisis and financial turbulence.

A. Mobile Payments

Mobile users and use of smartphones are increasing steadily globally given the enhanced functions and features of smartphones. A smartphone has become a prerequisite

to the deployability and performance of various financial activities (Kang 2018). As such, participation of certain firms in this business is highly influenced by certain factors such as IT solutions and organizational pressure (Du 2018). Coffie et al. (2020) stated that financial accessibility is a critical factor for the enhancement of financial inclusion by mobile payments that helps in filling the gap created by limitation of physical banking. Kang (2018) reported that the fintech mobile payment services are exposed to various risks and certain requirements are needed to fulfill to maintain integrity and privacy. In addition, Choi and Park (2019) stated that the level of uncertainties in mobile payments can be reduced by abiding by the stringent framework of Payment Directive Service, which results in decentralization in the payment network. Customer data is very sensitive to any hackers in the transaction system who indulge in unethical practices (Lu 2018). Firms need to be incredibly careful in such areas as the major SMEs in developing countries expect to use this mobile payment as an alternative to the stringent banking system (Talom and Tengeh 2020).

Customer satisfaction upon using the mobile system depends upon perceived usefulness that they attain and on security. This has motivated customers to keep up social mobile payments (Nan et al. 2020). Malala (2017) argued that regulations help in addressing various legal transactions and have made payment services reach various segments of the economy. This ensures that the people in an informal economy who are unable to make mobile payments would get an opportunity to get into this formal service (Duma and Gligor 2018; Romanova et al. 2018; Soutter et al. 2019). The parties usually involved in a mobile payment are merchants, individuals or a group of individuals (Du 2018; Lee and Lee 2016; Nahata 2018). Major crucial requirements to improve mobile payment operations are convenience and compatibility. Gomber et al. (2018) also reported that mobile phone users initially focused on using prevalent online banking opportunities but there is a shift towards new apps for various payment structures. These payment structures are cash, payment via cards and checks. Šerėjienė et al. (2019) suggested that mobile financial apps integrated with accounts of different banks, Near Field Communication (NFC) and smart budget planner improved security by using biometric data. Soutter et al. (2019) stated that mobile money, electronic money, P2P payments, digital currency and the advanced technology of blockchain, a part of Distributed Ledger technology and so on are classified as fintech payments (Pang et al. 2020; Weech-Maldonado et al. 2014).

B. Alternate Payments–Blockchain

Blockchain is an electronic payment system where the security of payment is ensured irrespective of the participants in the transaction (Sangwan et al. 2019). Blockchain is a type of Distributed Ledger Technology (DLT) that occupies a permanent spot in finance industry by enhancing cryptocurrency technology and other technologies with essential implementation in financial services. A substantial number of studies on Blockchain also discussed it, (Andersen and Bogusz 2019; Cai 2018; Daj 2018; Denisova et al. 2019; Gomber et al. 2018; Medeiros and Chau 2016; Olsen et al. 2018; Singh et al. 2019; Xu et al. 2019; Yin et al. 2019; Zalan 2018). The potential functionality of blockchain poses serious competition for the banking industry, as they are finding it difficult to formulate a strategy that guides distribution of technology (Grover et al. 2019; Harris and Wonglimpiyarat 2019). Blockchain helps in providing a virtual currency payment system that can be accessed by websites boosting the economy (Henly et al. 2018; Manta and Pop 2017). Blockchain adoption rate in various countries depends on several organizational factors. Organizational readiness, culture, and management support are considered as the top three factors for any IT firm to consider blockchain adoption significantly (Clohessy and Acton 2019). The ethical issues of blockchain are explained using UTAR (Understanding, Technology, Application, Regulation) principle, where all the variables need to be standardized (Tang et al. 2019). For a business model to benefit from blockchain, which in turn benefits the economy, certain characteristics such as customer values, logics, and maintenance, disruptive innovation

and so on are taken into consideration (Da Silva Momo et al. 2018; Swan 2017; Tseng et al. 2018).

Large corporate companies using blockchain to disclose transaction details to the investors to provide a decentralized and transparent way of checking capital usage (Umarovich et al. 2017). Initial coin offering is a method for blockchain startup companies to increase their revenue for business operations (Tönnissen et al. 2020; Boreiko and Vidusso 2019). Smart contracts are often used by blockchain firms to automatically execute any contracts (Daj 2018; Fandl 2020; Van der Elst and Lafarre 2019). Blockchain is adopted worldwide to provide various applications to solve problems, thus updating market infrastructure (Hughes 2018; Surujnath 2017).

Cryptocurrency technology is a widely adopted application of the blockchain (Daj 2018; Gomber et al. 2018; Olsen et al. 2018; Șcheau and Zaharie 2018). Bitcoin cryptocurrency is often claimed as the most secure and innovative platform for payment networks (Olsen et al. 2018). The decentralized nature of cryptocurrency helps in solving long-standing problems in both private and public sector, requiring various authoritative bodies to implement certain key regulations to ensure this continuance (Daj 2018). The regulations brought in cryptocurrency ensure a safe environment for the continuation of financial innovation and also helps microfinance institutions to emerge (Afzal 2019; Franklin 2019; Șcheau et al. 2020). Cryptocurrency consumes electricity while being implemented. This leads to the growth of increased power consumption. However, bitcoin consumes extraordinarily little electricity compared to other cryptocurrencies (Denisova et al. 2019). These digital platforms use consumer data which is highly sensitive to hackers and could result in loss of data. Hence, such data needs to be protected against various unethical players (Carnahan et al. 2010; Chanson et al. 2019). Sun et al. (2022) clearly pointed in their research that crowd funding and block-chain technologies in fintech have created a remarkable change in the finance industry. However, there is still a gap in literature analysis and visualization research to define the future pathway for the fintech field. Their study included 1128 papers that were published from the year 2000 to 2021, and the results noted that IT technologies are the foundation for fintech, whereas innovations by finance entrepreneurs ate the motivation and the policy supervisions guaranteed the development of fintech in the last two decades.

3.2. RQ2: What Is the Significance of Regulation in Fintech Innovation?

The disruptive nature of fintech has led to a transformation in business model innovations that has brought regulatory concerns worldwide, as stringent rules existing for incumbent financial institutions are not enough to deal with fintech complexities (Kumail Abbas Rizvi et al. 2018). Several other published papers explaining this concern are (Adriana and Dhewantoa 2018; Arner et al. 2017; Bruckner 2018; Das and Ali 2020; Golubić 2019; Gomber et al. 2018; Lin 2019; Yoon and Jun 2019).

Suitable and modern tools, frameworks and regulatory approaches are helpful in realizing key goals for policymakers and regulators to provide proper information on regulations, even though the nature of innovation in fintech and digital finance is known (Gomber et al. 2018). Small businesses turned to fintech lenders due to fewer restrictions as they are unregulated (Palladino 2018). Due to limited interconnection with regulators, Fintech 3.0 participants lack financial compliance customs and face several constraints in bringing in innovative approaches (Arner et al. 2015; Wilamowicz 2019).

Proper laws, regulations, and guidelines are mandatory to set rules for fintech businesses to get a standard spot in the market (Adriana and Dhewantoa 2018; Deng et al. 2018). To accommodate safety and security for every participant in fintech, lawmakers should propose transparent laws that mitigate uncertainty and protect them against fraudulent players (Aulia et al. 2020). Currie et al. (2018) state that accountability, transparency, and surveillance are the three concepts that together build compliance culture, which helps in disclosing and systemizing information for various authorities. Huang (2018) argued that the appropriate approach is regulation rather than prohibition, because most of the

regulations fail to prevent financial market scandals; rather they are designed only to react in the aftermath.

Illegal fund-raising activities happening in various parts of the world result in a lack of growth in the economy, hence stringent regulations are highly necessary to protect customers (Liu et al. 2018; You 2018). Market discipline influences banking distress but may not be able to control it, however proper regulation helps in reducing banking distress; these regulation helps in maintaining the Too-Big-To-Fail variable to make sure that distress is under control (Oliveira and Raposo 2019). Due to stronger protection rules for consumers belonging to the formal sector, the borrowers are having an advantage over others leads to compromise in consumer protection (Gaughan 2017; Omede 2020). International policy helps to reinforce consumer utilization with innovative financial products that are assumed to absorb shocks in the economy (Ramsay and Williams 2020). Ambiguity, market manipulation, arbitrage, and regulatory loopholes occur due to the proposal of more complex regulations (Allen et al. 2018; Pollman 2019).

The faster adoption of fintech payments by customers has put a huge pressure on policymakers in regulating a framework (Eka Putri et al. 2019; Romanova et al. 2018). The payment service directive often helps in finding a suitable solution to create a framework that is mutually beneficial for both fintech and other institutions. By creating regulations, payment services are working smoothly with fewer uncertainties and a fair distribution of resources (Volkov et al. 2019). Lending depends on the borrower's credit score and the amount estimation depends on various inputs of the borrower. Regulation in lending leads to a reduction in unlawful discrimination, but however acts as a barrier for innovative products (Bruckner 2018; Naglie 2017). Regulations for various other innovative products such as cryptocurrencies, Robo-advisory, crowdfunding, P2P lending are highly necessary to ensure safety and secure internet, privacy, as well as the trust of consumers (Adriana and Dhewantoa 2018; Huang 2018; Lazcano 2019; Tsindeliani 2019). Customers started to shift towards firms that provide more value to them, thus regulation is required for companies to understand consumer data and this helps incumbents get a vision about future strategies to counter fintech (Mitchell 2016).

Ling et al. (2021) has analyzed the impact of COVID-19 on the constraints in finance and the impact of financial technologies in moderating the constraints. This study concludes that fintech has played a significant role in mitigating the negative impacts of the pandemic which otherwise would have brought larger disruption to the markets globally.

4. Discussion

The main aim of this literature review is to systematically review the papers published on the subject to enhance the understanding of the contextual aspects of fintech innovations in various financial services and regulations.

Table 1 shows the analysis of fintech innovation in payment services. The key discussion shows the core focus of the paper and the benefits for customers show the results obtained after the authors' research. Since payment services are mostly adopted by fintech firms around the world, it is necessary to understand and observe the outcomes from various points of view. This table discusses various aspects of payment services including risks, financial inclusion and regulations. We can observe that fintech can easily provide various services to the informal sector where people do not meet the requirements of traditional financial service firms to avail various services. Moreover, internet usage and mobile phone users around the world are increasing every year providing an additional advantage to fintech firms to capture more market share. The services offered by fintech firms are easily available, transparent and consume less time attracting Gen Z. Cybercrime is a major threat to such online payment systems. More sensitive data are being required for such payment systems and this might create more opportunities for hackers to steal it. As data are considered to be the new oil, this is clearly understood by fintech firms, and they prepare their policy terms accordingly.

Table 1. Analysis of fintech innovation in payment service.

Analysis of Fintech Innovation in Payment Service		
Source	**Key Discussion**	**Benefits for Customers**
Kang (2018)	Customized payment service	Convenience
Yoon and Jun (2019)	Anti-fraud investments in payment service	Increased safety
Du (2018)	Increased participation of financial institution in payment service	New mobile payment service
Soutter et al. (2019)	Mobile payment adoption in informal economy	Increased low margin customer participation
Polasik and Piotrowski (2016)	Bank involvement in payment innovation	Convenience
Duma and Gligor (2018)	Awareness of cybercrime	Increased Gen Z participation
Romanova et al. (2018)	Regulation for industry competitiveness	Improves customer satisfaction
Utami (2018)	Tax payment system using fintech	Time savings
Coffie et al. (2020)	Banks effort toward financial Accessibility	Sustainable growth in finance sector
Choi and Park (2019)	Measures taken by Payment service directive	Diverse and decentralized payment networks in markets
Nan et al. (2020)	Users' continuance intentions to utilize social mobile payment	Improves customer satisfaction
Hayashi and Toh (2020)	Mobile banking offered by community banks	Faster payments
Raharja et al. (2020)	Digital payment solutions	Customers get access to wide market
Eka Eka Putri et al. (2019)	More payment options	Customer experience is more productive
Son and Kim (2018)	Company alliances with other companies	Wide range of choices
Petrushenko et al. (2018)	Technology acceptance by customers	User-friendliness

Fintech firms are rapidly growing around the world as their innovative services are simple and creatively use emerging digital technologies. This poses a major threat for incumbents as their traditional way of catering to financial services is complicated and are abided by strict regulations provided by their regulatory board. So, incumbents need to think of a strategic alliance that could be collaborative, co-operative, or competitive depends upon their business objectives. Collaborative and cooperative terms are often interchangeably used. Collaborative refers to shared authorship with shared vision and values whereas cooperative refers to passive teamwork with no sacrifice in individual autonomy. Fintech has struck the right balance between innovation and efficiency along with risk management in recent years (Toderașcu and Oprea 2021). In most countries, initiative to implement fintech technologies were made mandatory by government bodies and central banks especially in the last three years. Fintech innovations were promoted through start-up funding schemes which resulted in positive intermediation and economic productivity of finance.

Figure 3 analyses the impact of incorporation of fintech in traditional banks by various authors. The constraint that fintech faces is not having enough equity to expand business, whereas traditional banks lack innovative, rapid technology backed services to acquire more customers. Collaboration could provide mutual benefits for both these participants and help in attaining their goals quickly. It is observed that banks are getting advantages such as personalization, accessibility, and smart solutions that help in targeting unmet customers. Meanwhile, fintech firms are also benefitted by eliminating some of the discrepancies they usually face. Major challenges that fintech firm faces are uncertain regulations, low capital, lack of security, and poor infrastructure. It is observed from the study that the majority of incumbents have understood the importance of emerging innovative digital technologies and have started to collaborate with fintech firms.

Impact of fintech incorporation in traditional banks														
Incorporation of fintech in traditional banks	Advantages attained by banks								Fintech challenges removed by banks				Strategic alliance	
Source	Personalization	Convenience	Accessibility	Adoptability	Channel diversification	Smart solution	Low cost	Customer experience	Uncertain regulations	Poor infrastructures	Low capital	Lack of security	Collaborative	Compete
L. Y. Sloboda & Demianyk (2020)	X				X			X	X		X		X	
Wonglimpiyarat (2017b)			X				X	X	X	X		X	X	X
Wankhede & Salunkhe (2018)		X		X			X		X	X				X
Hadad & Bratianu (2019)	X		X			X		X	X			X		X
L. Sloboda et al. (2018)	X			X	X			X	X		X			X
Rühl & Zurdo (2020)				X		X		X	X				X	
Temelkov (2018)	X		X			X	X		X		X	X	X	
Jakšič & Marinč (2019)			X		X		X		X				X	
Coetzee (2018)	X	X		X	X	X	X		X			X		X
Costa-Climent &Martínez-Climent (2018)			X				X		X			X	X	
Ntwiga (2020)				X	X							X	X	
Japparova & Rupeika-Apoga (2017)	X				X						X	X	X	
Rousseau (2019)				X	X				X	X			X	
Trudeau & McLarney (2017)			X	X	X			X	X		X	X	X	
Meager (2019)	X						X	X	X			X	X	
Koeppl & Kronick (2020)	X	X							X	X		X		X
J. Y. Lee (2020)										X				X
Nastiti & Kasri (2019)					X					X		X		X
Chuang (2019)		X						X			X		X	
Esmaeil et al. (2020)	X				X		X		X	X			X	
Hayashi & Toh (2020)		X	X	X				X	X			X		X
W. R. Lin et al. (2020)	X	X			X			X	X			X		X
Sengupta & Dice (2019)			X						X					X
Badour & Presta (2018)		X							X	X		X		X
Szopiński (2019)						X				X				X
Jagtiani & Lemieux (2018)		X			X		X	X				X	X	
Chen, Y., Chiu, J., & Chung, H. (2022)		X			X				X		X			X
Sun, Y., Li, S., & Wang, R. (2022)	X		X		X		X		X	X		X		
Luo, S., Sun, Y., & Zhou, R. (2022)		X				X		X			X		X	X
Wang, J. H ET AL., (2022)		X	X	X					X	X		X		X
Wang, S. (2021)	X					X		X		X	X		X	X
Ling, S., Pei, T., Li, Z., & Zhang, Z. (2021)		X	X		X		X		X	X		X		

Figure 3. Impact of Fintech incorporation in traditional banks. Source: Researchers' own source.

Of the total papers analyzed, 66 papers primarily relied on financing services provided by fintech. It is also observed that studies that discuss innovative methods of fintech cover financing services predominantly, compared to other services available in the finance industry. Emergence discusses the origin and evolution of fintech across the world and its importance in fulfilling the gaps in service.

By referring to Table 2, we can observe the effect of a strategic alliance of fintech with incumbents in financial products. Collaboration provides more advantage on financial products compared to competitive nature of the alliance. Reduction in various costs and risks, customer retention and new digital model are some of the advantages that help in enhancing the value of various financial products. Competition leads to several disadvantages to financial products for both incumbents and fintech firms. There is a loss in revenue, customer retention, and relationship maintained if a competitive nature exists.

Table 2. Effect of strategic alliance of fintech on financial products.

Collaborative Fintech	Products	Competitive Fintech
low risk	Deposit accounts	relationship loss
low risk	Payments	revenue loss
low operational cost	Lending	revenue loss
new digital model	Asset Management	relevance loss
new digital model	Markets	revenue loss
customer retention	Insurance	customer loss
low operational cost	Back Office functions	neutral

With respect to publication year, Figure 4 indicates that there was a huge increase in research papers in the year 2018. This increase may be because more research was done to understand the hidden potential of fintech. In addition, the number of papers published regarding fintech innovations is increasing every year.

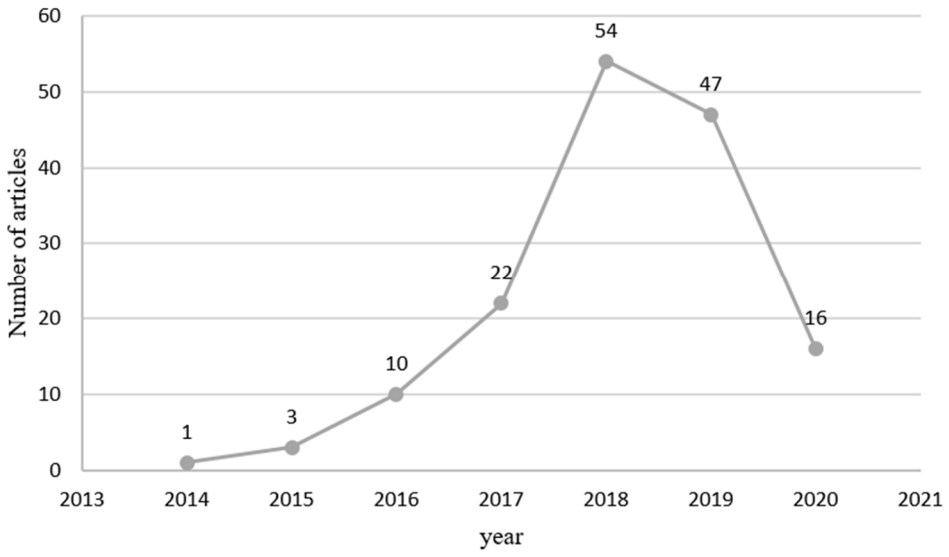

Figure 4. Distribution of studies by publication year.

5. Conclusions

Technological innovations change the way of practicing financial services leading to disruption. Though fintech is helping in improving financial services, reducing customer constraints, and reducing operating costs, it might pose a threat to various other factors. Already fintech startups have huge competition with incumbents who provide traditional financial services. The fintech industry is marching towards creation of one single medium

of exchange and app for global transactions and industry 4.0 is highly influenced by fintech innovations (Wang 2021).

Most players in this industry put customers in the center of any business model they create or adopt. The study was done to understand and analyze the impact of fintech by discussing the innovations that fintech has brought to the financial service industry as well as issues faced by policymakers to propose regulations. This paper provides a comprehensive study of the review of literature on fintech by collecting top-published research papers from various databases. The researcher carefully examined scholarly articles published between 2014 and 2022 and analyzed the current state of fintech. This paper also summarizes the findings from the systematic review of influential publications in fintech.

Although fintech is a vast subject, more focus is given on financing, payments, and regulations, as they are crucial topics to be understood and are restructuring financial activities with more innovative technologies. Fintech has emerged as the panacea for systematic growth of finance industry. The technological flow of fintech has improved the effectiveness and efficiency of the much-needed innovations that were much awaited in the finance sector (Wang et al. 2022). Entrepreneurial innovations and improved activities are seen as the brainchild of the fintech industry. The extent of support from the governments all over the world is viewed as the direct proportional stimulant for the growth of fintech sector.

Banks and financial institutions played a major role in economic recovery and fintech was an indispensable tool to ensure financial liquidity of the society in general. Fintech has ensured improvement of quality of life, social equality, stable economy through financial inclusions and technology interface (Rabbani et al. 2021). COVID-19 has been the platform of opportunities encouraging a significant number of uncluttered social innovations and at the same time reached the interested public in a swifter, unfailing, timely and sustainable way to fight economic inequalities (Rabbani et al. 2021).

As Nair et al. (2021) cited fintech should be seen as just the tip of an iceberg rather than a complete or matured technological intervention in finance. The field is forecasted to grow in leaps and bounds with more inventions are in pipeline from both the business side and consumer side. In fast-developing economies such as BRICS nations, fintech has contributed significantly to the outside market sectors also. The explosive adaption of digital payments has revolutionized revenue records in India through fintech technologies. The field of fintech operations have shifted from a short-run solution to a long-run vision in the fast-developing economies of the world. Internet finance is the next buzz in the fintech field that is found to witness a great development in the near future in the finance industry Sun et al. (2022).

Thus, to conclude, it can be stated that innovations are the most charismatic features in the fintech, and the financial services industry is greatly benefited by the intervention of fintech in the last two decades.

Figure 5 depicts an outcome of this extensive systematic literature review, which provides an overall view of fintech. This mind map has fintech in the center and branches with five identified research themes such as innovation, emergence, regulation, threats, and ecosystem. To conclude, the study has come up with valuable insights about financing and payment activities. Regarding regulations, the regulators will need to take every interdisciplinary field of fintech which we provided in the mind map to develop a fair ecosystem in the finance industry.

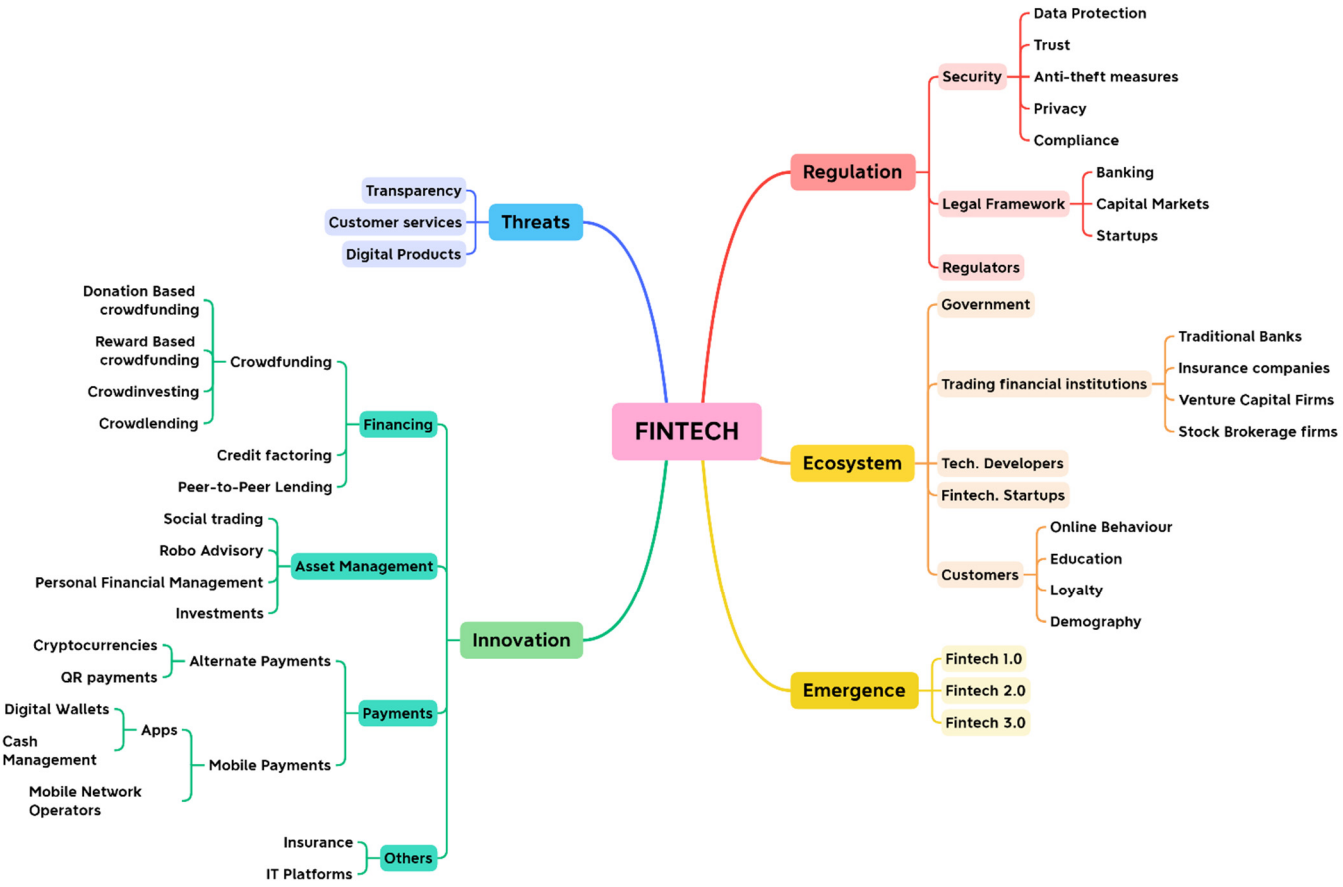

Figure 5. Mind map of fintech built on systematic literature review. Source: Researchers' own source.

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