

I-Fintech adoption readiness

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ABSTRACT

Various studies show information technology can beneficially apply to enhance financial services. The merger of Fintech, based on the Islamic law, creates the concept of Islamic Fintech (I-Fintech). The growing investment and numerous startups across Islamic Fintech offer financial innovation evidence of the importance of I-Fintech. Many governments support I-Fintech growth through investments and supporting startups. Pakistan, an Islamic country, is experiencing evolutionary changes in Fintech adoption. This I-Fintech adoption can engage governments, companies and firms across the Islamic world. Eighty five percent (85%) of Pakistan's population lack financial services. Hence, financial inclusion is a dominant problem of Pakistan. To date, few I-Fintech companies or firms operate in Pakistan. These are limited to big cities like Islamabad, Karachi and Lahore. To date lack of investment has restricted I-Fintech growth processes. Thus, a demand for local corporate and firm engagement is desirable to capture full advantages across the Fintech sector. This paper proposes a conceptual framework for adoption of I-Fintech across Pakistan. It proposes Islamic Fintech challenges and risk affect intention to adopt I-Fintech in Pakistan. Intention to adopt I-Fintech technology contains the constructs of technical literacy, financial literacy, digital literacy and social acceptance. Tis study's next stage is to measure and model competitiveness position of Pakistan's Islamic financial institutions (by gauging their resultant collective intelligences position).

Keywords: Fintech, I-Fintech, Banking, Islamic Countries, Shariah, Finance, Blockchain.

INTRODUCTION

Background

Information Technology has helped in bringing innovative ideas in businesses and the daily life of common man. Information Technology has provided many of the solutions to various businesses pertaining to the financial and infrastructure sectors. The financial solutions provided by the technology is called FinTech or Financial Technology; it is obvious the two words have been shortened to Fintech (Echchabi et al., 2021). Various benefits have been provided by Fintech such as fairness in business dealing, lower cost in transactions, ease in finding or communicating with customers and the direct and easy availability of various types of information, including financial information (Zavolokina et al., 2016). Business volume has been increasing by transformation of business transactions to smart devices including online remittances, payment of bills, equity and insurance and so on. Moreover, the interest likeliness has been observed by commercial banks of Fintech-based financial solutions.

Islamic Fintech (I-Fintech)

As the name implies, Islamic Fintech are the financial services purely based on Islamic Shariah law and for this purpose various Islamic banks and traditional banks are offering their services to their customers for various benefits. Most Islamic governments support Islamic Fintech including the Dubai International Financial Center (DIFC) which reserved a Hundred million dollars fund for Fintech and the sandbox of the Bahrain regulator. There are some other private alliances for Fintech growth such as Turkey's Al Barakah Bank's accelerator arm with Singapore for uplifting and supporting Islamic Fintech or I-Fintech (Tarique & Ahmed, 2019).

Global Landscape of Islamic Fintech (I-Fintech)

Startups in Fintech have presented evidence of a global landscape in the latest IFN report of 2020 (IFN,2020). The growing marketability and development are evident inside the Islamic Digital Economy as shown in Figure 1. Islamic Fintech's role is being explored by academia and industry, while according to Oseni & Nazim (2019) academia is progressing slower than industry as new studies prove. According to the IFN (2018) report, Fintech companies need to follow three types of requirements to be considered as recognized Islamic Fintech companies. The first one is the availability of internet or mobile app-based financial services. Another requirement is the financial services must be based on Islamic shariah compliance. The third and last one is that the company must have finalized a business, or the company is performing the minimum viable product (MVP) process development.

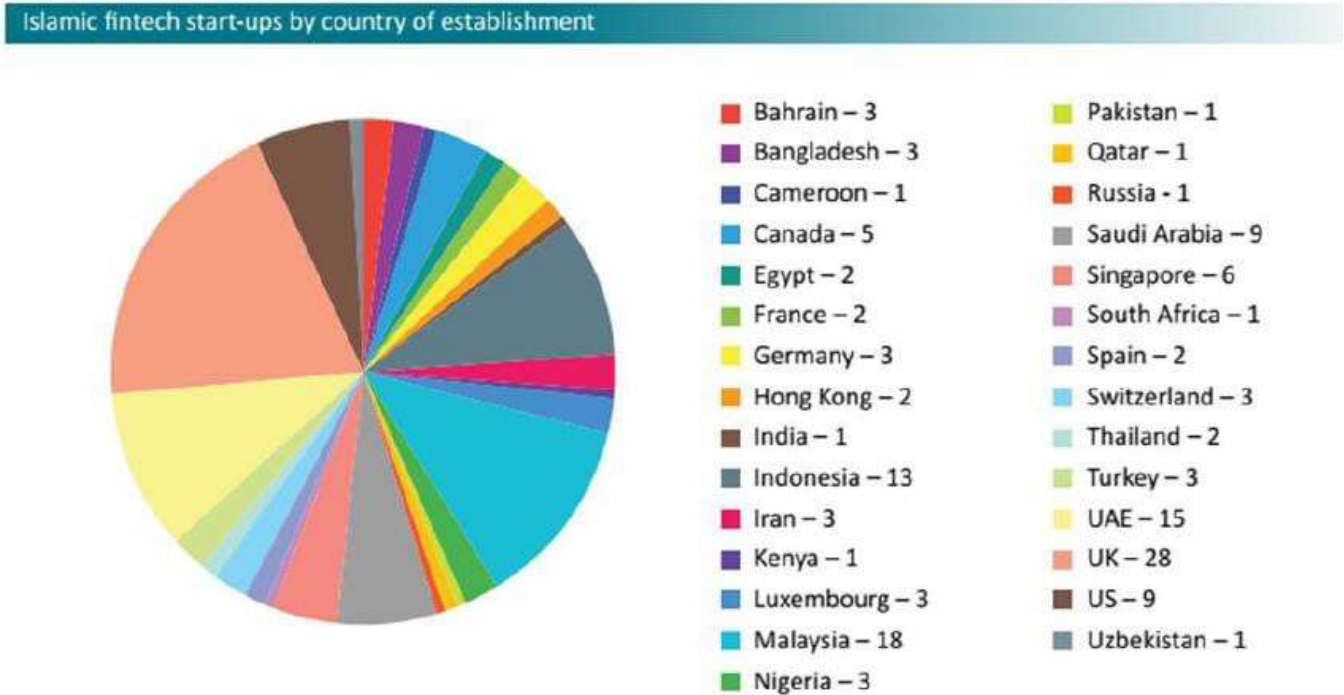


Figure 1: Countrywise Fintech Startups Source: (IFN, 2020, p.17)

Fintech in Pakistan

Fintech in Pakistan is a new sustaining technology, and is growing gradually. Debit cards, credit cards and ATM machines are the basic and popular products of commercial banking. These products were added to the basic services because of the change of financial systems towards technology. According to Rizvi et al. (2018), a revolutionary change of technology has been seen in Pakistan resulting in intelligent financial solutions. The main financial services and financial products have been using improved technology, which has increased the productivity of the financial system. Pakistani Fintech can be categorized in two groups, namely traditional and emergent Fintech. The traditional system works with the incumbent whereas the emergent is working with banks and firms. As the name implies, traditional Fintech in Pakistan deals with traditional price models and products and emergent Fintech is innovating some new technology driven solutions

Motivation and Gaps to be addressed

Islamic finance should apply Artificial Intelligence (AI) and big data analytics in more areas of business as business may gain more benefits from AI. Distributed ledger technology could boost Islamic trade financing and reduce the incidence of Shari'a non-compliance. Wealth management can be simplified using AI. Takaful needs traction and innovation to capture the Muslim insurance market.

Many empirical and theoretical studies are available on financial inclusion in Pakistan, but these studies do not discuss the topic directly; rather, they discuss other subtopics which may be somehow relevant to financial inclusion, including poverty elimination, economic stability and reduction of income disparities based on economic development (Shahbaz and Islam 2011; Nenova et al., 2009; Akhtar and Hussain, 2015;).

LITERATURE REVIEW

I-Fintech Challenges

The list of challenges in I-Fintech is lengthy and long. These challenges typically range across legal or regulatory (Saksonova and Kuzmina-Merlino, 2017), market or business, educational or behavioral and technical domains (Rizvi et al., 2018). Modern regulations, including legal, innovation (business), scalability (technical) and testing of a network, plus behavioral considerations (Elasrag, 2019), remain important challenges in I-Fintech (Murinde et al., 2022) when using blockchain technology (Mohamed and Ali, 2018; Salah et al., 2019). The tradeoff understanding between the blockchain and the database remains a key skill that still needs further improvement (Cole et al., 2019). First, the weaknesses and strengths of each approach must be understood. Balancing the positive power of blockchain and its combination with the benefits of databases and their applications still requires mastery (Guo and Yu, 2022; Khalil & Gervais, 2017). Research continues exploring and discovering the balance and re-balance between technologies and databases (Khalil & Gervais, 2017). Some of the challenges for the implementation of Fintech using blockchain are presented below.

Economic Benefits

The economic benefits can be understood in cases where technology and high tech activities provide economic benefits along with user friendliness (Walker and Johnson, 2006). The older methods and traditional approaches are being slowly replaced by new and advanced activities and services based on technology. The goal is the various benefits provided to businesses and to

help businesses attract a greater number of users, especially when available to users in terms of security and certainty while performing financial transactions (Nambiar and Lu, 2005). The various uncertainties such as related to environment would be reduced while using technology such as in the perspective of I-Fintech, and the building of customer trust can be achieved. For building of customer trust in businesses or service providers it is very necessary to present a higher degree of Fintech services with all available and desirable benefits (including economic benefits) for the users. To grow customers, a higher level of Fintech services includes strong privacy policy, best quality service, supplier reputation, security and integrity control so that customer and service provider relations can be maintained for the long term (Siau and Shen, 2003). Secure transactions and funds shifting with ease and other benefits such as relaxation can build a higher level of trust and provide a galvanizing impact of Financial Technology (Kim et al., 2009).

Convenience

Convenience may be considered as 'ease' or perception of the product or service within some 'range of ease.' (Convenience, 2022). The sum total of efforts and time spent by an individual to purchase a product or to avail of a service is called convenience (Copeland, 1923). In the same context, time and effort used to avail oneself of banking services using a mobile banking platform can be called convenience (Lee, 2015). So, I-Fintech must provide ease in availing of its services and must save time. A catalyst in extending and growing financial services - such as mobile services and electronic services - is their convenience, plus other catalysts such as safety, affordability and accessibility. Various research studies have elaborated the concept of convenience in perspective of typical retail channels (Bergadaa and Del Bucchia, 2009; Gahinet and Cliquet, 2018; Seiders et al., 2000; Labb'e-Pinlon et al., 2016). Therefore, there is requirement to bridge the gap between way of shopping online. Studies for the design of convenience measurement pertaining to financial services are limited and the very few studies are available (Mevel et al., 2021; Gielsens et al., 2020; Vyt et al., 2017) especially in the perspective of a convenience as a role of digital variable and the affect of consumer response.

Smooth Tech Transactions

Fintech service providers ensure customer transactions are secure and information protection is provided. Further, Fintech services should be matching in accordance with the customer's lifestyle and the user friendliness must be provided (Mallat, 2007). In the similar manner, convenience is considered one of the perceived benefits of Fintech in which user is performing one touch payments or the transactions with minimum efforts (Nambiar and Lu, 2005). The previous studies have proved that perceived benefit of online application usage has increased the user intention of the adoption of applications especially in the various Information Technology based applications (Lee, 2009; Lee et al., 2013a; Lee et al., 2013b; Benlian and Hess, 2011; Farivar and Yuan, 2014; Abramova and Bo'hme, 2016; Ryu, 2018). Hence, in I-Fintech banking situations smooth, simple, one-touch transactions remain important considerations when pursuing customer acceptance..

I-Fintech Risks

I-Fintech is a booming industry and proves a disrupting technology for the financial sector and the proof is the global investment of billions of dollars. I-Fintech has the advantages for Muslim populations additional to the other benefits to non-Muslim populations, but the combination of risks are also available for these businesses that don't fit typical financial institutions. More than 2.7 billion Euros were invested in European Fintech in the first quarter of 2018 and a total of 12.4 billion Euros over the whole of 2018. Further, the United Kingdom has more than 2000 Fintech Firms and this number is expected to double by 2030. Business and investment growth is not without a combination of risks.

When the users of I-Fintech services perceive the uncertainty, or the negative results or consequences is called as risk. Much of the literature has been emphasized and achieved a positive attention by the uncertainty and the negative reinforcements especially in perspective of consumer innovation research (Mitchell, 1999; Lim, 2003; Ryu, 2018). The prior knowledge of technology should be provided to the customers or the early adopters to reduce the risks and uncertainties (Eiser et al., 2002). The user behavior has a significant role as well as higher level of influence by the digital literacy and literacy of technology while using technological products and services. In this regard, the I-Fintech service providers and the marketers must be able to understand the uncertainties, risks and other negative reinforcements before the implementation or deployment of the services of I-Fintech (Laroche et al., 2003). The study of Paylou (2003) presented that users have been found discouraging while performing e-commerce activities during the adoption of e-commerce services because of risks associated with the e-commerce. The risk has the influence over the demand of e-commerce and the Fintech service because the risk nature of bother services is same. In perspective of financial issues and the security, risk can be understood one of the most critical impacting factors during the process of Fintech adoption (Bensaou and Venkatraman, 1996; Slade et al., 2013).

Financial Risk

The probability of the losses (financial) experienced by the customer during the process of fintech usage or the transaction performance that would not have been experienced if the same transaction or activity have been performed rendering a conventional (alternative) method. The operation failure is considered the typical example of consumer-perceived risk which reduces the pace of Fintech adoption. The perceived risk framework has classified the risk within the panorama of financial, safety (psychological and physical), performance timeframe, convenience, social as well as the opportunity (Conchar et al., 2004; Torugsa and Arundel, 2017). The studies drawn from the risk processing framework four types of the risks have been identified within the context of the I-Fintech namely operational risk, financial risk, security risk and legal risk.

Legal Risk

Legal risks are considered when technology faces reduction in the adoption because of regulation and the administrative rules (Ryu, 2018). According to Razzaque et al., (2020) the Central Bank of Bahrain is serving as the controlling (regulating) body in Bahrain. Similarly, Bank Negara Malaysia serves the purpose in Malaysia (Muhamed et al., 2014). In respect to Pakistan, The State Bank of Pakistan (SBP) is the policy regulatory body and is the controlling authority for the banking system in Pakistan. A regulating sandbox in perspective of Fintech is called a mechanism or approach which keeps fast pace of the innovations or support information technology by developing the supportive regulations. The sandbox contains business models test platforms especially the I-fintech and Fintech companies otherwise the companies will try to continue operations outside the regulatory bodies umbrella (Todorof, 2018).

Security Risk

Another challenge is information security, which can be observed from the security attacks of recent years, questioning the current protocols and security standards. The Global State of Information Security Survey of 2016 reported that the year 2015 had a 38% rise in detected security incidents detected compared with 2014. The risk of fraud is another challenge resulting from digital banking and involves falsification of legitimate information and the manipulation and misinterpretation of electronic funds and digital information in databases. Global technology specialists have revealed that Malaysian digital transactions continued to grow by 54% even in the presence of various frauds and other challenges. There has also been a growth of 51% in stolen ID's. 58% of identity verification and 50% of cyber fraud prevention challenges have been identified as key challenges in the process of digital transaction growth as per the report of GBG, a data intelligence, identity verification and the fraud specialist (Abiola, 2015).

Operational Risk

Operational risk is considered one of the important and impacting financial transactions which is impacting negatively during the process of Fintech tools adoption. These tools are used during the execution of financial transactions in the context of operational risk in Fintech is more than the conventional tools used in conventional transactions. Bank of International Settlements (BIS) has described operational risk as the loss probability because of internal failure process or inadequate process, systems, people or the external events. The Fintech poses greater operational risk as compared to conventional tools of finance in context of failed or improper execution, process, delivery or any other activity. These situations will trigger a typical customer in an operational risk of high level for the usage of Fintech. The current study investigates the significant effects of operational risk perceived by the consumers to use and continue the Fintech usage.

Other Challenges and Capacities

Fintech has proved its importance from its introduction as the financial sector gained an impressive boost while introducing the amalgam of financial services and financial technology. A Fintech firm imposes various (additional/other) challenges to conventional institutions in terms of new innovative and novel or extended varieties of consumer products.

I-Fintech technology can greatly benefit if blockchain and other aspects of Fintech are implemented for the various offerings of products. The combination of Fintech and Islamic finance will require more efforts on monitoring so that the complex and difficult relationship of the key stakeholders and agents can be maintained. The trust issue may arise if increased monitoring is not available, especially when using new technologies. Financial solutions providers (Fintech Providers) are facing enhanced scrutiny imposed by governmental regulatory bodies. Efficient and common Fintech solutions need time along with the support of regulators for the Islamic financial industry.

The other challenge to the combination of Fintech and Islamic finance is the stakeholder's understanding, which is surely related directly to Fintech's abstract nature. The capabilities understanding and market progress of Fintech are due to the underdevelopment of Fintech's infrastructure and ecosystem. There are many security and privacy issues in Fintech solutions (Hassan et al., 2020).

I-Fintech Adoption

The use of products and services of Islamic Fintech can be understood as I-Fintech adoption (Oseni et al., 2019). The adaptability of I-Fintech requires policies, legislation and consumer protection laws so that the I-Fintech products and services will be of service to individuals and businesses as well (Ahmed et al., 2020).

Technical Literacy

The capability to use, analyze, and comprehend technology with responsibility, effectiveness and safety is called technology literacy or sometimes it is called technical literacy. Technical literacy can be defined as the use of technology for the creation, evaluation and integration of information. The technical literacy is not bounded to the internet and the use of computers, rather technological device, services such as Fintech or Islamic Fintech can be thought of technical literacy. As per definition of technology any system, tool, device or an approach or methodology designed to solve a particular problem or in other words to complete or carry out a task is called technology. Various activities such as using smartphone, tablets and laptops accessing through internet can discover, evaluate, review, and use data and information via different platforms can be calculated under the umbrella of the Technological digital literacy. The definitions regarding the technology change and evolve with the passage of time. An example of this approach is the digital literacy referred as the material of technology digital literacy. In this context

technology digital literacy is considered the sub-group or a specific form for the literacy of technology (Entrena and Ordóñez, 2013).

Digital Literacy

According to British Futurelab's handbook on Digital Literacy across the curriculum (Hague and Payton, 2010, p. 2); the digital literacy is explained as

Access of the broad-spectrum range of cultural and practical resources applicable to digital tools is called digital literacy. Digital literacy is the making and sharing ability of various formats and modes for the creation, collaboration and communicating effectively. It is the understanding of various digital technologies in which when and where these technologies fit best so that the processes can be supported.

In another definition stated by the European Information (Martin, 2005, p. 135) system about Digital literacy in a similar context has been Defined as

The attitude, ability and awareness of the persons to use digital tools and technologies and facilitation of the identification, managing accessing, evaluating, analyzing and synthesizing digital resource for the construction of new knowledge, creation of expression, creation of media and communications with others with respect to various life situations so that the constructive social action and reflection of this process.

Communicate effectively with others and the ability to create meaning are the two factors which have been emphasized the definitions. The later definition asserts the ability to search, assess and synthesize various digital tools.

Financial Literacy

The topic of financial literacy was under consideration by various research studies (Glaser and Weber, 2007; Hung et al., 2009). Financial literacy directly influences the person in context of the behavior. The combination of skill, knowledge, behavior, awareness and attitude is the formation of financial literacy is necessary for the effective and strong financial decisions resulting in the financial wellbeing of the individuals. Every person possesses the varying level of financial literacy which impacts the behavior. The financial literacy needs attention because limited studies are available especially focusing concepts of Islamic finance.

The current study focuses and examines the attitudes and financial literacy in perspective of the Islamic finance. The study will analyze the degree of financial literacy of an individual such as awareness, understanding skills, set of knowledge understanding fundamental rules and mechanisms of Islamic financial information and services which in turn will enhance the ability to decision making of appropriate and effective financial decisions. The financial literacy is considered important because the financial knowledge is strongly adhered to the financial behavior (Xio et al., 2014). If a person is sound in financial literacy then he/she can avoid wrong financial decisions and make decisions (Lusardi, 2008) about high cost mortgages or the excessive amount of borrowing. The Islamic financial literacy will definitely affect the overall behavior of an individual especially while choosing between the Islamic financing and the traditional banking. It is also assumed that the Islamic financial literacy will enable a person to make financial decisions between conventional and Islamic financing.

Social Acceptance

The passive and active notions of the technology acceptance are considered in social acceptance such as (employment resisting) is a passive notion whereas the active notion when technology adoption is involved (Batel et al., 2013).

The consumer usage and the use of technologies by the consumers have been vastly studied and many of the academic research studies are available. The previous studies have insights from the reasoned behavioral theories such as TPB describes about the aspects of human behaviors. To understand individual's behavior about the usage of innovation, IDT has the answer. The two; UTAUT and TAM comprehensively presented important factors of use of technology by the individuals. It is assumed that the decisions are based on rational considerations by the people and that's why individuals are called rational beings. Many of the studies have emphasized on the various rational factors impacting the acceptance of the technology whereas the irrational factors still need more consideration. Hence the current study analyzes and investigates the Islamic fintech adoption affected by the consumer usage (Social acceptance).

I-Fintech Inclusion

Financial inclusion is considered as easy, efficient and reliable access to a financial service and products with confirmation. These products and services include formal savings, bank accounts, credit facilities in cheaper form, underprivileged or lower income clusters provision of the low-cost transactions and others (Raza et al., 2015). It is believed that inequality and poverty can be reduced via financial inclusion along with economic growth. Developed countries financial systems are more inclusive compared to less or underdeveloped countries (Clarke et al., 2003).

RESEARCH METHODOLOGY

Research Method and Design

Financial inclusion is considered as easy, efficient and reliable access to a financial service and products with confirmation. These products and services include formal savings, bank accounts, credit facilities in cheaper form, underprivileged or lower

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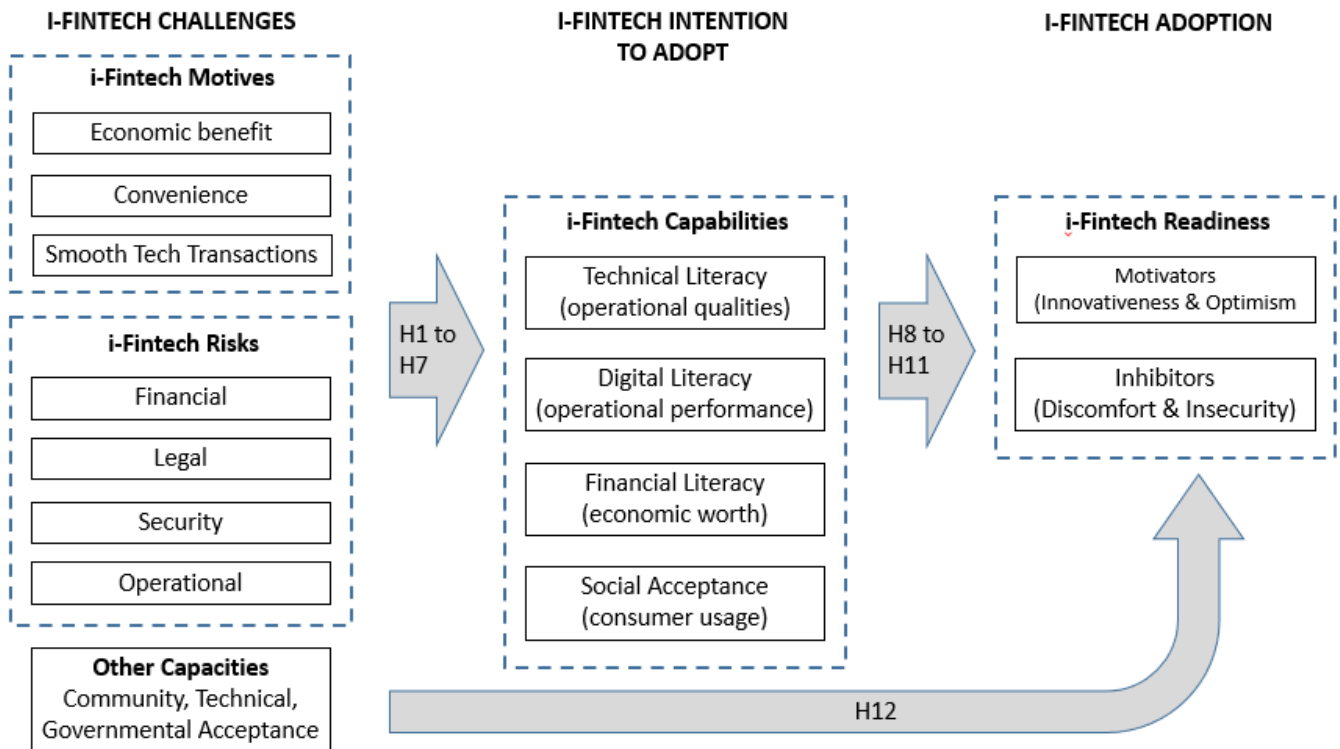


Figure 2: Research Conceptual Framework for Islamic Fintech Adoption

METHODOLOGY AND PROPOSED ANALYSIS PLAN

The proposed study is conducted through James Cook University's (JCU's) College of Business Law and Governance whereas the responses and data collection is performed in Pakistan using two comparative groups of banking systems. Responses from bank officials of Islamic banks and responses from bank officials of traditional banks offering Islamic banking windows. The survey data collection instrument comprises seventy quantitative response items each offering five choices (5 point Likert Scale), plus ten demographic questions. Where possible the survey instrument is delivered personally to the bank, or sent via email to more distant bank respondents. Once data is collected and collated, missing values replacement is used to correct for surveys with random, and under 20% missing values. This data set is then filed into JCU's research online database. For increased survey form completion response rates a Dillman reminder approach (using six weekly reminders) is utilized. The number of respondents targeted is 500 plus. This allows for sectioning into SEM calibration (300+) and SEM validation (200) data sets. This study focuses on the quantitative and multifactor structural equation modelling as its key analysis methodology.

RESULTS AND DISCUSSIONS

Most interpretation and analysis is typically performed in two phases where data analysis is done first with SPSS. The initial demographic details are processed and analyzed with SPSS. Next the Cronbach alpha is found for each individual factor captured within the study. Descriptive analysis and interpretation of exploratory analysis is performed. PLS-SEM is used as second phase using factors to build a causal model as shown above in Figure 2.

Recently, financial digital inclusion in Pakistan is very low and typically aligned towards least financial inclusive countries. According to Shahid et al. (2017) the percentage of Pakistan population lacking financial services is 85%. This indicates Pakistan banks likely need to commit considerable revenue to build their banking and digital infrastructure, and train their bank users into adopting an I-Fintech approach. These scale and reach problems likely can resolve using digital financial servicing, and their associated inbuilt capabilities. Further, ninety two per cent (92%) of senior executives, and 80% of middle managers, illustrated in 2016 that Fintech likely helps emerging markets with low rates of financial inclusion to better join the financial services sector. Thus, this survey, and analysis study approach is designed to show the key contributors to delivering I-Fintech adoption.

EXPECTED CONTRIBUTION OF THIS RESEARCH

Pakistan is a growing and attractive space for Fintech companies. It also has large software house development capabilities which can support I-Fintech development. The expected contribution of this study comes from analysis and investigation of Islamic finance firms - from the perspective of challenges, risks and other issues, and across processes of inclusion and

diffusion, and their net competitiveness impact. The proposed framework of this study (illustrated in Figure 2) provides understanding of the stage wise progress for adoption of I-Fintech. Figure 2 releases factors contributions and relative strength pathways showing relative levels of challenges, risks and capabilities involved in delivering I-Fintech adoption. This model and its measures help Islamic banks and Fintech startups in Pakistan understand where to focus, and to what degree to focus, when initiating various contributing factors as model deliverers for their I-Fintech adoption.

REFERENCES

- Abiola, S. (2015). Legal and Regulatory Issues and Challenges Inhibiting Globalization of Islamic Banking System, Munich Personal RePEc Archive, 1-17, Retrieved from: <https://mpra.ub.uni-muenchen.de/62332/> (accessed 12 August 2022).
- Abramova, S., & Bolhme, R. (2016), Perceived benefit and risk as multidimensional determinants of Bitcoin use: a quantitative exploratory study. Proceedings 37th International Conference on Information Systems, 2016, (1-20), Dublin.
- Ahmed, E. M. & Ali, I. S., Ali, A., Mohamed, K., Mohamed, H. A. (2020). Enhancing Financial Inclusion through Islamic Finance. In: Enhancing Financial Inclusion through Islamic Finance. Achieving Sustainability. In Sudan Through Microfinance and Mobile Banking, 2. Palgrave Macmillan, Research Book, (297-325).
- Akhtar, S., & Hussain, D. A. (2015). Poverty Dynamics of Rural Punjab and Over Time Changes. *Journal of Animal and Plant Sciences*, 25(2), 572-577.
- Batel, S., Devine-Wright, P., & Tangeland, T. (2013). Social acceptance of low carbon energy and associated infrastructures: a critical discussion. *Energy Policy*, 58, 1-5. <https://doi.org/10.1016/j.enpol.2013.03.018>.
- Benlian, A., & Hess, T. (2011), Opportunities and risks of software-as-a-service: findings from a survey of IT executives. *Decision Support Systems*, 52(1), 232-246.
- Bensaou, M. & Venkatraman, N. (1996). Inter-organizational relationships and information technology: a conceptual synthesis and a research framework”, *European Journal of Information Systems*, 5(2), 84-91.
- Bergadaà, M., & Del Bucchia I, C. (2009). La recherche de proximité par le client dans le secteur de la grande consommation alimentaire. *Revue Management et Avenir*, 21 (1), 121-135.
- Bhabha, J. I., Khan, S., Qureshi, Q. A., Naeem, A., & Khan, I. (2014). Impact of Financial Literacy on Saving-Investment Behavior of Working Women in the Developing Countries. *Research Journal of Finance and Accounting*. 13(5), 118-122.
- Clarke, G. R., Xu, L. C., & Zou, H. F. (2006). Finance and income inequality: what do the data tell us?. *Southern Economic Journal*, 72(3), 578-596.
- Cole, R., Stevenson, M., & Aitken, J. (2019). Blockchain technology: implications for operations and supply chain management. *Supply Chain Management: An International Journal*, 24(4), 469-483. <https://doi.org/10.1108/SCM-09-2018-0309>.
- Conchar, M. P., Zinkhan, G. M., Peters, C., & Olavarrieta, S. (2004). An integrated framework for the conceptualization of consumers' perceived-risk processing. *Journal of the Academy of Marketing Science*, 32(4), 418-436.
- Convenience. (2022). In Merriam-Webster.com. Retrieved from <https://www.merriam-webster.com/dictionary/convenience>. (accessed 28 August, 2022).
- Copeland, M. T. (1923). Relation of consumers' buying habits to marketing methods. *Harvard business review*, 1(2), 282-289.
- Echchabi, A., Omar, M. M. S., Ayedh, A. M. & Sibanda, W. (2021), Islamic Banks Financing of FinTech Start-Ups in Oman: An Exploratory Study, *The Journal of Muamalat and Islamic Finance Research*, 18(1), 55-65.
- Eiser, J. R., Miles, S. and Frewer, L. J. (2002), Trust, perceived risk, and attitudes toward food technologies 1. *Journal of Applied Social Psychology*, 32(11), 2423-2433.
- Elasrag, H. (2019), Blockchains for islamic finance: obstacles & challenges. Munich Personal RePEc Archive. Paper No. 92676, 1-39. Retrieved from <https://mpra.ub.uni-muenchen.de/92676/> (assessed 18 August 2022).
- Eshet-Alkalai, Y. (2004). Digital literacy: a conceptual framework for survival in the digital era. *Journal of Multimedia and Hypermedia*, 13(1), 93-106.
- Evans, C. W. (2015). Bitcoin in Islamic banking and finance. *Journal of Islamic Banking and Finance* 3(1), 1-11.
- Farivar, S., & Yuan, Y. (2014), The dual perspective of social commerce adoption. Proceedings SIGHCI 2014, pp.
- Gahinet, M. C., & Cliquet, G. (2018). Proximity and time in convenience store patronage: Kairos more than chronos. *Journal of Retailing and Consumer Services*, 43, 1-9.
- Gielens, K., Gijbrecchts, E., & Geyskens, I. (2021). Navigating the last mile: The demand effects of click-and-collect order fulfillment. *Journal of Marketing*, 85(4), 158-178.
- Glaser, M., & Weber, M. (2007). Why Inexperienced Investors Do Not Learn: They Do Not Know Their Past Portfolio Performance. *Finance Research Letter*, 4(4), 203-216.
- Guo, H., & Yu, X. (2022). A Survey on Blockchain Technology and its security. *Blockchain: Research and Applications*, 3(2), 100067, 1-9.
- Hague, C., & Payton, S. (2011). Digital literacy across the curriculum. *Curriculum Leadership Journal*, 9(10), Retrieved from <http://www.curriculum.edu.au/leader/default.asp?id=33211&issueID=12380> (accesse 10 August 2022).
- Hasan, R., Hassan, M. K., & Aliyu, S. (2020). Fintech and Islamic finance: literature review and research agenda. *International Journal of Islamic Economics and Finance*, 3(1), 75--94.
- Hung, A., Parker, A. M., & Yoong, J. (2009). Defining and measuring financial literacy. Labor Population, Working paper, WR-708, 1-29.
- IFN (2018). IFN Fintech: Unlocking the Potential of Islamic Finance, Retrieved from: <https://www.ifnfintech.com/issue/volume-2-issue-1> (accessed 1 August 2022)

- IFN (2020), IFN Financial Innovation Report 2020, IFN & Edgar, Retrieved from; <https://www.islamicfinancenews.com/supplements/ifn-financial-innovation-report-2020> (accessed 1 August 2022).
- Khalil, R., & Gervais, A. (2017). Revive: Rebalancing Off-Blockchain payment networks. *Proceedings 2017 ACM SIGSAC Conference on Computer and Communications Security*. 131467, 439-453). ACM.
- Kim, D., Ferrin, D., & Rao, R. (2008). A trust-based consumer decision-making model in electronic commerce: the role of trust, perceived risk and their antecedents. *Decision Support Systems*, 44(2), 544-564.
- Kim, G., Shin, B., & Lee, H. G. (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, 19(3), 283-311.
- Labbé-Pinlon, B., Lombart, C., & Louis, D. (2016). Impact de la proximité perçue d'un magasin sur la fidélité des clients: le cas des magasins d'enseignes alimentaires de proximité. *Management Avenir*, 84(2), 73-94.
- Laroche, M., Bergeron, J. & Goutaland, C. (2003). How intangibility affects perceived risk: the moderating role of knowledge and involvement. *Journal of Services Marketing*, 17(2), 117-140.
- Lee, H., Park, H. & Kim, J. (2013). Why do people share their context information on social network services? A qualitative study and an experimental study on users' behavior of balancing perceived benefit and risk. *International Journal of Human Computer Studies*, 71(9), 862-877.
- Lee, M. C. (2009). Factors influencing the adoption of internet banking: an integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, 8(3), 130-141.
- Lee, S. G., Chae, S. H. and Cho, K.. (2013b). Drivers and inhibitors of SaaS adoption in Korea. *International Journal of Information Management*, 33(3), 429-440.
- Lee, S. H. (2015). The impact of convenience value of mobile banking service on customer satisfaction and Re-usage intention: the moderate effect of technology anxiety. *Journal of Information Technology Services*, 14(2), 1-14.
- Lim, N. (2003). Consumers' perceived risk: sources versus consequences. *Electronic Commerce Research and Applications*, 2(3), 216-228.
- Lusardi, A. (2008). Financial literacy: an essential tool for informed consumer choice? . National Bureau of Economic Research, Working Paper No. 14084, 1-29.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments—a qualitative study. *The Journal of Strategic Information Systems*, 16(4), 413-432.
- Martin, A. (2005). DigEuLit – a European framework for digital literacy: a progress report. *Journal of ELiteracy*, 2(2), 130-136.
- Mevel, O., Morvan, T., & Morvan, N., (2021). New societal expectations and services relationships in food supermarkets: the case of drive-in and home delivery. *Logistique Manag.* 29 (4), 252–266.
- Mitchell, V. W. (1999). Consumer perceived risk: conceptualisations and models. *European Journal of Marketing*, 33(1/2), 163-195.
- Mohamed, H. & Ali, H. (2018). *Blockchain, Fintech, and Islamic finance: Building the future in the new Islamic digital economy*. Berlin/Boston: Walter de Gruyter GmbH & Co KG.
- Muhamed, N. A., Ramli, N. M., Abd Aziz, S., & Yaakub, N. A. (2014). Integrating Islamic Financing and Halal Industry: A Survey on Current Practices of the Selected Malaysia Authority Bodies. *Asian Social Science*, 10(17), 120-126.
- Murinde, V., Rizopoulos, E., & Zachariadis, M. (2022). The impact of the FinTech revolution on the future of banking: Opportunities and risks. *International Review of Financial Analysis*, 81, 102103.
- Nambiar, S., & Lu, C. T. (2005). M-payment solutions and m-commerce fraud management. In *Advances in Security and Payment Methods for Mobile Commerce* (pp. 192-213). VT Polytechnic Institute and State University, Falls Church, VA: IGI Global.
- Nenova, T., Ahmad, A., & Thioro Niang, C. (2009). Bringing finance to Pakistan's Poor: A Study on Access to Finance for the Underserved and Small Enterprises (No. 48672). The World Bank.
- Oseni, U. A., & Ali, S. N. (2019). *Fintech in Islamic finance: Theory and practice*. London, England: Routledge Taylor & Francis Group.
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 7(3), 101-134.
- Raza, M. S., Fayyaz, M., & Syed, N. (2015). Overview of Financial Inclusion in Pakistan. *International Journal of Management Sciences*, 6(12), 572-581.
- Razzaque, A., Cummings, R. T., Karolak, M., & Hamdan, A. (2020). The propensity to use FinTech: input from bankers in the Kingdom of Bahrain. *Journal of Information & Knowledge Management*, 19(01), 2040025.
- Rizvi, S. K. A., Naqvi, B., & Tanveer, F. (2018). Is Pakistan ready to embrace Fintech innovation?. *The Lahore Journal of Economics*, 23(2), 151-182.
- Rodríguez-Entrena, M., & Salazar-Ordóñez, M. (2013). Influence of scientific–technical literacy on consumers' behavioural intentions regarding new food. *Appetite*, 60, 193-202.
- Ryu, H.S. (2018), What makes users willing or hesitant to use Fintech?: the moderating effect of user type. *Industrial Management & Data Systems*, 118(3), 541-569.
- Saksonova, S., & Kuzmina-Merlino, I. (2017). Fintech as financial innovation—The possibilities and problems of implementation. *European Research Studies Journal*, 20(3A), 961-973.
- Salah, K., Rehman, M. H. U., Nizamuddin, N., & Al-Fuqaha, A. (2019). Blockchain for AI: Review and open research challenges. *IEEE Access*, 7, 10127-10149.
- Seiders, K., Berry, L. L., & Gresham, L. G. (2000). Attention, retailers! How convenient is your convenience strategy?. *MIT Sloan Management Review*, 41(3), 79.

- Shahbaz, M., & Islam, F. (2011). Financial development and income inequality in Pakistan: an application of ARDL approach. Munich Personal RePEc Archive, 1-20.
- Shahid, Q., Razaq, L., Mughal, A., Imtiaz, M., Piracha, M., & Shahid, O. (2017). SEEDING INNOVATION A framework for rooting FinTechs in Pakistan. Technical Report, FinSurgents. Retrieved from: <http://www.karandaaz.com.pk/wp-content/uploads/2017/01/Seeding-Innovation.pdf>. (accessed 29th August 2022).
- Siau, K., & Shen, Z. (2003). Building customer trust in mobile commerce. *Communications of the ACM*, 46(4), 91-94.
- Slade, E. L., Williams, M. D., & Dwivedi, Y. K. (2013). Mobile payment adoption: classification and review of the extant literature. *The Marketing Review*, 13(2), pp. 167-190.
- Tarique, K. M., & Ahmed, M. U. (2019), A Survey of i-Fintech Literature and Identifying Future Research Direction. Proceedings 1st International Conference on Business, Management and Information Systems 2019 (ICBMIS 2019)', (Vol 1. pp. 494-503).
- Todorof, M. (2018). Shariah-compliant FinTech in the banking industry. In *ERA Forum* (19(1), 1-17). Berlin Heidelberg: Springer.
- Torugsa, N. & Arundel, A. (2017). Rethinking the effect of risk aversion on the benefits of service innovations in public administration agencies. *Research Policy*, 46, 900–910.
- Vyt, D., Jara, M., & Cliquet, G., 2017. Grocery pickup creation of value: customers' benefits vs. spatial dimension. *Journal of Retailing & Consumer Services*. 39, 145-153.
- Walker, R. & Johnson, L. (2006), Why consumers use and do not use technology enabled services?, *Journal of Services Marketing*, 20(2), 125-135.
- Xiao, J. J., Ahn, S. Y., Serido, J., & Shim, S. (2014). Earlier Financial Literacy and Later Financial Behaviour of College Students. *International Journal of Consumer Studies*, 38(6), 593-601.
- Zavolokina, L, Dolata, M., & Schwabe, G. (2016). FinTech–What's in a Name?, Proceedings 37th International Conference on Information Systems (ICIS), (pp. 199-219), December. Dublin, Ireland.