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Authors’ contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

ABSTRACT

During last few decades, Sri Lanka has shifted from agrarian economy to service economy. In service sector dominant role is played by the Banking and Financial Industry (BFI). Owing to this shift, BFI Industry has experienced a constant evolution by transforming entire BFI industry landscape with new era of convergence service delivery. This evolution can be considered as an extended connectivity and increased speed of information processing by introducing new business models and opportunities in BFI. As one of the developing countries, BFI sector in Sri Lanka is looking for an exceptional level of divergence between technology and finance. However to date, there is not much published studies to explain the nature of digital transformation in BFI industry in Sri Lanka. This study proposed to develop digital transformation framework of BFI Industry in Sri Lanka based on the diffusion of innovation (DOI) theory, technology-organization-environment (TOE) framework and actor-network theory (ANT) to conduct the multi-level analysis of the development of Sri Lanka’s BFI industry digital transformation. It attempts to create and reveal the process of building and execution of disruptive technology and variety of heterogeneous actors involved in the newly emerging converging industry. This research is a stepping stone in exploring interaction between FinTech and yet unfolding other technology around this context. It also discusses policy implication for Sri Lanka BFI industry, focusing on the expansion of state in fostering the exponential growth of BFI industry within and outside Sri Lanka.

Keywords: ANT; digital finance; digital transformation; DOI; disruptive technology; exponential growth; FinTech; TOE.

1. INTRODUCTION

Innovative solutions development with new technological concepts leads to new business model [1]. The emerging ecosystem growth of disruptive innovation changes the directions of many industries leads to business transformation [2]. Digital transformation takes place in every
industry and society: banking, financial, manufacturing, medicine, healthcare, telecommunication retail etc. which leads to creativity and innovation of an emerging disruptive digital technologies with entirely new business model transforming the competitive landscape [3]. “In order to succeed in digital transformation, leading companies focus on two complementary activities: reshaping customer value propositions and transforming their operations using digital technologies for greater customer interaction and collaboration” [4]. Digital transformation of BFI profound significant change in the pattern of how new business model and the mechanism for innovation and create value [3]. This would change the business to adopt innovative business model and position customer at the center of the business process to stay in the market with competitive arena for Banking and Financial industry (BFI) value chain as well as introduce new channel to attract the existing and new customer [2]. The disruptive technology shaping the BFI as an “enabler” than deliver the service or product [5]. The researcher aims to define the digital transformation in BFI and further elaborates how FinTech companies are going to be the disruptors as technology developers and deploy digital technology to cause the disruption.

Financial industry developed into banking, wealth management and insurance industry with the liabilities of trust and confident [6]. Delivery of BFI has experienced major change from human led interaction to machine led interaction, in order to leverage the potentiality to improve response time, accuracy, credit scoring and fraud management [7]. This is feasible by introducing artificial intelligence (AI), machine learning, blockchain, IOT, big data and social media in to financial services. Digital Transformation is the key driver of creating a more connected world by changing the people’s lives and radically improving the business growth [8]. Socio-economic activities, increased populations and globalization are the key factors for the change of global proportion, motivated to properly choose the digitization path for organizations [9]. Customer experience, competition and regulatory directives are major driving factors for digital transformation. Successful digital transformation leads to sustainable growth and higher profits [6]. Insurance industry in Sri Lanka is expected to be transformed to deliver fast growing demand to integrate their services with various products offered as a service. Technology adaptation become mandatory in order to deliver the world class service such as on-demand insurance coverage using a mobile app, improve the customer experience by offering IoT sensors and drawn to collect information from remote locations by lowering the cost of business process [7]. However, adaptation to such technology is a question in all aspects where acceptance by general public and regulatory requirements need to be addressed for successful transformation. Researcher examines the ICT usage and development in BFI industry, on the other hand the intensive application of advanced technologies leads to a digital transition in BFI industry in other part of the world. The researcher takes this literature as a point of departure and puts digital finance strategy building processes in BFI on trial to investigate whether and how digital transformation initiatives transpires organizational culture and technology challenges as a part of transforming banking and finance operation from traditional brick and mortar approach to modern technology adaptation. This will encounter previous studies in Sri Lanka in terms of introducing a digitalization logics perspective. Despite digital transformation initiatives so-called business transformation and technology adaption, the institutional logics perspective promoted me to seek a research gap around the issues of organizational, cultural and management challenges stemming from the co-existence of digital transformation. In order to achieve this broader aim, researcher will analyze the data in the light of DOI and TOE along with their cultural and management ramifications, which will lead to a deeper understanding of level of technology adaptation and digital transformation of BFI in Sri Lanka.

1.1 Aim of the Study

There has been little empirical research done on digital transformation about all disruptive and vast changing processes that are ongoing on BFI sector in Sri Lanka. Researcher discusses about mainstream factor influence on digital transformation in BFI sector in developing country context using Sri Lanka as a case study. Research on adaptation of technology in view of BFI sector readiness to attract the digital technology. Researcher in this article hopes to show the gap and key challenges on adaptation with technology to build the trust on digitization, benefits of moving to cloud and recommendation for regulatory frameworks alteration to streamline the flow of information as well as flow of physical goods. The analysis resulted distinctive
dimension of digital adaptation in to organizational level transformation is timely and highly relevant. Researcher pays more attention to theorizing actual process and formulation of a theory. The pragmatic procedure in the business of “theorizing” then is to intertwine the data being collected with institutional logic perspective in the form of a dialectic process of iteration between the data and theory.

2. METHODOLOGY

This study follows the constructivism paradigm with the mix of narratives and thematic analysis as the qualitative data analysis techniques. During the study the researcher conducted interviews, held conservations, make physical observations, review available documents, and performed qualitative case studies for turning them into theoretical model.

This research is aimed to pursue with qualitative empirical data collected from purposively select five case studies representing a public-sector bank, a public sector regulatory agency (Central Bank of Sri Lanka), private sector bank, private sector insurance company, and private sector financial company. Conversation was carried out with relevant actors (up to about 2 from each organization) to examine the similarities and differences among digital technology adaptation and their views on the issues of digital transformation. Documentary reviews were undertaken concerning the policies, implementations and practices of digital transformation strategies in respective case organizations.

These discussions were conducted by determining, in close collaboration within BFI providers within Sri Lanka in order to present the digitization, digitalization and digital transformation applicable thoughts on ideal researcher should pursue and responsibilities about overcoming the essential issues within the organization. In total seven face-to-face interviews with firm managers and business leaders regarding the business environment in their respective sector and productivity of their firms, including questions relating to awareness and usage of blockchain as a technology in BFI, social media usage for business purpose, current issues and gaps in technology adaptation and effective management of collateral for loan assets and how do we build trust with new technology.

3. LITERATURE REVIEW

Digital transformation is the unique divergence of data, advanced analytics, and innovation as a cycle, or process that enables organizations through better, more informed decision-making to create value for themselves and society [10]. Digital transformation journey can be categorized in to three major steps:

(i). Digitization is an automation of manual process by converting analog streams of information to digital data to deal with automated workflow and processes [6]. According to Gartner’s IT Glossary, “Digitization is a process of changing from analog to digital forms”.

(ii). Digitalization is the “process of employing digital technologies and information to transform business operations” leveraging digitized data and process the way social and economic life restructured around communication and media infrastructure to improve data transparency and process efficiency [11]. According to TOE framework “technological organizational and environmental factors influencing the digitalization process”.

Digital transformation is a combination of multiple digitalization project with the intention of “customer driven end to end strategic business transformation that require organization level changes to core competency”. Many scholars defined as opportunities created by digitization in organizational patterns, cultural barriers and transform existing business model, socio-economic cultures, legal and policy measures [12].

In today’s digital world, most organizations are already finding ways to deliver the digital services by offering interactive websites, customer service and improve the customer experience in various channels. However, successful digital transformation could occur depending on strategic objectives of the organization, industry context, peer pressure and expectations of the customers [4]. In Sri Lanka digital transformation has been proceeding from 1980 when the commencement of personal computer introduced to offices and home [12]. In addressing digital transformation issues at banking and financial industry, digital technology offers disruptive financial value chain and deploy to cause the disruption while keep the customer at the center of the development process. Impact
of internet on digital transformation in a developing country like Sri Lanka is exaggerated and success can be based on the usage of internet from grassroots level [13].

4. TECHNOLOGY ADAPTATION IN FINANCIAL INDUSTRY

According to technology adaptation model (TAM), customer adaptation process is beyond perception of convenience and perception of technological usefulness as well as convenience on adaptation intention [14]. Evolution of FinTech started with telex network, and to digitization of financial services such as ATM, e-banking and technological development enabled startup and IT firms provides financial services categorized as FinTech 3 [15]. RegTech evolution is based on internal risk management system followed by technology to enhance regulatory compliance and streamline its component process, as a result transformed in to know your customer (KYC) into know your data (KYD) which resulted in data centric mindset [16]. Digital transformation needs to be anchored in a sound human rights framework [12]. This is because as digital tools and web services become more pervasive in our lives, they can either enhance or inhibit the free flow of information and freedom of expression.

In this article, researcher analyzes how Sri Lanka’s Digital Transformation policy attend to construct ‘go global’ as a factor in reforming the delivery of BFI sector readiness to attract the global economy with recommendation of the implication for information design, accessibility, and affordability. In emerging SME sector, digital technologies can make a significant cost savings by technology adaptation, accelerate development using technology platform [17]. Trends of digital transformation constitutes of four phases such as technology, business, organization and society [18]. Each of these phases are investigated for its relevance for the successful transformation in this chapter. Digital transformation of BFI sector path and operational execution to be defined based on the existing organizational and societal frameworks in order to realize the value of digitization, analyze the behaviors of objects and forecast about customers, organizations used to integrate Big Data across different applications, IT systems and examine the transaction data for decision making. Using deep data analysis, organizations used to reduce the customer churn by analyzing data from internal data as well as social media and CRM applications. Customer engagements towards service providers can be enhanced via digitalized strategies whilst web-based life is a strategic avenue for such initiations Social Customer Relationship Management (SCRM) in Contemporary Business Era [19]. The framework defines developments of smart factory, and revolutionized business model from technological disruption across the IOT and artificial intelligence based on BFI challenges to track the assets to ensure protection of collaterals. Similarly, with the vehicle, IOT can keep track of the engine condition of the vehicle and send alerts when maintenance is required also need to consider practical deployment and challenges such as driving cultural changes, skills gap among workforce, changing customer expectations, and maximizing return on investment [20].

Most emerging new technology with new services try their luck with the customer without impacting the fundamental business processes. WhatsApp, Viber and Skype are the best example for telecommunication business model innovations which can run on top of the existing telecom technology. Having considered the potential to work closely with customers and enabling them where ever they live it is a social channel or physical environment combination of Big Data analytics, robotics, artificial intelligence and internet of thing (IOT). However, only few organizations are taking the full advantages of them. Top technological companies tend to have higher technology intensity index compared to the industry average. According to Harvard Business Review study focused on financial service industry, where digital leaders outperform digital laggards in customer loyalty and ultimately in revenue growth. This holds true for small and medium enterprise as well (Roger, 2017).

Differentiation & innovation are the driving factors of technology changes in any industry resulted in brand awareness, increase process efficiencies and improve customer experience. Entrance of FinTech organization like Uber, PickMe, YouPay, PayMe and similar mobile payment are the key drivers of digital transformation in financial industry in Sri Lanka. That said, strategy has been considered by various organizations and respond to the emerging FinTech challenging traditional banking institution with convenient mobile technology. However, the way FinTech causing disruption, top banking executives fear that a quarter of traditional financial services business will be at a risk of taken away by FinTech [7]. FinTech development in BFI
Technology adaptation in financial industry

Based on physical media
Analog Technologies Banking IT Digital Technologies FinTech
1500 1860 1960 2008

Evolution of financial technologies

Fig. 1. Evolution of financial technologies

provides financial platform starting from bank account creation to track the accounts, transactions, financial planning, manage mortgages and track cash flow using single digital interface supported by an app [3].

5. EMPIRICAL REVIEW

Information technology (IT) is regarded as essential tool universally for the productivity of an organization and competitiveness of the economy of a country. This can be only realized through wide spread usage and IT adaptation, it is important to know the key theoretical mode for individual adaptation and firm level [21]. Further, Rosario et al. (2011) reveal two theories for adaptation model at the firm level namely: diffusion of innovation (DOI) theory and technology, organization and environment (TOE) framework. Moreover, DOI theory explain the antecedence as individual internal and external characteristics for organizational innovativeness while TOE framework analyzes technology, organizational and environmental context influence on implementation and adaptation of innovative technology [21]. Researcher expects to analyze TOE framework with other theories such as DOI, actor network theory (ANT), monetary theory and institutional theory. Individuals are possessing different level of adaptation and generally noticed that segments of adaptation segregate individuals into five categories as explained in the below figure.

Fig. 2. Digital technology adaptation model
6. CASE REVIEW ON DIGITAL FINANCE

In the discipline of finance for small business, economic analysis suggest that BFI to accelerate the market penetration in middle income sector to generate more business opportunities from micro, small, medium size enterprises and startups [22]. Further illustrates SME sector is vital with major contribution to GPD by providing micro entrepreneurs to micro level financial support inclusive, agro insurance and pensions [23]. Major obstacle for the implementation of above recommendation is, unregulated microfinance institution with high profit low expense and lack of competitiveness reluctant to adopt to technology for high level of operational efficiency [24]. The emerging SME sector to focus on behavioral changes to the low income rural users to adopt to technological and financial infrastructure as a platform to streamline the microfinance operation [23].

Registered and non-registered financial institutions have an impact on rural economy in Sri Lanka as every small entrepreneurs and individuals engage with others on a daily basis. Consequently, cost of managing the finance has significant effect on financial behavior of rural economy, living standards and cost of living. Therefore, developing the financial area in the digital format with the involvements of key players for lending space can significantly contribute to ease of doing business, convenience banking and quality financial service at lower cost. This will have significant impact on economic growth in Sri Lanka [9].

7. ARGUMENT ON SRI LANKAN CONTEXT

Digitization is required in all types of markets and organizations adapt with digital changes by carefully identifying the gap in shorter period can survive in the market. The organization with more innovation and globalization has shown more digitization and dictate the digital transformation. The paper examines technology adaptation in the presents of BFI companies in Sri Lanka. The banking sector of Sri Lanka is a prominent scope as a service driven economy, and it requires needful marketing approaches [25]. Technology has broaden the boundaries between online and offline services at rapid pace and traditional way of depositing money and making payment has transformed with the improvement of technology organization captured the new opportunities in the financial market through alternative financial products and services. There are factors influencing the success of BFI industry in Sri Lanka, including raise of private e-commerce companies, government support for innovating the traditional financial system and facilities for payment authorization via the company’s of third party web sites [26]. Successful digital transformation in BFI industry is closely linked to the technology development as well as central bank of Sri Lanka’s policy could make suitable innovative solutions and evolution of FinTech presence in the BFI industry could play significant role in the overall growth of Sri Lanka BFI sector. Until Sri Lanka’s technological strategy has been characterized by government intervention in favor of FinTechs presence in direct transaction with customer, Sri Lanka to follow the international platform such as PayPal to depend and follow in the footsteps of developed countries for the cross-border transactions.

In this article, researcher made a review literature of IT adaptation model in organizational level, most empirical studies are derived from DOI theory, ANT theory and TOE framework. TOE framework can be used for intra-firm technology adaptation as well as potential of application information system adaptation. Extensive analysis to be taken place for this reason to use TOE framework, DIO theory and ANT theory.

8. DISCUSSION

The ultimate goal of this research is to bring together the evolution of technology phenomenon and to drive the formative elements which may assist to illuminate why FinTech delivers disruptive potential for the financial industry and goes beyond simple linear continuation of current development. According to the COO of a private sector bank, “customer interfacing applications are medium to high level technology adaptation ratio while back end systems are medium level adaptation”. Banking model expects radically different changes to the main fundamental functions of the system in such way provide the essential financial services at lower cost. All banks in Sri Lanka are established in different ways and their revenue streams are linked to history and all business models are in the traditional sense. However, if we look at other parts of the world, they don’t have any history hence traditional banks as well as non-bank organizations conduct banking business operations. China’s social network
offers digital content and gaming through platforms such as QQ and WeChat, now they have developed an internet based system to connect customers and merchants without being based on a simple “intermediation” model, similar to the way first generation digital marketplaces. The system capitalizes on all the data, structured and unstructured, that is able to gather and mine, generating intelligence used for profiling best merchant and consumer experience as well as value propositions [6].

In Sri Lanka, smart phone usage is growing and lower cost handsets are available, while cost of data packages is still high compared to rural earning power. In time, data packages also will become more affordable and assist the adoption of BFI digitization. To structure transformation of banking and financial industry, framework can be defined for banking, insurance and regulation at three transformative levels: internal, network and external [27]. Following steps were taken to interview with stakeholders and summarize the qualitative content analysis.

According to CEO of a regulatory agency in Sri Lanka “Few Banks using blockchain technology in few application, however, there should be a bigger initiatives in national approach to use blockchain as a technology to educate the corporates and making users comfortable to use this technology. BFI need to consider practical deployment of IoT to monitor risk for a loan thereby reducing the likelihood of engine condition of the car, crop failure on one hand, while reducing wastage on the other, a bank could track this to ensure protection of collateral. Initiatives like RFID, and NFC for public transport and toll fee payment systems must be done in conjunction with the Central Bank so the solution is robust and properly governed” [28]. Privacy regulation alignment to GDPR is a possible way of adopting required privacy for distributed ledger [29]. Public sector bankers revealed “Loans for housing and land require title searches which can be very time consuming and expensive. While most loans are backed by collateral, there are cash flow based loan products. With better credit scoring, hopefully non-asset based lending can grow. An example is Credit Cards which are typically unsecured credit, and a high growth product for most banks”. Public sector bank CFO revealed that “a strategy similar to market skimming could be used to accelerate adoption, by initially focusing on early adopters and those segments that are more profitable, followed by other segments”. Using the concept of a global digital citizen, approaches from more developed regions can also be used in Sri Lanka rather than trying to determine a unique approach [30]. Parallels of this approach in the past were Blue Jeans, Music, etc., that cut across national borders. A private sector and public sector bank heads reveal "for Start-ups where the loan required is small, assistance should be provided to develop standard business case templates to make it easier for a bank to determine credit risk. Organization like Angel Investors are available to assist with developing these business cases. Meantime, the banking industry should be

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<th>Company</th>
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<td>A</td>
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<td>CEO</td>
<td>75</td>
<td>Regulatory Agency</td>
<td>Personal interview; audio recorded and transcribed, duration 45min</td>
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engaged to help develop these templates. Banks also have a responsibility to have staff who understand start-ups and can provide expert credit evaluation. There should be an initiative from state and nonstate supportive activities for entrepreneurship from a funding and knowledge perspective, setting up funding for fund Investment Company by government to invest in private venture capital funds. New tax policy to be introduced in order to promote innovations and Startup to come forward”. Head of IT of a FinTech organizations discloses following expectation from Central Bank “to fast track the launch of Sandbox and become comfortable with innovation which will allow innovation to be tested and implemented much faster than at present. Also FinTechs follow a discipline around payment systems rather than looking at it only as just technology and consumer protection is a foremost consideration”.

9. CONCLUSION

Although the BFI industry has conventionally existed an early adopter and rigorous user of new developments of technology, innovative business models have an incredible impact on current industry dynamics with high competition. Against this background, most companies in the business to design customized, smart, flexible, and cost-efficient financial products as well as services and attempt to succeed new levels of customer centricity. By reviewing the literature, it is evident that advanced technology application leads to digital adaptation and speed of transformation significantly influence the sustainability, profit and market position of the organization. Creativity and innovations are crucial for the survival of the organization along with technology adaptation and digital business strategy by top management and board of directors. Even though Sri Lankan organizations are highly innovative, low creativity leads to average productivity. Less innovation companies will lose to high innovative companies. Also, it is revealed by many scholars that innovation is an alternative to price competition and it can complement many advantages for the customer. Sri Lankan banking sector demands considerable employee related and process related developments. According to the annual report of Central Bank of Sri Lanka, financial sector of Sri Lanka has attributed intensive competition ,say between banking and non-banking institutions (31). Thus, knowledge related insights are critically important to discuss the avenues of strategizing finance sector of Sri Lanka. Accordingly, researcher intended to propose a framework which aims to provide overview of digital transformation BFI and create a business model. To situate this analysis and uniqueness of this context, researcher surveyed and evaluated Sri Lanka’s recent information policy development against international measures. It is revealed by the current study in the field, lot of new insights will be gained throughout the research which will allow us to draw a much better proposition of the business model changes for traditional banks, financial company and insurance companies in the future to sustain in the market.

In the context of digital transformation, researcher has found from literature that increasing importance of Big Data, IOT, robotics, cyber security, artificial intelligence Blockchain and crypto currency in the context of the BFI transformation (32). Based on review of literature, business structures will evolve based on the potential to develop value streams offered on the basis of new data processing solutions and organizational implications (33). In our view, precise roles examine the capacities for BFI and could reveal how they will transform their business with high level of technology adaptation. The future of FinTech solutions will be focused both by innovations on the technology level and by the response of regulators to the new developments. Customers will appreciate technological solutions that affluence usage and moderate transaction costs (32). Beyond this, agreed the great forces at work in this field and the essential for fast, however well-organized regulatory answers, any theoretical comprehensions on the effect of regulatory processes in the BFI sector will be greatly appreciated.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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