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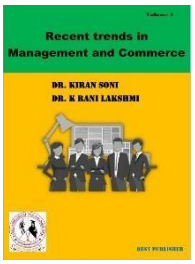

An Empirical Investigation of Innovation and Technology in Banking

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Abstract: *As proven by both private and public banks, IT-enabled innovation has had a substantial influence on a range of industries, including banking. These financial institutions value innovation and have achieved success as a consequence of technical breakthroughs. The increased competitiveness has compelled all players to act more rapidly. As a result, public sector banks have experienced substantial transformations, and consumers are now confronted with a slew of new options. These banks, which previously depended on traditional methods, are now proactively getting out to the public through billboards, FM radio, and other media outlets. In addition, endorsements from famous people are becoming more common in government entities. The widespread usage of basic banking processes has increased banks' need to innovate. Client satisfaction increases as a consequence in both public and private banks. The study's purpose is to investigate how new technology effects customer satisfaction in Bhopal's public and commercial banks. Customer data obtained from these banks was reviewed, with substantial results. In terms of innovative successes, private banks outscored state banks, according to the poll. Rising banking rivalry is widely considered to have had an immediate influence on how financial institutions prioritize customer-oriented operations and define company goals. Considering the significance of technology and innovation in the modern economy for strategic management, business development, and economic success, new approaches to understanding the relationship among technological innovation and financial services are critical. These unique strategies are required for gaining an advantage over the competition. With this in mind, the goal of this study is to investigate the basic implications of technological innovation on financial services at the bank's location level, specifically through an examination of customer-facing staff input. According to the findings, information and communication technology is critical to the sector's performance. The paper also examines the empirical study's practical implications, strengths, and limitations.*

1. INTRODUCTION

A bank is a sort of financial institution that accepts deposits and lends money to people. Following economic liberalization, the participation of both public and private banks in India's financial sector has risen dramatically. India's banking system has reached an intersection as the economy of the nation expands. Marketing principles has been utilized by service-based organizations since the advent of private corporations into the banking industry (Apte, 2006). According to industry sources, the Indian banking sector has grown quicker than the remainder of the economy, resulting in higher GDP levels. Banking advances in the twenty-first century have transformed the way banks work. India's monetary liberalization has had a huge impact. The monopolization of banks strategy has been tremendously effective in increasing the general amount of branches of banks (Kaul and Ahmed, 2005). Nationalization was utilized by the Indian government to limit the management and oversight of banks by a limited number of significant commercial enterprises. This program attempted to avoid the accumulation of wealth and influence in the economy by additionally mobilising regular people's savings. Financial services, business banking, corporate banking, brokerage services, and NRI financing are all examples of banking services. Furthermore, banks have gradually provided value-added services for their consumers (Pahuja and Kaur, 2007). As a result, customers now have more options for doing financial transactions. Financial institutions have grown easier to use than ever before as a result of technical developments and the use of cutting-edge technologies. Banks play an essential role in economic activity, and the public relies on a strong and stable financial system. This

significance is due to the banking sector's links to the real economy, and also from the provision of a dependable settlements and payment method (Kapila & Kapila, 2001). Consumer banking, commercial banking, finance, insurance, investment banking, mortgage loans, private equity, savings, securities, asset management, wealth management, and credit cards are all being provided by banks. Most governmental and commercial banks in India have adopted modern marketing methods, with Internet banking functioning as a critical tool. Consumers no longer need to go to a bank because they can do nearly every financial transaction on their computers or mobile phones. Setting up accounts, checking balances, completing transactions, paying taxes, handling bills, obtaining loans, and a variety of other tasks may all be done online. Service providers who are seeking creativity want to know how to use new technical developments to streamline and speed up processes, save money, improve service delivery, and strengthen customer connections (Lovelock, 2004). Basic banking has grown into a situation which helps both banks and customers. The State Bank of India (SBI) group distinguishes out as an innovator in banking procedure automation among all Indian banks. In terms of income, assets, and market value, this is the biggest and oldest bank. In March 2016, the State Bank of India (SBI) generated US$41 billion from a network of over 14,000 branches, comprising 191 international operations. The bank was nationalized by the Indian government in 1955, with the Reserve Bank of India purchasing a 60% interest and renaming it the State Bank of India. In 2012, it was ranked 285th on the Fortune 500 list of the world's largest firms. Furthermore, Forbes ranked it as the 29th most trustworthy firm in the world. The largest private sector bank in India is the ICICI Bank (Industrial Credit and Investment Corporation of India). This 1995-established bank is India's second-largest by assets and third-largest by market capitalization. It offers an extensive selection of financial services and banking services to individual and business customers through a number of channels. In addition, the bank has subsidiaries that focus on financial services, life and non-life insurance, venture capital, and asset management. It has a wide network with 4,450 branches and over 14,000 ATMs in India, while its foreign presence has extended to 18 countries. Regional offices are located in China, Thailand, Malaysia, South Africa, Bangladesh, and Indonesia, with headquarters in the United States, Hong Kong, Singapore, Sri Lanka, Bahrain, Qatar, and Dubai. In India, the State Bank of India implemented automation in 1995. During this early era, a computerized system eventually superseded the manual entry process. To boost operational efficiency and productivity, several tasks, such as passbook input, demand draft generation, fixed-income administration, and additional procedures, were automated. To develop links and enhance branch operations, computers were supplied to all banks linked by the local area network. These efforts attempted to promote bank efficiency and customer satisfaction, both of which were typically successful. [1].

FIGURE 1. Innovation and Technology in Banking

The ongoing global recession is largely considered to have increased global competitiveness in the banking and financial industries. This heightened competitiveness, fueled by worries about globalization, has had a direct influence on how banks establish business plans and connect with clients to gain a competitive edge. Portuguese financial institutions do not constitute an exception in this regard. Although the precise causes and remedies to the current economic crisis have been debatable (see Beltratti and Stulz, 2011; Kowalski and Shchmurove, 2011; Puri et al., 2011; Spahr and Ferreira, 2011; Yeager, 2011; Wu, 2012; Xiao-yan et al., 2012), widespread agreement exists that capitalizing on technological innovation and financial services is critical for gaining a competitive advantage. Indeed, technology advancements not only enable lower prices, but also provide a variety of new chances for organizations to raise their efficiency in novel ways. This notion is supported by several sources (Ferreira and Cravo, 2004; Adekola et al., 2008; Melnikas, 2010; Pinto and Ferreira, 2010, Kim et al., 2011, Sawng et al., 2011). Given this, it is necessary to do research on the basic effects that technological innovation for the banking industry at the branch level. Since "bank branches serve as the main point for communication where consumers have access to services to build assets or receive credit" (Serna, 2005, p. 2), it is critical to comprehend a number of issues, including the expectations set for bank branch employees and the changes supported by the banking sector. Furthermore, it is critical to determine if present and future bank clients have policies in place to address the sector's growing use and growth of communication and information technology (ICTs). This study

extends on previous research through Pinto and Ferreira (2010) and Ramos et al. (2011) in terms of technique by giving data acquired via direct questions, specifically questionnaire surveys, from front office staff in the Santarém area of Portugal. There has been no previous research that assesses the outcomes from a direct investigation involving bank branch staff in order to assess the influence of technology improvements on financial services. The remainder of the piece is structured as follows: The first section examines the relationship between internet distribution with retail banking, in addition to the most recent reforms to Portugal's banking system. The second section looks into the methodology used to explore the link between technological innovation with financial services, especially at the branch level. The findings of this investigation are presented and discussed. Finally, the report provides a summary of the study's findings as well as recommendations regarding further research. [2]

2. INNOVATION

Despite the reality that the word "innovation" is commonly used, many businesses fail to achieve it. This issue may develop because the majority of data on innovation adds to misunderstandings. To effectively integrate plus reap the benefits from innovation, it is vital to know that it is made up of three unique components: a result, a strategy, plus a mindset. Product innovation, process innovation, marketing innovation, business model innovation, supply chain innovation, and innovation in organizations are some examples of outcomes. Innovating as a strategy necessitates organizing the procedures required for innovation to take place, which involves both an overall invention method and a process for developing new commodities. Creativity as a style of thinking refers to the process of employees inside an organization adopting and implementing creative ideas while also creating a supportive environment that allows creativity to thrive. This comprehension comprises identifying important components, concepts, and language associated with innovation, which leads to better decision-making and, ultimately, raises the likelihood of successful innovation. [1]

FIGURE 2. Innovation

Over the last decade, the importance of innovation in the social sciences has grown, possibly surpassing the ephemeral and uncertain worth formerly held by small number research. Similarly, the study of innovation encompasses anthropology and economics as well as a single subject. This widespread interest in innovation is understandable, given that research in this discipline gives light on crucial behaviors demonstrated by individuals, corporations, and governments, with significant social implications. Even the most obscure study findings on innovation have a degree of generality that is becoming increasingly rare in the fast expanding specialized area of social science. The innovation idea is still highly appreciated and cherished. According to Nelson (1972: 39), ingenuity, like efficiency, is a desirable characteristic for social entities. While the principles of expansion and development have fallen out of favor due to a shift in thinking, innovation, especially when seen beyond basic technological developments, is still connected with progress. Unfortunately, the theoretical significance of current studies on innovation is dubious. One worrying feature of empirical studies in this industry is the wide disparity in their conclusions, which we refer to as stability. The significance of determinants of innovation discovered in one study is frequently decreased, pronounced irrelevant, or even reversed in another. This constant trend is noticeable. While some variation in outcomes is expected in social science research, the topic of innovation is more complicated than simple interpretation. Despite much effort, the outcomes have not been integrated or expanded upon. This is not to argue that previous research has been ineffective. When properly prepared and examined, it may be a valuable source of proof for key theoretical concepts. Before most of this material can be regarded relevant, Rogers and Shoemaker's 1971 (p. 346) unified theory must be advanced. [3]

3. TECHNOLOGICAL INNOVATION

This study investigated the relationship between communication and technological progress. The primary goal was to investigate how organizational and researcher communication patterns influenced the efficacy of technological developments. The study had two goals: the first was to look into the impact of interactions on technical innovation at the individual level, and the second was to look into the impact of interpersonal contact on technological innovation. Data was gathered from 117 principal investigators involved in Sea Grant research, which were chosen at random from a pool of 495 activities. The data was examined using multivariable plus partial correlation techniques. According to the statistics, trade frequency, relevancy, and diversity all have a beneficial impact on individual technical advancement. Communication regularity has a bigger impact than communication importance and diversity. Furthermore, formal communication was found to have a negative impact on technical innovation. On a broader scale, technology growth is connected with increased communication unity, relevance, and variety. These findings have various practical implications for managers, including the promotion and facilitation of information sharing between academics and organizations, the expansion of joint studies, and the facilitation of collaborative procedures. [1]

FIGURE 3. Technological Innovation

A set of interconnected acts and endeavors are required for innovation. Current technology and scientific troubleshooting rely heavily on information sharing and accurate processing (Fischer 1980). Problem-solving is an important part of the innovation process, emphasizing the need of communication and information analysis. Because distinguishing between communication and information processing can be difficult, we shall treat them as synonymous for the purposes of this essay. Communication is important to the success of almost any endeavor, as professionals from various professions have carefully researched and stressed. Allen and colleagues (1979); Katz and Tushman (1979); Lee and Allen (1982); O'Reilly and Pondy (1979); Rothwell and Robertson (1973); and Tushman (1977) explored the role and function of interaction in accomplishing effective scientific study and technological innovation. The goal of this research is to look at how different aspects of communication encourage innovation. The study investigates the impact of individuals and organizational communication on the effectiveness of Sea Grant Research initiatives. [1]

4. INFORMATION TECHNOLOGY

The pervasiveness and use of information systems and technology has attained commodity status, approaching a degree of nearly ubiquitous presence comparable to labor. American firms spent more money almost information technology than almost everything else in 1991. Spending on computers and related services more than quadrupled from more than $80 billion in 1984 to a little more than $160 billion in 1998. A number of software platforms including databases are included in information systems. These systems, which are designed to handle a company's basic activities, are provided by companies like SAP, PeopleSoft, JD Edwards, Oracle, Microsoft, among others. They range from massive structures to highly specialized database systems. Voice mail, email, video and voice conferencing, the internet, groupware, corporate intranets, car phones, fax machines, personal digital assistants, and numerous other information technologies that connect information systems and people are examples of information technologies that connect information systems and people. Evans (2000), Hickman (2000), Kathleen (2000), McKendrick (2000), Menezes (2000), Andolsen (2000), Campbell (2000), Edwards (2000), Schober (2000), Spiegelman (2000), Tarabour (2000), and Wildstrom (2000). Information systems as well as data technologies are frequently inextricably linked, and the phrase "information technology" (IT) is now used to refer to both. As a result, we shall refer to that integrated idea as IT for the rest of this research. [2]

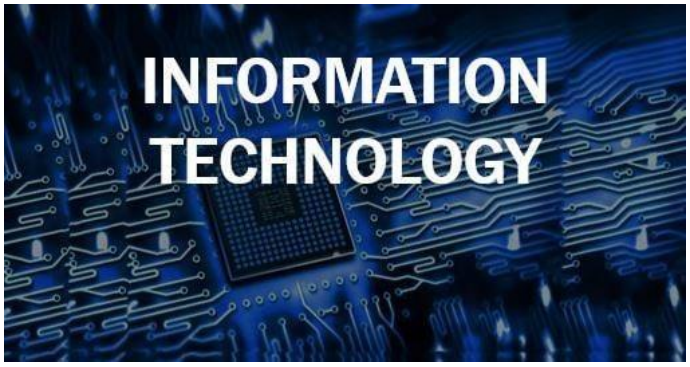

FIGURE 4. Information Technology

Practitioners and academics alike are growing more interested in the organizational aspects for information technology development its use. The identification of "implementation" with "organisational implications" as major factors in the field for information systems emphasizes the need of investigating these topics. However, there have been criticisms regarding inconsistencies within study findings, and also the lack of integration or creation of comprehensive theoretical frameworks in these domains. Attewell with Rule (1984), Markus with Robey (1988), Culan (1986, 1987). Researchers frequently address the problem from a practical angle, for example, how customers embrace information technology or ways to conquer user resistance. Unfortunately, in their studies, they frequently overlook the underlying essential components of organizations. As a result, this research strategy fails to provide a body of information that can be used by operators and other researchers. It is important to emphasize that not all of these criticisms should be leveled only at information system researchers. Organization theory, which provides the framework for the majority of this research, raises basic metaphysical and epistemological issues [Burrell and Morgan, 1979]. Recent research indicates that present-day perspectives differ significantly from one another in their assumptions regarding the causes of structure, the significance of human intentions and actions, the influence of environmental factors, and so on (Grandori, 1987; Hartman, 1988; Morgan, 1986; Perrow, 1986; Pfeffer, 1982; Scott, 1987; Van de Ven as well as Joyce, 1981). Attempts to bring these various points of view together, or merely acknowledge their similarities and differences, have mostly failed. As a result, anyone examining complex businesses, particularly those interested in information systems, will find this piece difficult. [4]

5. FINTECH

The word "FinTech" is derived from the phrase "financial technology" and refers to companies or individuals linked with companies that merge cutting-edge, innovative technologies with financial services. These new market rivals frequently provide internet- and application-based products. FinTechs attract customers by providing userfriendly, efficient, transparent, and robotic goods and services that beat competitors' offerings. Traditional banks continue to be underutilized in these areas (EBF 2015; Mackenzie 2015). [5] The Fintech industry is quickly increasing and rising. Fintech investment rose by 75% in 2015, totalling USD 22.3 billion higher than the previous year, based on Skan et al. (2016). Since 2010, over USD 50 billion have been invested into Fintech companies worldwide. According to current estimates, around 12,000 Fintech enterprises operate internationally (Drummer et al., 2016). Furthermore, experts anticipate that Fintech growth will continue to be disruptive (Schneider et al., 2016). Since its start, fintech has played a significant role in driving innovation in the financial services sector. In this research, Arner et al. look into the evolution of Fintech. In the words of (2015, p.1), fintech growth is a continuous process whereby technology and finance have progressed in tandem. This advancement has resulted in a wave of incremental and disruptive innovations such as Internet banking, mobile payments, crowd funding, peer-to-peer lending, Robo-Advisory, online identities, among many more. Similarly, Chishti and Barberis (2016) provide an extensive collection of case studies that demonstrate how the confluence of finance and technology has fuelled innovation within the financial services sector. These possibilities include the creation of new startups such as eToro, the revival of old firms such as Citi, government improvements such as those seen in Israel, and coordination among supraorganizations such as SWIFT. In all of these examples, fintech has dramatically increased innovation. Its capacity to innovate and potentially disrupt the financial services industry has had farreaching and long-term consequences for the whole industry. According to industry analysts, the impact of fintech will affect every aspect of the firm. [1]

FIGURE 5. Fintech

FinTech, or the merger of financial services and information technology, is widely considered to be a new trend. Finance and technology convergence, on the opposite hand, has a lengthy history, having both industries influencing and assisting one another over the years. The 2008 Global Financial Crisis marked a watershed point in the progression of FinTech into a new era. This tendency poses challenges for policymakers and market participants as they strive to balance the advantages of creativity with the risks associated with it. This conundrum is especially evident in rising markets, particularly Asia. [3]

6. TECHNOLOGY AND BANKING

The majority of banks arrange the lending process by building many branches, each of which serves a separate local credit market. A local branch manager (abbreviated LBM) is typically in charge of obtaining information about prospective lenders, particularly small and medium-sized firms. The LBM gathers vital information about a company's creditworthiness, contacts the market's most promising potential debtors, and reviews loan applications through personal connections with the company's management and the local community. To ensure excellent decision-making, the person in charge of making decisions must be educated about the issue. On the other hand, providing information may be costly. As a result, delegating specific decision-making authority to smaller-scale bank managers (LBMs) is advantageous, particularly when lending to small enterprises. Nonetheless, institutions may incur additional costs as a result of principal-agent models since LBMs may prioritize personal gains over enhancing the bank's profitability. As a result, determining the ideal amount of delegation entails balancing these agency charges with the costs for internal information conveyance. Over the last few decades, the rising usage various ICT (Information and Communication Technologies) within the financial industry has had a range of repercussions for this delicate balancing act. To begin with, it has significantly improved the CEO's capacity to assess and supervise the work performed by the LBM (Local Branch Managers), leading to lower agency expenditures and more centralization.In contrast, information and communication technology (ICT) has played a role in lowering the costs of upward communication and addressing the issue of information overload faced by CEOs, thereby increasing the capacity for higher-level decision-making within an organization's structure. Moving away from these contradictory consequences, the purpose of this study is to examine if the introduction and ICT (information and communication technology) changes the distribution the authority for making decisions inside the bank's operational structure. This is especially notable given that it is commonly assumed that a self-sufficient and adaptive technology-based management system may boost loan availability for small enterprises with minimal transparency and assessment issues. [1]

FIGURE 6. Technology and Banking

The technological transformation process in corporate organizations is a complex combination of management techniques, technology, and organizational structure. Perceiving this transformation solely as a result of enterprises reacting to the effect of technology, on the other hand, is regarded as a failure to recognize significant strategic

decisions made by management during the innovation process. Indeed, an increasing number of writers feel that top executives must adopt a strategic approach while making technology-related decisions, particularly in the field of information technology. Several proposals for excellent technology management have been presented in strategic planning. Some of these suggestions emphasize the value of including non-financial considerations in decision-making, while others emphasize the importance of enhanced communication between R&D and marketing personnel in new technological initiatives. [4]

7. CONCLUSION

Product differentiation is challenging for financial services organizations due to the simplicity with which their ideas may be duplicated. Furthermore, as client expectations for retail banking services have grown, providing these services has been crucial to maintaining a competitive advantage. Changes in retail banking service distribution have been influenced by both the demand and supply sides, with branch systems undergoing alterations to make them more customer-friendly and marketing-focused. More drastic changes, on the other hand, take longer. The current level of technology enables a cashless society, which will have a substantial impact on the distribution of financial services The general population has been cautious to adopt more sophisticated means of service delivery thus far. First Direct, on the other hand, has achieved success by merely substituting phone conversations for face-to-face meetings, proving that they have uncovered the amount of innovation that the banking sector is prepared to absorb. The dynamic nature of this barrier, without a doubt, causes a key strategic conundrum in the sphere of banking and financial service delivery. Given current technical breakthroughs, the biggest issue right now is the rate at which this barrier will be breached. In this day and age of global economic digitization, banks are adopting new financial technology to provide an increasing variety of inventive means of engaging with clients. They provide a diverse selection of goods and services that are accessible from anywhere on the planet. Bank-customer relationships have advanced to a higher level of service, with innovative methods of obtaining services, a customized strategy for serving customers, the introduction of tailored retail banking services and goods based on individual consumer preferences, and client empowerment through self-service and online financial transactions. Customer service efficiency has increased dramatically, resulting in higher monetary transaction quality and security. As a result, bank clientele has grown and profits have surged. Banks gain a substantial competitive advantage in the financial sector by cooperating with financial start-ups and leveraging FinTech efforts, presenting themselves as industry leaders.

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