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ADOPTION OF INTERNET BASED TECHNOLOGIES IN ACCOUNTING: BANKING PROFESSIONALS' PERCEPTION

Abeygunasekera, A. W. J. C.
Department of Accounting, Faculty of Management & Finance
University of Colombo, Sri Lanka

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Abstract

Internet-based technologies such as big data, cloud computing, artificial intelligence, Internet of things, robotic process automation, blockchain, etc. influence the traditional accountants' role and the accounting process despite their limited adoption within the accounting field. Why there is a minimal adoption of these technologies in accounting is less investigated. Therefore, this study endeavoured to identify the internet-based technologies that are used in the Sri Lankan banking sector, and identify the perceptions of the banking professionals on the underlying reasons for the limited adoption of internet-based technologies in accounting. Seventeen online interviews were conducted in two large licensed commercial banks, and data were analyzed inductively; the results are discussed, using the process of institutionalization by Tolbert and Zucker (1996) and the Technology acceptance model by Davis (1989). Robotic process automation (RPA), data analytics, artificial intelligence, and cloud computing were used at the banks at varying levels. Lack of technical knowledge and experience in using technology among accounting professionals; fear/reluctance in adopting advanced IT solutions; feeling of undue influence from IT staff; and the already institutionalized accounting practices resulted in lack of adoption. These technologies are still at the stage of pre-institutionalization, and for them to reach full institutionalization stage, improving the current levels of IT skills of accounting professionals; incorporating IT skills into their skill set; attempts for more rationalization/theorizing; facilitating the visualization of positive outcomes; increasing interest group advocacy; and an increase in the perceived usefulness and ease of use among staff is necessary. This study's findings enable the promotion of internet-based technologies within banks and open new avenues for research.

Keywords: Accounting, Artificial Intelligence, Banking, Cloud Computing, Data Analytics, Robotic Process Automation

Corresponding e-mail: jabeygunasekera@dac.cmb.ac.lk

1. Introduction

The development of Internet-based technologies such as artificial intelligence, big data, blockchain, cloud computing, robotic process automation, internet of things, etc. have formed revolutions in many fields, including the banking industry. With the emergence and use of these technologies, the existing structures are interrupted, and the industry boundaries have become unclear and blurred; the manner of creating and delivering products and services has changed, new openings for entrepreneurship is facilitated; and more democratic access to financial services is enabled (Admati et al., 2014; Buchak et al., 2018; Philippon, 2016). More specifically, these technologies seem to facilitate the attempts to minimize customer acquisition costs, risk control, operating costs and improving efficiency and enhancing user experience of customers (Samar et al., 2017; Wang et al., 2021). Scholars suggest that the finance industry requires special attention and investigation in using these technologies as this sector handles and analyzes large amounts of data (Cockcroft & Russell, 2018; Huttunen et al., 2019).

At the same time, in the accounting field there is limited adoption of these technologies (Huttunen et al., 2019; Moll & Yigitbasioglu, 2019), and there seem to have a considerable influence on the traditional accountants' role and the accounting activities due to the vast amount of data being used during the process (Cockcroft & Russell, 2018). With the limited empirical investigations on why these technologies are minimally adopted in accounting (Huttunen et al., 2019) and the requirement in the finance industry to investigate the use of these technologies, this study attempted to *(1) identify the internet-based technologies that are used in the Sri Lankan banking sector; and (2) identify the perceptions of the banking professionals on the underlying reasons for the limited adoption of internet-based technologies in accounting.*

In doing so, the researcher adopted a multiple case study approach, and interviews were conducted with 17 employees in two large commercial banks. The data analysis was done inductively; however, the factors identified to influence the limited adoption through the analysis were subsequently discussed from the lenses of the institutionalization process of Tolbert and Zucker (1996) and the Technology Acceptance Model (TAM) of Davis (1989).

The next sections of this paper are structured as follows: Section 2 presents the literature on the leading technologies identified within the banks in Sri Lanka together with details on the Institutional theory and Technology acceptance model. In Section 3, the methodology used is presented, followed by the findings on the type of internet-based technologies used and the

underlying reasons for lack of adoption in Section 4. Next, the discussion is presented with suggestions for the promotion of adoption in Section 5, followed by the implications in Section 6 and conclusions in Section 7.

2. Literature Review

Technology-enabled banking tends to reduce the cost of banks and increase competitive advantage, while the development of information technology has changed the business models of the banking sector. During the adoption process of these technologies, banks face many challenges: scholars discuss these challenges in terms of online/digital banking/e-banking (He et al., 2021; Karthikeyan & Soniya, 2016; Kaur & Ali, 2021), ICT adoption of customers (Mwashiuya & Mbamba, 2019), etc. and these challenges inhibit the adoption as well. However, there is a dearth of studies in the banking sector that discuss internet-based technologies and their extent of adoption. When discussed within the banking and finance industry, these internet-based technologies such as artificial intelligence, big data, blockchain, cloud computing, robotic process automation, internet of things, etc. are referred to as fintech (financial technology) also. In general, fintech refers to the application of a range of advanced technologies that will support the developments in the finance industry (Darolles, 2016; Pedersen, 2015). However, within this paper, only the term internet-based technologies will be used. Among the vast number of technologies that can be discussed under internet-based technologies, the four identified within the study context are discussed next, followed by a brief explanation of the institutionalization process and the TAM.

2.1. Big Data and Analytics

In general, when defining big data, three Vs are used, and they are referring to Volume, Velocity, and Variety. Scholars and practitioners also included many additional Vs from time to time (Gandomi & Haider, 2015; Tonidandel et al., 2018). A commonly used definition of big data states that, big data 'is high-volume, high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation' (Gartner, n.d.). This big data is unstructured, voluminous, and with high speed (Moorthy et al., 2015).

Big data analytics is a type of advanced analytics that allows the processing of large volumes of big data collected. Analytics can be classified into four groups as: descriptive (focused on the past); diagnostic (focused on the present); predictive (focused on the future); and prescriptive (focused on the future) (Balali, 2020). The process of extracting information can

happen in five stages: (1) acquisition and recording; (2) extraction, cleaning, and annotation; (3) integration, aggregation, and representation; (4) modeling and analysis; and (5) interpretation. These five are grouped into two sub-categories: (1) data management and (2) analytics. Data Management includes the technologies used to acquire, store, and prepare data, whereas Analytics includes extracting insights from the data gathered (Gandomi & Haider, 2015).

Big data and analytics can be used to improve organizational performance (Shabbir & Gardezi, 2020), and big data analytics and data science applications (such as data mining, data visualization, and machine learning) can be used in budgeting and investment decisions within accounting and finance fields (Huttunen et al., 2019).

With Big data and data analytics, banks have attempted to improve the processes related to acquisition, processing, and storage of data and focused on real time knowledge creation and decision-making (Edu, 2022; Labun, 2016). Understanding customer needs and the market dynamics in the banking industry (Saxena & Ali Said, 2017) while fully projecting on customer centric outcomes (Hajiheydari et al., 2021) with real-time customer focus (Ali et al., 2020) is facilitated with big data. Banks can understand the strategic issues with greater precision with the use of big data (Saxena & Ali Said, 2017) while creating new financial products, financial management, operational optimisation, and employee collaboration is also enabled (Hajiheydari et al., 2021). Scholars have also stated the ability to regularising reporting, sentiment analysis, control of anti-money laundering attempts and accessing a wider network (Ali et al., 2020; Edu, 2022; Sun et al., 2019) within the industry with the use of big data and analytics.

2.2. Artificial Intelligence

Artificial intelligence has been a goal of computer scientists since the mid-19th century. It enables a computer program or a machine to think independently and learn based on experience and is most similar to a human's behaviour. Artificial intelligence and expert systems incorporate intelligence into the databases to perform tasks and assist users without human involvement. Innovations in natural language processing, machine learning, statistical techniques such as classification and clustering, etc., are included under artificial intelligence (Sutton et al., 2016). In machine learning or cognitive computing, the system learns by example without human intervention, and probabilistic frameworks are used to infer reasonable models to explain detected data (Ghahramani, 2015). As per Brynjolfsson and Mcafee (2017), it can evolve and capture the tacit knowledge that is inherently difficult to

program. Therefore, it can better approximate human intelligence (as cited in Moll & Yigitbasioglu, 2019).

Artificial intelligence is used commonly in tasks such as authorizing and screening credit, risk analysis of mortgages, financial and economic analysis, default and bankruptcy predictions, discovery of management fraud and risk rating of exchange trade, etc. (Moudud-Ul-Huq, 2014). Though it creates more opportunities for accountants to improve efficiency and provides more insights while delivering extra value to firms (ICAEW, 2018), artificial intelligence systems can also become biased in certain instances of making decisions based on system attributes (Chen & Koufaris, 2015; Seow, 2011) and the expertise or experience levels of users (Jensen et al., 2010).

2.3. Robotic Process Automation

Robotic process automation is a 'novel class of software tools that automate tasks, or entire business processes, which are heavily based on clerical work' (Dumas et al., 2018, p.361). 'It is currently seen as a way to quickly achieve a high Return on Investment' (van der Aalst et al., 2018, p.269). Robotic process automation enables automating repetitive manual tasks. And it is advancing at a pace that has become a part of a more significant move toward low code or no-code tools (Aguirre & Rodriguez, 2017; Dumas et al., 2018; Mullakara & Asokan, 2020). It can also be considered a point of transition between extensive business process automation and human work (van der Aalst et al., 2018).

Some scholars state there are two kinds of robotic process automation: attended automation and unattended automation (Mullakara & Asokan, 2020). Some others refer to a third category, intelligent process automation or cognitive robotic process automation (Taulli, 2020). When deciding on the approach for the automation of processes, consideration should be given to organizational capabilities, available finances, and required time (Hofmann et al., 2020).

Artificial intelligence and cognitive automation components can be combined into the robotic process automation tools and make them more powerful. The combination of robotic process automation with artificial intelligence is often referred to as Intelligent Robotic Process Automation (IRPA) or Smart Robotic Process Automation (SRPA), as part of intelligent automation in general (Kirchmer & Franz, 2019). These may become more useful for business firms than mere robotic process automation attempts.

Benefits of robotic process automation include improved productivity, rapid results, low start-up costs, reduced processing costs, improved quality, and accuracy, improved

compliance (Mullakara & Asokan, 2020), increased return on investment, increased efficiency, and relative ease of implementation (Taulli, 2020), etc. However, with Robotic process automation, there can be an increase in job losses in the future. As cited in Taulli (2020), a survey from Forrester had predicted that software automation will make a 9% loss of the world's jobs by 2025.

2.4. Cloud Computing

As cited in Ruparelia (2016, p.4), according to the National Institute of Standards and Technology (NIST), 'cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction'. Cloud computing combines two main trends in information technology (IT), i.e., IT efficiency and business agility (Marston et al., 2011). The manner the information technology resources are 'invented, developed, deployed, scaled, updated, maintained and paid for' are changing with cloud computing (Marston et al., 2011, p.1).

Among the four possible cloud deployment models (i.e., private cloud, public cloud, community cloud, and hybrid cloud) (Mulholland et al., 2010), the public cloud is the most attractive one for business firms (Babcock, 2010). This is mainly due to the vast number of benefits that can be gained, as identified by Moll and Yigitbasioglu (2019) in their review. Cloud computing includes three types of models: Software as a service (SaaS), Platform as a service (PaaS), and Infrastructure as a service (IaaS). Under SaaS, the cloud service provider provides the applications (e.g., accounting, productivity, or human resource applications) over the Internet, and they are responsible for updates or changes in the application. Under PaaS, the cloud service provider provides and manages the developmental tools that help build computer applications over the Internet. Customers can access these using a web browser, and they can modify and customize them. Under IaaS, customers use a complete set of equipment (e.g., hardware, storage, servers, networking component, etc.) required to support their business operations. Customers only pay for the service based on usage (Wang et al., 2011).

Cloud-based solutions or services can be used for accounting, analytics, compliance, control, monitoring, reporting, and data governance. It enables unprecedented data-sharing abilities and mobility (Moll & Yigitbasioglu, 2019). Further, the Cloud offer benefits such as improved decision making and cost-effectiveness (Quinn et al., 2014), the ability to use

sophisticated functionality quickly and at a considerably low cost, ability to better adapt to the volatile and global marketplace (Wolf, 2015); real-time access to data (Vasarhelyi et al., 2015), low-cost entry to computer-intensive business analytics, immediate access to hardware resources with zero initial investment, lowering IT barriers to innovation, and easy expansions (Marston et al., 2011). Apart from the benefits, limitations such as cloud providers being highly leveraged and less liquid and having material weaknesses in internal controls (Alali & Yeh, 2012); the limited use for financial transactions, and security concerns (Quinn et al., 2014) are inhibiting the adoption.

2.5. Institutionalization Process

Among the many scholarly discussions on 'institutionalization' and the 'institutionalization process,' this study used the process proposed by Tolbert and Zucker (1996). They discuss three stages and the factors/causal forces that influence the achievement of these three stages of the institutionalization process. The three stages are: (1) 'Habitualization' or pre-institutionalization; (2) 'Objectification' or semi-institutionalization; and (3) 'Sedimentation' or full-institutionalization. These are progressive and sequential stages influenced by several factors.

The pre-institutionalization stage or Habitualization refers to 'the development of patterned problem-solving behaviors and the association of such behaviors with particular stimuli' (Tolbert & Zucker, 1996, p.181). A habitualized action is a kind of behavior that is 'developed empirically and adopted by an actor or set of actors in order to solve recurring problems' in organizations (Tolbert & Zucker, 1996, p.180).

Inter-organizational monitoring of competitors and Theorizing will lead to the next stage in the institutionalization process i.e., the state of Objectification or semi-institutionalization will be reached. During Theorizing, the facts about the intended change (e.g., adoption of the technology) are communicated by the groups that are involved in planning the change initiative to the respective other parties who are supposed to use the new technology and attempt to convince them. Mainly, facts on why it should be considered the best option to be accepted will be communicated, and attempts will be made to convince that selection. Semi-institutionalization or Objectification is developing 'general, shared social meanings attached' to habitualized behaviours. This development is vital to transfer the actions to 'contexts beyond their point of origination'. In reaching the level of Objectification the habitualized action(s) will be generalized and become independent of the individual who acts (Tolbert & Zucker, 1996, p.181).

Existence of Positive outcomes, the promotion by interest groups (i.e., Interest groups' advocacy), and least resistance, will lead to reaching the next stage in the institutionalization process, i.e., Sedimentation or full-institutionalization. By the time of reaching this stage, the actions and behaviours will be entirely transmitted, and will be acknowledged as given practices (i.e., accepted as the '*new normal*'), and will continue for a prolonged period without changing back to the earlier practices (Tolbert & Zucker, 1996).

Apart from these three stages in the process of institutionalization, Tolbert and Zucker (1996) refer to a triggering point for introducing a change to organizations as 'Innovation'. This occurs before any decision is taken on changes. Mainly the point of the trigger for change is referred to here, and it comprises pressures from market forces, legislation, or technical changes. In the current study context, the triggers may arise due to any of these three factors that are external to the banks as well as due to internal factors such as the strategic decisions for embracing digitization.

During the analysis of the transcripts, the researcher could map the inductively generated reasons for lack of adoption to the factors discussed by Tolbert and Zucker (1996) in their model. Thus, it was selected to discuss the results of the study.

2.6. Technology Acceptance Model (TAM)

Davis (1989) initially developed the TAM with the expectation of understanding if people are willing to accept a new technology system and the underlying reasons for that acceptance. Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 2010) and theory of planned behaviour (TPB) (Ajzen, 1985) were used in the development of TAM, and it, therefore, replaces and merges the attitude measures and behavioural elements of the two models (Tsaur & Lin, 2018).

As per TAM, firstly, people tend to use or not use a technology based on their belief that it will help them perform their job better. Secondly, even if they believe that it is useful, they may consider whether it is easy to use or not. These two factors are named as perceived usefulness (i.e., 'the degree to which a person believes that using a particular system would enhance his or her job performance') and perceived ease of use (i.e., 'the degree to which a person believes that using a particular system would be free of effort') (Davis, 1989, p.320). The TAM can be used to evaluate whether a particular technology would be accepted or rejected by the potential user groups. It successfully predicts user-level acceptance and continuance (Ramkumar et al., 2019).

It should be noted that this study is a qualitative study with an interpretive approach, and a survey was not carried out for data collection with the questionnaire related to TAM. However, during the analysis of the transcripts, the statements made by the respondents seem to explain the two core concepts presented in the model and the items in the related original questionnaire. Thus, TAM was taken in providing suggestions for promoting the adoption of internet-based technologies.

3. Methods

A multiple case study approach is adopted in this study as that best suits studies on under-explored areas (Yin, 2009). In-depth case studies in two large-scale licensed commercial banks in Sri Lanka were conducted; Bank X (BX) and Bank Y (BY). The two banks were selected for the study, considering whether they have invested in internet-based technologies and whether they were willing to share information.

Seventeen senior-level employees were interviewed, including four senior-level managers, seven senior staff handling activities related to finance and accounting-related processes, and six senior members of different IT teams in the two banks (see Table 1). Interviews were conducted online via zoom using a semi-structured interview guide. The interviews ranged between fourty to seventy minutes. The recordings were transcribed verbatim.

The transcripts were then coded thematically, and the data were analyzed using an inductive approach. Analysis was done in two rounds related to the two research questions.

The first research question was identifying the internet-based technologies used within the banking sector in Sri Lanka. In the first round of analysis, details were extracted related to this question.

The second round of the analysis focused on the second question, i.e., identifying underlying reasons for the limited adoption of the internet-based technologies in accounting. Though there were several theories under consideration by the researcher prior to analysis, none of them were used to conduct the analysis as the expectation was to derive the reasons/factors limiting the adoption from the data itself. Theories were only used for the discussion of the results at a later stage. The data analysis was done as a pure inductive analysis where initially the transcripts were read and coded with in-vivo codes and thereafter these codes were combined to identify the factors influencing the limited adoption. Finally, four themes were derived: (1) the gap between the technical knowledge and experience; (2) fear or reluctance for adopting advanced IT solutions; (3) undue influence from IT staff; and (4) already institutionalized accounting practices.

These four factors identified through this analysis, could be mapped to the factors discussed under the institutionalization process of Tolbert and Zucker (1996) and the factors dicussed under the TAM of Davis (1989). Thus, they were the theoretical lenses used in discussing the study results.

Table 1. Case study interviewees

Designation of Interviewee	Code	Time Duration
Branch Manager	BX-M1	40 minutes
Senior Manager	BX-M2	45 minutes
Branch Manager	BY-M1	65 minutes
Senior Manager	BY-M2	50 minutes
Senior Manager (in Finance Division)	BX-F1	45 minutes
Manager (in Finance Division)	BX-F2	50 minutes
Manager (in Internal Audit Division)	BX-F3	45 minutes
Manager (in Financial Report handling)	BY-F1	45 minutes
Manager (in Financial Report handling)	BY-F2	70 minutes
Senior Manager (in Internal Audit Division)	BY-F3	65 minutes
Manager (in Internal Audit Division)	BY-F4	55 minutes
Senior Database Administrator	BX-IT1	60 minutes
Manager System Administration	BX-IT2	65 minutes
Software architect	BX-IT3	60 minutes
Senior Database Administrator	BY-IT1	70 minutes
Manager Database Administration	BY-IT2	65 minutes
Software architect	BY-IT3	65 minutes

4. Results

The study attempted to answer two questions: (1) what are the internet-based technologies that are used within the Sri Lankan banking sector, and (2) how the underlying reasons for the limited adoption of internet-based technologies in accounting are perceived by the banking professionals. The following two sub-sections present the findings related to the two research questions.

4.1. Internet-Based Technologies Used

Four advanced technologies could be identified within the two large licensed commercial banks, including robotic process automation. The other three internet-based technologies used by the two banks were artificial intelligence, cloud computing, and big data analytics.

In both banks, **artificial intelligence** is used, and this was the most applied and adopted technology among other internet-based technologies. The transactions of customers are tracked continuously, and the behaviour of customers is monitored regularly. For specific purposes such as loans or forex transactions, more details are collected from customers. As stated by **BX-M1**, '*We use AI in loan processing. We evaluate the credit histories of our customers before approving loans using AI. With this, we can analyze the customers' default levels more precisely. Here, we use a machine learning approach with logistic regression*.' These enable the banks to minimize and detect frauds. **BY-IT2** stated similar facts: '*AI has many capabilities. It can easily study and recognize patterns and frauds. We specifically use it for detecting currency-related frauds. We call it money laundering*.'

Further, **BX-IT3** stated that they are in the process of introducing an AI-based solution for forex transactions of their clients. They expect to provide access to the Foreign Exchange Rate Request Portal in Treasury to their customers and enable them to link to that portal directly.

When considering the responses, AI seems to be applied for anti-money laundering attempts, forex trading, and supporting decision-making within the banks, such as loan processing and credit card approvals.

One bank (B2) has a separate unit to deal with **data analytics** and they handle all analytic-related tasks. They analyze big data and make decisions such as staff allocation decisions among the branch network, supply chain related decisions, and promotion campaigns related decisions. For instance, as **BY-IT2** stated, '*we perform text analytics to understand customer preferences in advance and cater to that requirement. This we do by data mining in social media. This is a successful way of identifying customer requirements.*' Apart from that, the bank also supports its customers while making profitable alliances based on the results of the analysis done by its analytics team. For instance, as **BY-IT3** stated,

> '*Our xx* (credit) *cardholders benefit from this. We analyzed the credit cardholders' behaviour through their transactions, and we attempt to partner with those firms and get discounts for our customers. We recently identified that most of our customers order food*

through xx delivery service. Then we partnered with xx delivery service and give discounts for our xx (credit) *cardholders.*'

Robotic process automation is the next most used technology, and some projects are at the research and development phase in one bank. Most RPA attempts are related to providing solutions to customers for their everyday banking needs and related to repetitive tasks in the documentation. One of the banks (BX) has attempted to introduce an automated system for issuing user IDs and passwords to their customers.

'*We recently automated the User ID issue process. Earlier, this was handled by our staff. … We were able to drastically reduce the response time to customers and also reduce the staff allocated in the User ID Management department of the bank with this automation project*'– **BX-IT2.**

The other bank is yet to roll out a robotic process automation initiative related to two customer services: account opening and account details updating.

Due to security reasons, the use of **cloud-based** software is limited; however, with the Covid-19 pandemic the use has developed to a certain extent. With the emergence of employees working from home, both banks have adopted cloud-based software. **BY-IT2** stated that '*we used the cloud to a certain level, and because of this, nearly 80% of our employees can work from home during the pandemic as they were able to access the system and information from around the country.*' Other bank respondents were silent on the percentages of use; however, most of them stated that they also use the cloud for limited functions and benefit from the use of the cloud.

Overall, these four technologies are used within the two banks at varying levels. Next, banking professionals' perceptions on limited adoption are presented.

4.2. Perception of Banking Professionals on Underlying Reasons for the Limited Adoption

When considering the responses on the type of internet-based technologies and the purposes they are used for, within the banks, it is well evident that the use is not much focused on accounting (including finance) related functions. A very minimal focus was evident about accounting in the two banks studied compared to other functions such as marketing and operations that seem to adopt these technologies to a greater extent.

As stated by many respondents (except for three respondents, i.e., BX-M2, BY-M1, and BY-F1), the **gaps that exist between the technical knowledge and experience in relation to**

using technology among the accounting and IT professionals inhibit the application of technology into accounting processes in banks as well as other industries. As stated by **BX-M1**,

> '*this less use is not only evident in banks. This, I guess, applies to many other sectors. Most of the time, we demarcate between IT and other functions. We get qualified in different streams and get trained separately for separate functions. Once we come to the industry, we want to mix everything. That is one basic point we should address if we want technology to flow freely to all functional areas*.'

Many others stated similar ideas. For instance, **BY-T3** noted that,

> '*…we should start a change at the school level or probably as soon as the children leave school and start their higher education, either university or professional. We should make this blend from the start, and this can be really impactful when they try to blend with different functions in the workplace. … They will start to respect each other…try not to dominate in their own areas.*'

Even though automation is generally accepted to a great extent within the accounting process, there is a **fear or reluctance** to adopt these advanced IT solutions. This reluctance results in a slow speed of accepting many of the advanced technologies, despite the benefits attached to them, such as the ability of getting more efficient and reliable information with less reconciling time. As stated by **BY-IT2**,

> '*Before this, I worked for xx firm* (a non-bank firm) for a few years. *I experienced that regardless of how much we try to show the benefits of analytics or RPA or any other tool, it is tough to convince non-IT staff about the benefits of advanced techniques. These benefits will definitely ease things in their life, but the convincing part is so hard sometimes.'*

Similar thoughts were stated by the **BY-M2,** who mentioned,

> '*I have a background in IT as well. So, I tend to have a balanced mindset. When you ask me to explain the thought process that I go through when I face a change initiative with an advanced IT solution, my situation is different from some of the others with no IT background. I don't feel uncomfortable. … I know there are well-experienced staff members who are reluctant and have second thoughts….*'

Apart from the above two aspects, few respondents felt that the staff handling accounting-related tasks sometimes faced a high level of **undue influence** from IT staff during the projects introducing new IT solutions. Mainly, in relation to the financial reporting related tasks, IT staff's involvement is considered unnecessary by the group handling the reporting

functions. **BX-F1 and BX-F2** both stated facts related to the unnecessary pressures that they face during certain projects. As one of them stated,

> '*we should not be changing everything day by day. We follow financial reporting standards, and we have the ERP that is already supporting us with reporting. Some changes introduced do not survive. We have to go back and forth. … with the workload we handle, it is sometimes frustrating to change time to time.'*

In addition to the above, as per the data, it also seems that the changes brought into the **accounting practices** that are **already institutionalized** are contributing to a slow pace of acceptance and adoption of high-tech solutions. With the limited visualization of the benefits of the new methods, their adoption of them has become limited. At Bank Y, the use of big data and analytics were mainly mentioned in relation to management accounting practices (such as during the budgeting process, performance measurement, evaluation, etc.). The separate team handling the analytics work introduces proposals for developments within many processes; however, the escalation rate of them to higher levels is nearly 60%, as stated by **BY-IT3**. As per the respondents, in other functional areas, such as marketing, the use of analytics seems to be high, and they gain visible benefits from the use of analytics. These visible positive outcomes and the promotion of the use of analytics within the user groups have increased the adoption within those functions. However, within the accounting function, they are unable to see many visible returns and compare the benefits at once against the existing practices they use ['*the main thing is they do not understand what they can gain. The dashboards are not clearly showing the cost-benefit for accounting and finance… they still want to stick to the same old methods…*' – **BY-IT2**]. This has led to continuing with the already used practices and limited adoption levels of new methods.

5. Discussion

During this study, it was identified that artificial intelligence, robotic process automation, data analytics, and cloud computing were the internet-based technologies used by the two banks. The author could not identify studies that had explored all these technologies together in the banking context; however, the use of these technologies within banks is studied individually by scholars: **robotic process automation** – e.g., Kumar and Balaramachandran (2018); Pramod (2021); Villar and Khan (2021); **artificial intelligence** – e.g., Königstorfer and Thalmann (2020); Vieira and Sehgal (2018); **cloud computing** – e.g., Best (2018);

Stewart (2021)); and **data analytics** – e.g., Chedrawi et al., (2020); Fang and Zhang (2016); Srivastava and Gopalkrishnan (2015); Wang et al., (2021).

As stated in the above section, there are four main factors influencing the limited adoption of internet-based technologies: (1) the lack of technical knowledge and experience in the use of technology among accounting professionals; (2) the fear or reluctance of adopting advanced IT solutions; (3) the feeling of undue influence from IT staff by accounting professionals; and (4) the already institutionalized accounting practices that are valued due to not seeing the value of the new technologies.

Technical knowledge and experience are important in determining the adopting technology (Hoque & Sorwar, 2017; Kumar et al., 2018; Managi at al., 2014; Prause, 2019; Purohit & Arora, 2021), and lack of technical knowledge and experience inhibit adoption. Similarly, in this study, it was evident that the limited technical knowledge and experience in using the technology among the accounting professionals resulted in the low levels of adoption. Considering the above, interest group resistance (Tolbert & Zucker, 1996) is the closest factor that can be related from an institutionalization process perspective. This interest group resistance arose due to the lack of technical knowledge and experience.

Next, the fear or reluctance to adopt advanced IT solutions among non-IT professionals tends to limit the positive perceptions they could build on the ease of using it. Further, it limits their ability to identify and experience whether such IT solutions would be helpful in their job role. This fear or reluctance is discussed by many scholars in terms of complexity and reveals a negative relationship with adoption (Agogo & Hess, 2018; Muhammad et al., 2020; Prause, 2019; Premkumar & Roberts, 1999; Rogers, 2003). Thus, the perceived ease of use and the perceived usefulness discussed in the TAM are reflected partially in these statements, similar to studies such as Sharma et al., (2015). This study did not focus on quantifying the adoption through TAM; however, when considering the interview data, the researcher could see respondents stating information around lack of perceived ease of use and lack of understanding of the usefulness as discussed in the TAM. Further, from the viewpoint of the institutionalization process (Tolbert & Zucker, 1996), this fear or reluctance inhibits the adoption and institutionalization of the technologies within the banks, and the inability to successfully theorize and convince the user groups has contributed to this as evident within responses.

The existence of already institutionalized accounting practices had resulted in a lack of adoption (similar to other studies done in the banking sector, e.g., Corrocher (2006)). In other functional areas such as marketing, the use of analytics seems to be high, and they gain

visible benefits from the use of analytics, and it is gaining acceptance due to visible relative advantage (Rogers, 2003), visible positive outcomes or gains, interest group advocacy, and lack of resistance (Tolbert & Zucker, 1996) within those functions compared to accounting. Further, the other functions can compare their results (e.g., marketing campaigns done by marketing staff using results given by the analytics team) with similar others in the same industry with identical technology adoptions, while accounting cannot see such direct comparisons of results. This inability of inter-organization monitoring (Tolbert & Zucker, 1996) also limits the adoption of new technology and promotes the use of existing institutionalized practices. This is similar to many other studies that identified factors such as the inability to understand the advantages of these technologies (Richardson, 2011; Rogers, 2003; Ullah et al., 2021); issues of acceptability (Batubara et al., 2018); lack of acceptance leading to resistance (McGaughey & Snyder, 1994) as factors that limit the diffusion of ICT related innovations.

Further, most of the technologies considered in this study are at a pre-institutionalization stage. For them to reach the full-institutionalization stage, there need to be improvements to the level of IT skills of the accounting professionals. Also, it is important to include IT skills into the set of skill that an accounting professional should possess (inclusion into the skill set). A higher level of theorizing/rationalization, together with picturing positive outcomes (visualizations) will also strengthen the transition towards full-institutionalization. Apart from the above a strong interest group advocacy with increased levels in positive perceptions on the usefulness and ease of use (i.e., perceived usefulness and perceived ease of use) among staff is also necessary.

Finally, the feeling of undue influence by IT staff also limited the adoption. However, during the literature review, the researcher could not identify any study that stated this factor. Thereby, it can be considered that this factor is introduced through this study.

Considering the above findings and discussion, the approaches that can be taken for promoting the adoption are presented next.

5.1. Methods for promotion

When considering the statements made by the respondents on the type of internet-based technologies that are introduced within the two banks and their functioning, none of these technologies have become the norm of the bank yet. i.e., they are still not considered the most suitable and acceptable practices by all members of the stakeholder groups. Therefore, these technologies are still in the pre-institutionalization stage (Tolbert & Zucker, 1996). For these

technologies to fully institutionalize and become institutionalized structures (Tolbert & Zucker, 1996) further actions need to be taken.

Considering the perceptions of the respondents and the factors discussed by Tolbert and Zucker (1996) in their institutionalization process following can be proposed as methods for promoting the adoption of internet-based technologies:

1. As a response to the **gap that exists between the technical knowledge and experience** related to using technology between the two professional groups: accounting and IT (see section 4.2), consideration should be devoted to improving the level of advanced IT skills of the accounting professionals and incorporate it into their skill set as a priority skill should be focused. Many scholars (e.g. Goes, 2014; Huttunen et al., 2019) recognize the lack of technical capabilities to work in the big data environment among accounting and finance staff. Huttunen et al. (2019) stated the need for accounting and finance field professionals to gain some basic IT knowledge and understand concepts such as big data, cloud computing, and data science applications to be successful in the future financial sector job markets. In the future, most repetitive tasks may be automated, and more skills in decision-making will be required. Therefore, the development of analytical skills will also become important. The generation and development of such employees is not a responsibility of one party. It is a combined responsibility of at least the universities, professional bodies, and human resource (HR) departments of firms. Changes should be made to curriculums to incorporate more IT subjects and equip the graduates or professionally qualified members to possess high levels of IT skills (similar suggestions are made by other scholars such as Ejiaku (2014)). The HR departments should consider recruiting staff with multiple qualifications or at least introduce training programs to expand the IT capabilities of the teams in other functional areas.
2. More attempts at rationalizing/theorizing (Tolbert & Zucker, 1996) the need to adopt the new technologies is another important task in promoting adoption, which will minimize the **fear or reluctance** to adopt these advanced IT solutions (see Section 4.2). Also, rationalizing/theorizing the need for the new practice can minimize the reluctance to give up the already institutionalized practices (see section 4.2). The introduction of technology should not be seen as a burden by the employees; they should not fear it. It should be recognized either as the most appropriate solution for an existing problem or as the most suitable option to improve the performance of employees/organization, or both. Getting the involvement of many parties during the planning stage of the technology implementation may facilitate its acceptance.

3. Visualizing positive outcomes to the users will enable the move towards acceptance. As suggested by Tolbert and Zucker (1996), positive outcomes help the movement toward full-institutionalization of a change. Once the benefits are visible, the potential user groups will have fewer reasons to reject new technology. This will also minimize the **fear or reluctance** to adopt new solutions and the reluctance to change the already **institutionalized practices** (see section 4.2).
4. Interest group advocacy is another suggestion that can be made based on Tolbert and Zucker (1996). Using a group that has already experienced the benefits of a particular technology can be used to promote the technology among the potential user groups. This method is said to reduce the failure rate of acceptance. Therefore, interest group advocacy can be used to minimize the **fear or reluctance to** adopt new solutions and the reluctance to change the already **institutionalized practices** (see section 4.2) and to build trust in the new solution.
5. In addition, if the project teams can convince the non-IT professionals (in this case, the accounting and finance staff) on the usefulness of the technology for their activities and the details on the ease of use, it will also be helpful for the promotion of the new technologies. This can minimize the **fear or reluctance** to adopt new IT solutions and the belief that the IT professionals have undue influence on accounting (see section 4.2).

6. Implications

This study contributed to minimizing the knowledge gap on the basic reasons for the limited adoption of the internet-based technologies in accounting by exploring the perceptions of banking professionals. The researcher also contributed to extending the discussions on the institutionalization process to a context of adopting internet-based technologies. As identified in this study, all these technologies are still not fully institutionalized within the banks.

The clearer understanding provided through the study on the reasons for limited adoption allows project implementation/management teams in their attempts to promote these technologies within organizations. Further, the study proposes methods for promotion of the acceptance of these technologies directly derived from the stakeholders' responses to these change initiatives within the banks, i.e., the banking professionals. These proposals will facilitate the success and effective promotion of future efforts of designing and implementing new change initiatives on internet-based technologies (also, these can be applied to change initiatives taken by any organization). This will allow the introduced internet-based technologies to get fully institutionalized within the organizations, including accounting.

7. Conclusion

Limited research on the perceptions of banking professionals on the limited adoption of internet-based technologies in accounting created the need and interest in conducting this research. As per the findings, both banks were familiar with automation and digitization. Additionally, cloud computing, robotic process automation, artificial intelligence, and data analytics were used at different levels in these banks. The main reasons for the lack of adoption were limited technical knowledge and experience in the use of technology among the accounting professionals; the fear or reluctance to adopt the advanced IT solutions; the feeling of undue influence by IT staff; and the already institutionalized accounting related practices.

Future research can focus more on exploring the possible applications of internet-based technologies in accounting and finance functions; the benefits of different internet-based technologies to the various accounting practices, both financial and management. Further, the number of cases can be increased, or a quantitative study representing all banks in the country can be conducted to get a broader view.

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