
**The Impact and Factors Affecting Information and Communication
Technology Adoption in Small and Medium-Sized Enterprises: A
Perspective from Pakistan**

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Abstract: SMEs are one of the main contributors to job creation and GDP. To ensure the sustainability of their business and meet market needs, the owner-managers these days, switch the functioning of SMEs from traditional to latest technological frameworks. However, even after adoption, local SMEs are still not fully able to exploit and reap the benefits of information and communication technologies (ICTs). To understand this issue, this research focuses on two research objectives. First, it highlights the impact of ICT usage on SMEs. And, second, it tries to identify different factors that affect the ICTs adoption in SMEs. Main contribution of this research is that it extends the Technology Acceptance Model (TAM) on two antecedents of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as a theoretical framework. For this research, qualitative interviews were conducted from ten (10) owner-managers of SMEs in Pakistan. A careful thematic analysis of interview data reveals the emergence of five different themes: the impact of ICT usage on SMEs, cultural decisions, factors affecting the adoption of ICT in SMEs, entrepreneurial characteristics of owner-managers, and the role of governments and institutional support leading to successful adoption of ICT in SMEs. Findings of this study have significance for SME's owner-managers, government bodies, and relevant business authorities who wish to address issues pertaining to the adoption and increase in ICT usage among SMEs in Pakistan.

Keywords: *ICTs, SMEs, Thematic analysis, Emerging Economies, Pakistan, TAM framework.*

Introduction

Globalization and digitization have changed the way we do business and compete in global markets (Roztock and Weistroffer, 2008). To embrace this change, more and more companies and SME entrepreneurs are adopting ICT to transform all of their business activities (Najar and Dhaouadi, 2020). ICT includes all technologies related to storage, retrieval, manipulation, transmission or reception of information in digital form (Rozmi *et al.*, 2020); and has played a crucial role in bridging the gap between businesses in the developed and emerging economies (Zhang and Wang, 2019). Over the past decade, the diffusion of technologies, the Internet, and ICT resources have led to a dramatic transformation of the society in general, and the emerging economies in the South Asia in particular (Akpan, Udoh and Adebisi, 2020; Lee, Falahat and Sia, 2020). The availability of the necessary ICT infrastructure has resulted in better access - in terms of scale, range and speed - to information, knowledge and wisdom for not only

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individuals but also businesses and various governments (Tan *et al.*, 2010; Mohanty and Mishra, 2020). The diffusion of ICT has improved the efficiency of resource allocation, reduced the production costs and led to much higher demand and investment in all economic sectors (Partanen and Goel, 2017). An investment in ICT leads to an improvement in the firms' performances in terms of higher profits (AlBar and Hoque, 2019; Nawinna and Venable, 2019; Kazakov, Ruiz-Alba and Muñoz, 2020).

The relationship between ICT adoption in SMEs and growth has been the subject of many researches. For example, (Kala Kamdjoug, Djuitchou Chengo and Gueyie, 2020) notes that owner-managers are using ICTs to reduce costs, improve efficiency and improve the productivity of their businesses. ICT provides additional support to SMEs, in many industries, to gain competitive edge over large competitors (Awiagah, Kang and Lim, 2016a). Therefore, to gain maximum business benefits, a tactical use of ICT is advised to owner-managers of SMEs by (Cassetta *et al.*, 2020).

Though, the adoption and usage of ICTs are ubiquitous among businesses in developed economies and it has yielded positive results for them (Cassetta *et al.*, 2020); the acceptance of ICTs for business development among SMEs in emerging economies in South Asia (Lee, Falahat and Sia, 2020) and especially in Pakistan is still facing problems (Nazir and Roomi, 2021; Qalati *et al.*, 2021). It has been observed that Pakistani SMEs are generally slower, in adopting ICT for future development, than their counterparts in other economies within the same region, (Nazir and Zhu, 2018). In their survey, (Qureshi, 2007; Ebad, 2018) have argued that easy access to ICT resources is a major obstacle for SMEs in the emerging economies due to the lack of basic technology infrastructure. Furthermore, (Zhang and Wang, 2019; Akpan, Udoh and Adebisi, 2020) have argued that, with a growing digital divide, SMEs in emerging economies face greater difficulties than their competitors, both in their own countries and in developed economies.

For many SMEs and larger firms, access to ICTs plays a decisive role to make strategic decisions as quickly as possible (Nazir and Roomi, 2021); however, in today's globalized business environment, the ability of SMEs to operate effectively using ICTs does not give them a big competitive advantage due to various factors which need to be explored (Awiagah, Kang and Lim, 2016b; AlBar and Hoque, 2019). A clear understanding of factors affecting the ICT adoption can help SMEs to strategically position ICT within their firms to maximise the economic benefits and business growth.

Pakistan is an emerging economy in South Asia. The Government of Pakistan (GoP) is aiming, as part of its digital policy, to increase the size of ICT industry (Qalati *et al.*, 2020) by focusing on provision of quality ICT services, development and use, and an enabling technology regulatory environment in Pakistan. GoP spent nearly 7 billion on ICT related projects in 2018-19 and around PKR 10 billion were reserved to be spent for year 2021. However, it was revealed in a cabinet meeting that the current lack of technological applications in human resources (HR) would make it difficult to use the budget effectively to its maximum capacity (Nazir, 2019).

From a theoretical perspective, situation of SMEs in Pakistan is very interesting. Despite of a significant investment by GOP in the ICT projects, SMEs have not been able to keep up with digital progress and, consequently, to compete in the global technology markets (Nazir and Roomi, 2021). To substantiate this, a report by (Group, 2020) stated that national policies in some emerging economies, including Pakistan, are failing to translate ICT investments into tangible benefits in terms of competitiveness, development and employment. Failure to purchase latest technology and cannibalizing broadband on individual Internet users has created a significant risk of a digital divide between urban and rural businesses in Pakistan. (Qalati *et al.*, 2021) has observed digital divide to be an important preventing factor in successful adoption and usage of ICT by SMEs in emerging economies.

By using various frameworks, researchers have tried to understand the impact of ICT on economic growth in emerging economies (Fernández-Ortiz and Lombardo, 2009; Lee, Falahat and Sia, 2020; Mohanty and Mishra, 2020); yet, an ambiguity persists in the results of these studies. As disagreement among researchers is quite wide, further investigations is needed to understand this issue clearly (Rahayu and Day, 2017; AlBar and Hoque, 2019; Nazir and Roomi, 2021). Additionally, presence of very little research, in Pakistani context, justifies the need to carry out a qualitative study to explore this issue in detail. This research attempts to first highlight the impact of ICT use on SMEs, and then to identify various factors affecting the adoption of ICTs by SMEs in Pakistan. Results of this study hopefully will bridge the knowledge gap that exists in the current literature (Ebad, 2018; Nazir and Roomi, 2021; Qalati *et al.*, 2021) (Akpan, Udoh and Adebisi, 2020; Chege and Wang, 2020). In this qualitative research, the culture aspects and entrepreneurial characteristics of owner-managers were embedded in the existing Technology Acceptance Model (TAM) to identify the impact and associated factors that hinder the adoption of ICTs by SMEs.

Literature Review

According to (Dar, Ahmed and Raziq, 2017), approximately 3.2 million SMEs - micro, small and medium-sized firms - operate in Pakistan. Together these SME firms account for almost 90% of all business units in Pakistan, employ 80% of the non-agricultural labour force, and contribute 40% in the GDP and 30% in total exports. The key role that SMEs play in the economic growth of an emerging economy has been acknowledged in the works of (Hyder and Lussier, 2016; Dar, Ahmed and Raziq, 2017). Magnitude of economic impact created by these SMEs makes it imperative that their technological growth should be a central element of government policies for economic recovery, poverty reduction and job creation in rural and urban areas (Nazir and Zhu, 2018). Though GoP has devoted significant efforts and resources to promote technological advancement of SMEs; yet, many researchers (Hyder and Lussier, 2016; Dar, Ahmed and Raziq, 2017; Nazir and Roomi, 2021) have reported presence of technological weaknesses among SMEs, in Pakistan and this weakness inhibits SMEs' abilities to take full advantage of the fast-growing global markets. Factors that contribute to this weakness include low value-adding products, lack of adequate financial information and lack of strategic government planning for the future technology development of the SME sector (Nazir and Roomi, 2021).

At the moment, Pakistan stands at the early stages of ICTs development. To improve the situation, GoP has taken a number of initiatives to promote ICT-enabled activities. Implementation of 5G policies, increasing the maximum broadband speed, granting licenses to third party service providers to increase financial inclusion, device identification and registration blocking system, online portal for the import of handsets, e-vision Pakistan 2020 and online interactive distance learning initiative are examples of such initiatives (ITU, 2019; Qalati *et al.*, 2021). Similarly, GoP, in its digital policy (2017), envisioned Pakistan to become a strategic enabler for an accelerated digitization ecosystem, to develop a knowledge-based economy, and to stimulate socio-economic growth. As a result of these measures, significant progress was noted on different frontiers. For example, tele-density rate grew by 12.1%, reaching to 70.4%; and broadband subscribers increased by 32% i.e., reached 40 million by August 2018 (ITU, 2019). However, some recent studies (Nazir and Zhu, 2018; Qalati *et al.*, 2020) have indicated that the growth of technology related projects including ICT in Pakistan are still in initial phase due to various hidden reasons that need to be explored.

Theoretical Framework

In this study, Technology Acceptance Model (TAM) is used as a theoretical framework to identify the impact and explore various factors of ICT adoption among SMEs in Pakistan. According to this framework, two factors i.e., Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) determine an individual's attitude and behavioural intention to use ICT

(Venkatesh *et al.*, 2003). Perceived usefulness (PU) is defined as the degree to which a person thinks using the ICT will improve his/her performance at work. In context of this study, PU measures whether or not an SME employee perceives ICT to be useful at work in increasing his productivity, performance, functionality, and benefits. Perceived ease of use (PEOU) is defined as the degree to which a person believes the usage of a computer, related technologies and ICTs system to be free from physical and mental effort at work. In this study, this implies if ICT is easy to use then the barriers are overcome. If it is difficult to use i.e., interface is complicated, then SMEs will not have a positive attitude towards it (Davis, Bagozzi and Warshaw, 1989).

Many authors e.g., (Awa, Ojiabo and Emecheta, 2015; Okundaye, Fan and Dwyer, 2019) believe TAM model to be an extension of Theory of reasoned action (TRA) that was proposed by Ajzen and Fishbeins. One of the main proponents of this belief is (Okundaye, Fan and Dwyer, 2019) who argues that TAM can be expanded based on two technology acceptance measures: perceived ease of use and perceived usefulness. A quick review of literature also suggests that TAM also has some roots in the theory of planned behaviour (TPB), which is an alteration of TRA and emphasizes on the measures of intention to use technology (Awiagah, Kang and Lim, 2016a; Alqatan *et al.*, 2017). This is the reason that many researchers considered TAM to be quite robust and used it to explain the acceptance of ICTs by SMEs (Awa, Ojiabo and Emecheta, 2015; Alqatan *et al.*, 2017; Kala Kamdjoug, Djuitchou Chengo and Gueyie, 2020). Their research has provided sufficient ground to the authors of this research to adopt TAM as most suitable framework to illustrate the impact and mechanism to adopt ICTs in SMEs. Majority of SMEs, in Pakistan, are owned by a sole owner or family owned and all strategic decisions including adoption of ICT are highly dependent on owner-managers (Nazir and Zhu, 2018), (Rahayu and Day, 2017; Najar and Dhaouadi, 2020). As many strategic decisions are influenced by cultural differences (AlBar and Hoque, 2019); therefore, another reason for adopting TAM framework was that it allows to test the impact of various factors including culture and entrepreneurial characteristics of owner-managers on PU and PEOU. By considering other factors in the TAM framework, this study intends to fill a critical gap in the existing literature. In the following paragraphs, these four variables are discussed in more detail.

Impact of SMEs in emerging and developed economies

According to the various statistics and reports of the industrialized economies, SMEs constitute the dominant form of business; accounting for about 99% of all businesses. They generate employment opportunities (averaging around 70% of jobs) and contribute significantly to value creation – generating between 50% and 60% of value added on average (Alraja, Hussein and Ahmed, 2020; Ramdani, Raja and Kayumova, 2021). An empirical study by (Qalati *et al.*, 2020) provided statistics on the contribution of SMEs in developed and emerging economies. The study showed that SMEs account for more than 55% of GDP and more than 65% of total employment in developed economies. SMEs and informal businesses account for more than 60% of GDP and more than 70% of total employment in low-income countries, while they account for around 70% of GDP and 95% of total employment in low and middle-income countries. It is therefore unsurprising that SMEs have been associated with the rapid economic growth of South Asian countries. It was also evident that SMEs in the Asian region are the most important source of job creation in all sectors of both rural and urban areas.

Impact of ICTs by SMEs in emerging and developed economies

The evolution of technology has led to significant changes in the industry infrastructure and business operations. Companies that adopt ICT, in their business processes, observe emergence of competitive advantages for them. (Okundaye, Fan and Dwyer, 2019) as they are able to access, evaluate, process and disseminate large volumes of data at a faster pace. Consequently, companies increase their productivity and achieve higher business performance (Garzella *et*

al., 2021). Usage of advanced technologies provides opportunities to enter the international market and remain competitive despite the challenges of globalization, liberalization and scientific and technical progress (Awiagah, Kang and Lim, 2016a). Since 2005, the pace with which ICT is adopted by large and small enterprises in developed economies is much higher than that in emerging and developing economies. Therefore, a very moderate impact of ICT adoption among SMEs is observed in emerging economies (Aslesen and Harirchi, 2015). One possible reason for such a low adoption rate in developing economies is the additional challenges faced by SMEs. Few of such challenges include high cost of telecommunications, lack of state legislative support, use of obsolete technologies, general technological illiteracy, and poor communication infrastructure (AlBar and Hoque, 2019). In the context of this study, PU measures whether or not SMEs in Pakistan perceive ICT as useful for increasing productivity, performance, functionality and benefits.

Culture decisions on ICTs adoption

Culture is defined as shared values, beliefs, attitudes, and behaviours. Shared values are an individual's perception of how things should be; whereas, beliefs are defined as 'an individual's perception of how things are done in their country' (AlBar and Hoque, 2019). While, attitudes and behaviours are the "shared by the vast majority of people in a group or a nation" (Okundaye, Fan and Dwyer, 2019), and represent a collective state of mind manifested by values (Mohanty and Mishra, 2020). In his research, (Okundaye, Fan and Dwyer, 2019) argued that the variations in the adoption of ICT can be "explained by the differences observed in the national culture". People from different cultures think and behave differently with respect to technology. Culture influences their perceptions, development and use of technologies. One can find clear differences in how people from different cultures react to and accept new products and technological innovations (Hughes *et al.*, 2016; Sunday and Vera, 2018). Previous studies provide evidences that national technology culture does have an impact on customer behaviour (Qalati *et al.*, 2021), individual decision-making (Nazir and Roomi, 2021), decision-making within the same firm (Sunday and Vera, 2018), information technology transfer (AlBar and Hoque, 2019), IT infrastructure for the development of new technologies (Garzella *et al.*, 2021), adoption and use of ICT-based technologies (Amoako *et al.*, 2020; Chege and Wang, 2020) and the implementation of new tools such as software's (ERP) (Chege and Wang, 2020). National culture is therefore a factor that affects the adoption of any technologies, regardless of the country's economic situation (Okundaye, Fan and Dwyer, 2019).

Factors Affecting ICT adoption by SMEs

Researchers have mentioned few barriers that make it difficult for SMEs to adopt ICTs as a competitive tool. For example, (Okundaye, Fan and Dwyer, 2019) has provided an overview of the current state of ICT adoption, in SMEs in Nigeria, and found important barriers to be 1) limited resources in the face of the high cost of adopting electronic technology, 2) online security concerns, 3) lack of client preparation, and 4) lack of advice and support. Similarly, research by (Alraja, Hussein and Ahmed, 2020) aimed to find possible factors that either allow new technology to be valued as drivers or prevent them from adopting it. The main barrier was found to be adoption expense that came with acquisition of new technology and/or the upgradation of existing poor ICT infrastructure. Due to high cost, start-up SMEs were found to be allocating less amount for ICT hardware and software at the investment phase (Tan *et al.*, 2010). Similar attempts to identify the determinants of smart manufacturing and the adoption of digital ICTs in manufacturing SMEs was done by (Ghobakhloo and Tang, 2013; Ebad, 2018; Najjar and Dhaouadi, 2020). Their findings suggest that changing the traditional working patterns of firms' employees required a data management system that is linked by ICT. Therefore, to adopt ICT, not only a firm decision by owner-managers is required; but also, government support in the provision of ICT infrastructure plays an important role. Another barrier that is highlighted in the literature is the belief by owner-managers regarding presence

of no need to use ICT in their firm (Fernández-Ortiz and Lombardo, 2009; Burke, 2010; Dutot, 2017). Since ‘entrepreneurial characteristics and beliefs of owner-managers’ play an important role in ICT adoption; therefore, there is strong need to include this variable in this research.

Entrepreneurial characteristics of owner-managers to adopt ICT

When ICT is introduced in a firm, not only it brings positive change, but also it brings new challenges (Okundaye, Fan and Dwyer, 2019). Coping with new challenges, successfully, requires presence of dynamic management that facilitates this technological change and creates an enabling environment for ICT (Najar and Dhaouadi, 2020). In many SMEs, responsibility to manage change and execute technology related projects falls on the shoulders of ‘owner-managers’ who plan, organize, direct and control all ICT projects and training activities (Dutot, 2017). To be successful, SME owner-managers must combine their leadership and other management elements throughout the ICT adoption cycle in their activities (Awiagah, Kang and Lim, 2016b; Kazakov, Ruiz-Alba and Muñoz, 2020). Understanding the importance of ICT by the owner-managers would individually encourage them to play a vital role in persuading other employees to welcome new technologies, and managers to allocate, willingly, sufficient resources for their adoption (Kala Kamdjoug, Djuitchou Chengo and Gueyie, 2020). After reviewing the literature, this study represents the conceptual model in Figure 1 for identifying various impacts, as well as factors affecting the adoption of ICT in Pakistani SMEs with the interactions of owner-managers. As discussed in literature, this framework is also suitable for further exploring different behavioural intentions for using ICT, including cultural decisions and entrepreneurial characteristics of owner-managers, factors on the perceived usefulness and perceived ease of use of ICT.

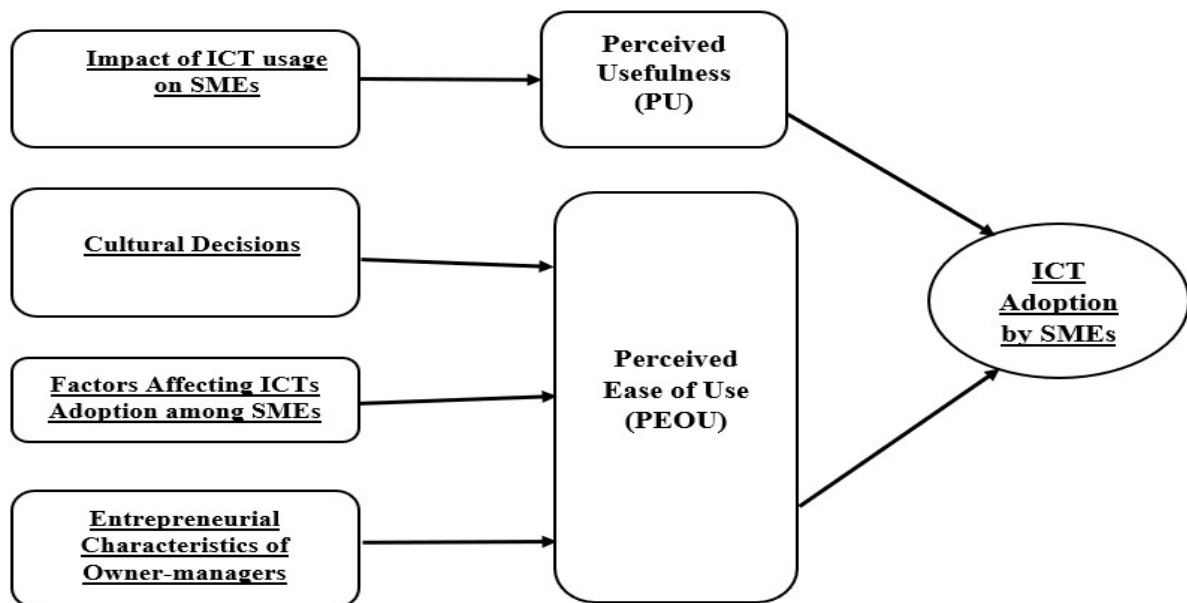


Figure 1: Adopted TAM framework (Source: Authors)

Methodology

This study is exploratory in nature; therefore, it involves the analysis of qualitative narrative data that is collected through interviews with the SME’s owner-managers. After selecting SMEs on random basis, interviews were conducted with those owner-managers who had participated in the development of ICT for their companies and thus had good contextual knowledge. Owner-managers’ were requested to provide an account of their experiences w.r.t. ICT adoption in their respective firms. The data collection exercise took place between May 2020 and December 2020.

Sampling

The unit of analysis for this study is the SME (or part of it) as an entity to be analysed and may also be an owner-managers with experience and interest in subject and field of study, an event such as a decision, a social process, an implementation process to examine the factors that influence the adoption of ICT among SMEs. The data was collected from SMEs located in the federal area (Islamabad-ISB) and Punjab (Lahore-LHR). These two cities are important service and manufacturing hubs and many professional firms work in these regions. The list of respondents and SMEs who participated in this study are given in Table 1.

Table 1: Respondent's information and SMEs participated in this study (Source: Authors)

Respondents	Age	Education	Est. Year	SME Type	Location	Size
R1	55	Bachelor	1996	Manufacturing	ISB	Medium
R2	61	Diploma	2004	Hospitality	ISB	Small
R3	45	Certificate	2015	Tourism	ISB	Small
R4	49	Certificate	2017	ICT	ISB	Medium
R5	50	Diploma	2000	Manufacturing	ISB	Small
R6	56	Master	2013	Manufacturing	LHR	Small
R7	48	Certificate	2011	Hospitality	LHR	Medium
R8	60	Diploma	2003	Tourism	LHR	Medium
R9	54	Bachelor	2009	ICT	LHR	Small
R10	59	Master	1999	Manufacturing	LHR	Medium

A purposive sampling technique was adopted by the authors as a means of asking the owner-managers to participate in the study. In this technique, as per (Yin, 2018), researchers are strongly recommended to start with a 'simple and straightforward sample size' because of the complexity of managing and analysing large volumes of data. Although there is no ideal number of samples in qualitative research, the study by (Rashid *et al.*, 2019) highlighted several recommendations made by other researchers. For example, (Eisenhardt and Graebner, 2007) estimates that between four and ten samples work well; (Nazir and Roomi, 2021) recommend a sample of six to eight for a homogeneous sample; and (Lee, Falahat and Sia, 2020) suggest that the number of samples in small business research is often less than ten (10).

At the initial level, a list of SMEs (with their contact details) was obtained from Regional Chambers of Commerce and SMEDA (Small and Medium enterprise development authority, Pakistan). To validate the existence of the companies and obtain the authorization to participate in the study, telephone calls were made to ten SMEs identified (five in each region) that met the criteria of this study. All contacted SMEs from the manufacturing, hospitality, tourism, and ICT (hardware and software) sectors agreed to participate in the research. These SMEs firms nominated their owner-manager, one from each firm, to provide qualitative data for this research.

Questionnaire design and data collection

Based on literature, several drafts of semi-structured questionnaire were developed in order to adjust the context of this study. The final version of the questionnaire contained open questions and were used during the interview process. The first part of questionnaire is devoted to knowing SMEs in terms of size, structure, characteristics, and type; and measures the various variables identifying the PU and PEOU of ICT usage on the impact of SMEs. The second

section contained questions that were aimed to identify factors that either lead SMEs to adopt or affect the ICT technology including cultural barriers. Entrepreneurial characteristics of owner-managers in terms of knowledge of and awareness of ICTs were also investigated in section 2.

After the construction of the research instrument, be it a questionnaire or an interview, it is imperative to test it before using it for collecting final data (Yin, 2018). To guarantee validity, the questionnaire was initially developed in English and later on translated into the local language (Urdu) by a team of researchers. After several revisions of the questionnaire and having judged by a group of experts, the pilot study was carried out with the owner-managers of four random SMEs in the two selected regions of Pakistan. The pilot study provided excellent feedback on the research questions and, as a result, the validity of the interview questions was improved due to the rigorous submissions that were made. During pilot interviews with the various participants, relationships were established to familiarize themselves with each firm, which subsequently facilitated access to the SMEs for the final face-to-face interviews.

Semi-structured interviews are quite flexible and interviewer does not strictly follow a formal list of questions so as to understand the respondents' perspectives in detail (Creswell and Creswell, 2017). To record responses, a conversation is either noted in handwritten notes or recorded in audio form (Saunders, Lewis and Thornhill, 2009). In this study, data was obtained through ten (10) in-depth semi-structured face-to-face interviews. Semi-structured interviews enable entrepreneurs to explain the opportunities, challenges and barriers and clarify how these contextual factors influence on their SMEs.

Data analysis

Handwritten notes and some audio transcriptions were carefully examined to find similarities and differences in the responses of the participating SMEs in order to better understand the field data. The qualitative data obtained from this study was analysed using thematic techniques which is considered an appropriate qualitative data analysis method (Braun and Clarke, 2006). For analysis, following six phase approach was used:

1st phase: At the end of the interviews, the data collected by taking notes and some audio recordings were manually transcribed and repeated readings were used to familiarize and understand the interview data.

2nd phase: After reviewing the data, codes were identified based on the responses provided by respondents.

3rd phase: Themes were identified by assembling codes and formed the same data set for each transcription.

4th phase: Once the themes were identified, the researchers modified and developed the initial theme and revised it to meet the objectives of the study. Therefore, after repeating the data several times, the themes were clear with the objectives of the study and found in 10 transcripts.

5th phase: Themes were defined and then searched for sub-themes where the data interacted with the main themes of the dataset.

6th phase: In the last phase, this report was produced, after obtaining codes, defining themes, sub-themes. Based on the necessary information, the researchers then formulated a TAM framework based on the results of the study.

Findings

The thematic analysis produces several information based on themes and sub-themes that contribute to the adoption of ICT by SMEs in Pakistan.

Table 2: Themes, sub-themes and codes derived from thematic analysis (Source: Authors)

Themes	Sub-themes	Codes
1. Impact of ICT usage on SMEs	To generate employment opportunities	Employment generation and flexibility
	Growth in labour productivity and technical efficiency	Labour growth and technical efficiency
	Reduction in Scale of fraud and the detection and prevention of financial crime	Fraud Detection and prevention of financial crime
	To gain a competitive advantage	Positive impact Improve business performance if ICT adopted successfully Maximum competitive advantage
2. Cultural decisions	Individual's lack of trust on ICT tools	Less trust on ICT tools
	Inadequate educational capacity in IT	Capacity of education in the society to use IT
	Financial infrastructure deficit	Internet crimes increased
	Traditional business selling methods	Operating businesses in traditional ways
3. Factors affecting ICTs adoption among SMEs	Existence of legacy IT infrastructure	Existence of legacy IT infrastructure
	Inadequate country's digital readiness	Overall country's IT infrastructure
	Size and structure of the firm	Adequate size and structure needed to adopt ICT
	Financial constraints	Inadequate financial resources to adopt ICTs
	ICT skills (HR) expertise	Lack of ICT skilled workers to run systems smoothly on daily basis
	Power outages	Continuous electricity required to run ICT devices for smooth operation
4. Entrepreneurial characteristics of owner-managers	Appropriate technological knowledge	Knowledge of IT to adopt and use ICT devices
	Compatible ICT systems adaptation	Compatibility in adapting ICT systems Complex interface

	Adequate ICT training at workplace	Proper IT training is needed for senior (old) executives to run ICT devices
	Senior employees (older employees) enthusiasm	Lack of motivation among employees to firstly adopt and then work on ICT systems
5. The role of governments and national (local) institutional support	Absence of legal regulations on ICT framework	Appropriate legal and institutional ICT framework is missing
	Governments ICT initiatives	Opinions on government initiatives in promoting the use of ICT
	National (local) institutional financial assistance	Financial assistance is required from local institutions to get ICT projects approval Lack of financial assistance
	Governments and Institutional ICT implementation support	Govts and national institutions support relating to ICT never been received or encouraged

Table 2 shows the five themes, sub-themes and codes that were identified in the interview data and these include (1) the impact of ICT usage on SMEs, (2) cultural decisions, (3) factors affecting the adoption of ICTs in SMEs, in particular (4) the entrepreneurial characteristics of owner-managers and (5) the role of governments and national (local) institutional support factors leading to successful adoption of ICT in SMEs. The categorized themes that emerged from the thematic analysis provided a framework for examining the views gathered from respondents in order to get answer to research questions.

The impact of ICT usage on SMEs – Theme 1

For the theme of the impact of ICT usage on SMEs, the derivation started from the sub-theme of to generate employment opportunities.

To generate employment opportunities

Three (3) respondents linked ICT with creation of employment and expressed that it makes labour markets more innovative, inclusive and global. They expressed the positive impact of ICT on the SMEs in the following words:

“I agree that the latest ICTs can help create jobs” – Respondent 1

“ICT persuades employment as industry itself” – Respondent 4

“ICT not only generates jobs, but I believe it works as a tool that allows workers in SMEs to access new forms of work [online] in new and more flexible ways” – Respondent 7

Growth in labour productivity and technical efficiency

For the code of Labour growth and technical efficiency, four (4) respondents were quoting that enabling new forms of ICTs in the workplace could help workers and SMEs to be more efficient than ever. Below are the selected narratives:

“My friends’ businesses are more technologically efficient than ever after using ICT devices” – Respondent 2

“I saw that ICT have the potential to revolutionize production in our company” – Respondent 5

“Not only by transforming production plant operations, but also enabling end-to-end visibility of the supply chain in real time, to the end user” – Respondent 6

“In addition to developing the technical efficiency of my staff, improving new products and services for our customers” – Respondent 10

Reduction in Scale of fraud and the detection and prevention of financial crime

Four (4) of the respondents agree that after ICT implementations, it becomes possible for SMEs and government departments to detect and prevent financial crime and fraud. This is due to the fact that instead of relying on paper-based record keeping books, they can conduct appropriate electronic audit trials in greater accountability. Following are narratives, of few respondents, related to this aspect:

“Yes, technological tools can give my firm a more complete view of our data (internal and external)” – Respondent 3

“The ICT system can prevent financial crime and fraud in society” – Respondent 8

“I can say that instead of relying on paper records, our firm with ICT can conduct proper electronic audit trials with greater accountability” – Respondent 7

“I’ve heard that ICT can help businesses be more predictive in identifying trends and patterns of financial crime risk that are not easily discernible otherwise” – Respondent 4

To gain a competitive advantage

In the opinion of Four (4) respondents, if ICT is implemented properly in an organization, it can enhance productivity, boost customer satisfaction through improved communication, and reduce operational costs. As a results, firms’ competitiveness can increase in local and international markets. These respondents voiced their opinions in the following words:

“I agree that if ICTs adopt positively in our society, our firms could help to gain a competitive advantage in local and international markets” – Respondent 1

“I can boost business operations and improve customer happiness in less time and reduce business costs” – Respondent 5

“As an entrepreneur, my firm can gain maximum competitive advantage by improving the customer experience, advertising strategies and communication with existing and potential customers on the Internet” – Respondent 4

“A better relationship with the environment and with customers, which can generate long-term economic benefits” – Respondent 6

Cultural decisions – Theme 2

In this theme, factors affecting the willingness of end consumers to adopt ICT-enabled product and services are described. For the theme of cultural decisions, the derivation started from the sub-theme of individuals lack of trust on ICT tools.

Individual's lack of trust on ICT tools

Five (5) respondents linked the trust of end consumers with the ICT adoption by firms. As per them, many household members from large urban backgrounds do have purchasing power and technical know-how to shop online; yet, they avoid doing so due to little or no trust on ICT enabled services. Lack of consumer trust is one of the biggest hurdles for online purchases through ICT interference tools. This indirectly forces the firms to rely on traditional selling and payment channels rather than ICT enabled mechanisms for selling and executing transactions. Following are excerpts from interview transcriptions that describe respondents' narratives:

"Most people do not trust the ICT based online activities in the country" – Respondent 2

"Let me explain it to you, while in big cities many household members have the purchasing power to go online and shop online, they don't trust ICT (Internet shopping) enough to do it"– Respondent 7

"I doubt the stability of this ICT system" – Respondent 8

"In my business lack of consumer confidence is one of the biggest obstacles to shop online via ICT interference tools"– Respondent 9

"I have a website for online customers, they called me and said they were sometimes reluctant to buy products online and share their details on merchant sites" – Respondent 10

Inadequate educational capacity in IT

Another factor, that respondent identified for poor adoption of ICT enabled services, is the lower capability of end consumers with regards ICT related knowledge and understanding. Customers with insufficient knowledge ultimately avoid purchasing online. The narratives are as follows:

"Most people in our society really don't know what ICT is?" – Respondent 3

"Computer training is required" – Respondent 4

"To adopt and perform ICT, the user must have knowledge of ICT devices" – Respondent 6

"I have ICT enabled devices running in my business, however, one of my clients called me to tell me he didn't know how to place orders on my website while sitting down at home"– Respondent 9

"Lack of sufficient computer education capacity in the country to purchase e-products using ICT devices"– Respondent 10

Financial infrastructure deficit

Six (6) interviewees pointed to the increase in financial crime and risks associated with internet technologies; and deficiency in financial infrastructure to cope with these risks. This inadequacy in making secured financial transactions has led many businesses and individuals to use ICT tools. Here are the selected quotes:

"Financial crime has increased in the country as technology enters" – Respondent 1

“You never heard about cybercrimes and hackers’ activities, what they are doing? Such dangers associated with Internet technologies, particularly in financial transactions”
– Respondent 3

“Financial infrastructure or secure gateway is needed for firms and online consumers”
– Respondent 5

“ICT use is good, but I think necessary financial infrastructure is required to enable businesses and government customers to conduct electronic transactions [on the Internet] in the local business environment” – Respondent 7

“Sometimes the downside is ICT security. Not sure of safety” – Respondent 4

“I wish a secure digital transaction platform is available in our country to protect us against information theft and hacking issues for the betterment of my business and our society” – Respondent 9

Traditional business selling methods

Another interesting factor suggested by the respondents is the traditional mind-set of end-consumers. In Pakistani culture, traditional sales methods that include personal contacts and relationships are still very prevalent. SMEs whose customers prefer the traditional methods, often use ICT in a limited way. Four (4) respondents cited similar reasons.

“My clients prefer traditional sales methods such as face-to-face transactions and relational selling without an ICT interface” – Respondent 2

“No ICT sales tool is adopted due to the local business environment which is traditional” – Respondent 7

“Many ticket agencies in the market do not prefer to communicate over the internet or through online software because they are sometimes reluctant to communicate and cannot easily explain what they meant using ICT tools” – Respondent 8

“Our business partners use traditional methods, so to communicate, they have to do that too. Therefore, the ratio of ICT use is very limited” – Respondent 5

Factors Affecting ICTs Adoption – Theme 3

In this theme, factor that affect the SMEs to adopt ICT and associated technologies in their businesses are described.

Existence of legacy IT infrastructure

Four (4) respondents mentioned the presence of legacy IT infrastructure that supports necessary business activities in their respective firms; yet, poor compatibility make it difficult to integrate with latest ICT. Embedding with latest ICT requires changing of complete infrastructure and thus requires large capital investment. Below are the selected narratives:

“We are running a small business and we do not have the basic capacity to adopt the more expensive technological umbrella devices” – Respondent 3

“Especially for new ICT trends, which involve the use of the latest computers, including hardware and software networks to communicate, store and manage demand information in a limited time” – Respondent 6

“In fact, we are very old. I have not adopted the latest infrastructure supporting ICT devices” – Respondent 8

“In 2011, I decided to upgrade the basic infrastructure to support the latest technology, but it didn't go well” – Respondent 9

Inadequate country's digital readiness

Six (6) of the respondents attributed low adoption to high cost of latest equipment and lack of infrastructure and its accessibility in small towns and villages. Below are the selected narratives:

“The latest technological devices are expensive, especially for small businesses” – Respondent 3

“I think the country's digital adoption index is very low for adopting the latest technology” – Respondent 4

“The ICT devices that support our company's online projects, including online communication with clients and corporate clients, were not easily accessible at low cost and worked well for longer” – Respondent 6

“I have personally felt that, especially in rural areas and small towns, are faced with the lack of physical and technical infrastructure and ICT facilities available to businesses” – Respondent 7

“I find it difficult to effectively implement ICT in business because cheap and reliable IT infrastructure is not readily available” – Respondent 8

“We have ISPs and other private companies to provide IT services, but their services are not affordable to me” – Respondent 9

Size and structure of the firm

Scale and size of the firm also have an impact on ICT implementation. Small sized companies usually have very informal management structure and possess very limited resources thus rendering the extensive adoption of ICT less likely. Following narratives represent the opinion of four (4) respondents:

“I think the medium size and informal structure seriously damages my company's ICT resources to be used properly” – Respondent 1

“I was considering changing the traditional structure to accept new technological changes, a smaller company in terms of size and inadequate structure forced me to rely on traditional methods of sales and communication” – Respondent 5

“My business size is very small; I don't think ICT is useful for my business” – Respondent 6

“I only have three departments to handle day-to-day operations, what's the point of adopting and running the business entirely on ICT devices?” – Respondent 8

Financial constraints

Responses from Five (5) participants suggest that even though they want to adopt or upgrade ICT-enabled environment, they cannot do so due to financial constraints. Projects such as development of e-commerce website; implementation of accounting, ERP, CRM and online

software's; and upgrading the existing ICT infrastructure are put on hold due to budgetary constraints. Below are the selected narratives:

"For the technological upgrade, an adequate budget is required, which is lacking"- Respondent 3

"We are interested in moving from traditional systems to in-line systems with the installation of ICT devices, the limited budget allocated to technological advancement limits me to manually performing day-to-day operations" – Respondent 5

"For the ICT upgrade, I have to buy the latest devices, which is expensive for me"- Respondent 8

"ICT devices are fast but it's a question of budget, which implies financial constraints"- Respondent 10

ICT skills (HR) expertise

Operating and maintaining technological devices; installing software and fixing hardware; developing websites to support online operations; and executing technological projects, often require a full-time ICT-literature staff member. SMEs often rely on external help as they do not have an in-house staff to perform these tasks. Outsourcing these tasks cost money and may cause delay in responding to needs as when these arise. Four (4) respondents showed their concerns in the following words:

"Normally, we never encountered any major technical issues with our IT and manufacturing systems, but whenever we found a technical error in the systems, we called our contracting family business who fixed the problem [in a fixed price]"- Respondent 4

"We did not have any IT specialist to rectify the errors on a daily basis" – Respondent 6

"We need to have skilled workers who are experts in ERP software and manage the website on a day-to-day basis" – Respondent 1

"I want to go in this direction but because of staff constraints, no one can make it work" – Respondent 8

Power outages

Online presence requires all ICT components to perform some function 24/7 to provide better customer service. Electrical outages in Pakistan make it difficult for SMEs to power their ICT equipment uninterrupted. Not all SMEs have backup arrangements and consequently are unable to provide on-line services and carry out day-to-day operations on a continuous basis. Here are the selected narratives:

"Pakistan is facing a serious electricity problem which is hampering the ICT growth, which operate the businesses on a continuous basis" – Respondent 1

"I believe that one of the main obstacles to the successful adoption of ICT and online technologies in all departments of the company is the electricity shortage" – Respondent 5

"Due to power outages all of the company's electrical systems have ceased to function" – Respondent 4

“We are no longer able to carry out an activity related to ICT devices affecting daily business operations” – Respondent 6

“I have this diesel generator that helps me keep the systems running during blackouts” – Respondent 9

Entrepreneurial characteristics of owner-managers – Theme 4

In SMEs, all strategic decisions are usually made by owner-managers. This implies that their knowledge, abilities and capabilities play an important role in smooth execution of projects including ICT implementation. For the theme of entrepreneurial characteristics of owner-managers, the derivation starts from the sub-theme of appropriate technological knowledge.

Appropriate technological knowledge

Five (5) respondents quoted that limited understanding and knowledge of latest ICT prevented the firms from adopting the complete structure of ICT. Their narratives are given below:

“Seriously, I have no interest in adopting new ICTs due to low technological knowledge and limited benefits of use” – Respondent 2

“I think ICT systems never bring change to my business” – Respondent 4

“I'm ready this year to embrace ICT and run the whole business on it if someone teaches me how to interface” – Respondent 6

“First, I have to learn the systems, no, I can't do that” – Respondent 9

“ICT systems are difficult. It is not easy to use” – Respondent 10

Compatible ICT systems adaptation

Four (4) respondents were saying that the firm's ICT systems must be compatible and aligned with the current technical requirements of the market. However, it will take time to implement such changes, since senior personnel were still reluctant to use online tools. Excerpts from their interview are stated below:

“I think it takes a while to get used to the new systems, and after a while everyone (older employees) will be comfortable working on more ICT devices” – Respondent 1

“I have to configure whole system that suits them (older employees)” – Respondent 5

“I myself likely to adopt ICT completely only if the system is compatible with our current requirements” – Respondent 7

“The system is complicated for us because each year we have to renew the license, or we have to update it” – Respondent 9

Adequate ICT training at workplace

Five (5) respondents acknowledged that senior employees (older executives) at various levels needed adequate training to use ICT related devices. Below are the selected narratives:

“I must provide training to staff members to work on ICT systems” – Respondent 3

“Most senior employees can only manage a few necessary items, such as sending and receiving emails, communicating with customers through a telephone and fax system” – Respondent 4

“However, adequate computer training is needed to learn advance ICT systems” – Respondent 7

“The challenge here is to train our staff members mainly older employees” – Respondent 8

“But the limitation is our senior workers. So, it doesn’t work as efficient as I wish” – Respondent 10

Senior employees (older employees) enthusiasm

Four (4) respondents were quoting that some of the most senior executives (older employees) had never expressed interest in working with these ICT technologies as per below narratives:

“Our head office has 20 employees, including nine senior executives (old employees), most of whom have been working since 1999 in different departments; they are good at their jobs and helpful. However, due to lack of computer skills and insufficient knowledge of ICT, they are not able to cope with the manufacturing problems” – Respondent 10

“They (older employees) are reluctant to work on ICT devices” – Respondent 9

“A lot of my older workers are afraid of losing their jobs if we switch from the traditional system to technology” – Respondent 8

“Senior executives are not interested in adopting and working on new systems” – Respondent 7

The role of governments and national (local) institutional support – Theme 5

This new and interesting theme emerged during the interview. For the theme of the role of governments and national (local) institutional support, the derivation started from the sub-theme of Absence of legal regulations on ICT framework.

Absence of legal regulations on ICT framework

Three (3) participants believed that GoP and local business associations should take the initiative and propose legislation for ICT framework as per below narratives.

“At this time (2019-2020) there is no effective governmental ICT policy” – Respondent 4

“I can say that the government and related national institutions must create a favourable technological environment in the country for the acceptance of ICTs and related applications” – Respondent 1

“It could be possible if there is an ICT policy existing in the field, which I think is missing or not fully implemented” – Respondent 6

Governments ICT initiatives

Four (4) participants argued that local and provisional governments in the country should set an example by adopting ICT-related technologies within their departments. Provision of training to SMEs that are doing business with local and provisional governments, will result in

implementation of ICT in SMEs in order to transact with the government departments. This will ultimately drive down the cost. The narratives are as follows:

“In my opinion, with effective use of ICT, local and interim governments can use the Internet to receive electronic transactions” – Respondent 4

“ICT can help reduce the cost of doing business with government and the public” – Respondent 5

“In my opinion, I think this is a good thing and we could welcome the government's initiative to create more efficient institutions to support ICTs” – Respondent 6

“I really want them (training program) funded by the government or local institutions. These ICT trainings are now necessary to stay in the competitive technology sector” – Respondent 9

National (local) institutional financial assistance

As mentioned in theme 3, ability to adopt ICT is often limited by financial constraints in a SME firm. Five (5) respondents stated about the reluctance of commercial banks to lend money for ICT implementation. Perhaps reasonable financial assistance to SMEs by relevant government department may solve this problem. Following excerpts tell the concerns of the respondents:

“I need financial help to buy manufacturing technologies” - Respondent 1

“I contacted the local bank for financial help, but they refused due to my bad credit and business history” – Respondent 2

“There is no need or demand for such things (ICT), so no financial help is required at the moment” – Respondent 3

“I run a family business and want to get a bank loan to upgrade basic devices. But they (the bank) refused me” – Respondent 6

“I saw that due to political interference in financial institutes [banks] and the lack of a legal and financial framework on the part of the government, national banks are reluctant to provide infrastructure loans to new entrepreneurs for the ICT development” – Respondent 9

Governments and Institutional ICT implementation support

Four (4) participants stated that GoP and local institutions offer no technological support to those SMEs that are, at least, trying to adopt ICT to facilitate their business activities. Below are the selected narratives:

“Support available for larger companies” – Respondent 4

“Who are they (the local institutions)? I never contacted them nor received any technological support” – Respondent 3

“In the local business sector, there are no appropriate local and government associations for our business that could provide reasonable and cost-effective assistance in e-hospitality development” – Respondent 7

“Many manufacturers’ associations and regulators have contacted me for an upgrade and provided me with roadmaps, but this is not feasible for my business” – Respondent 10

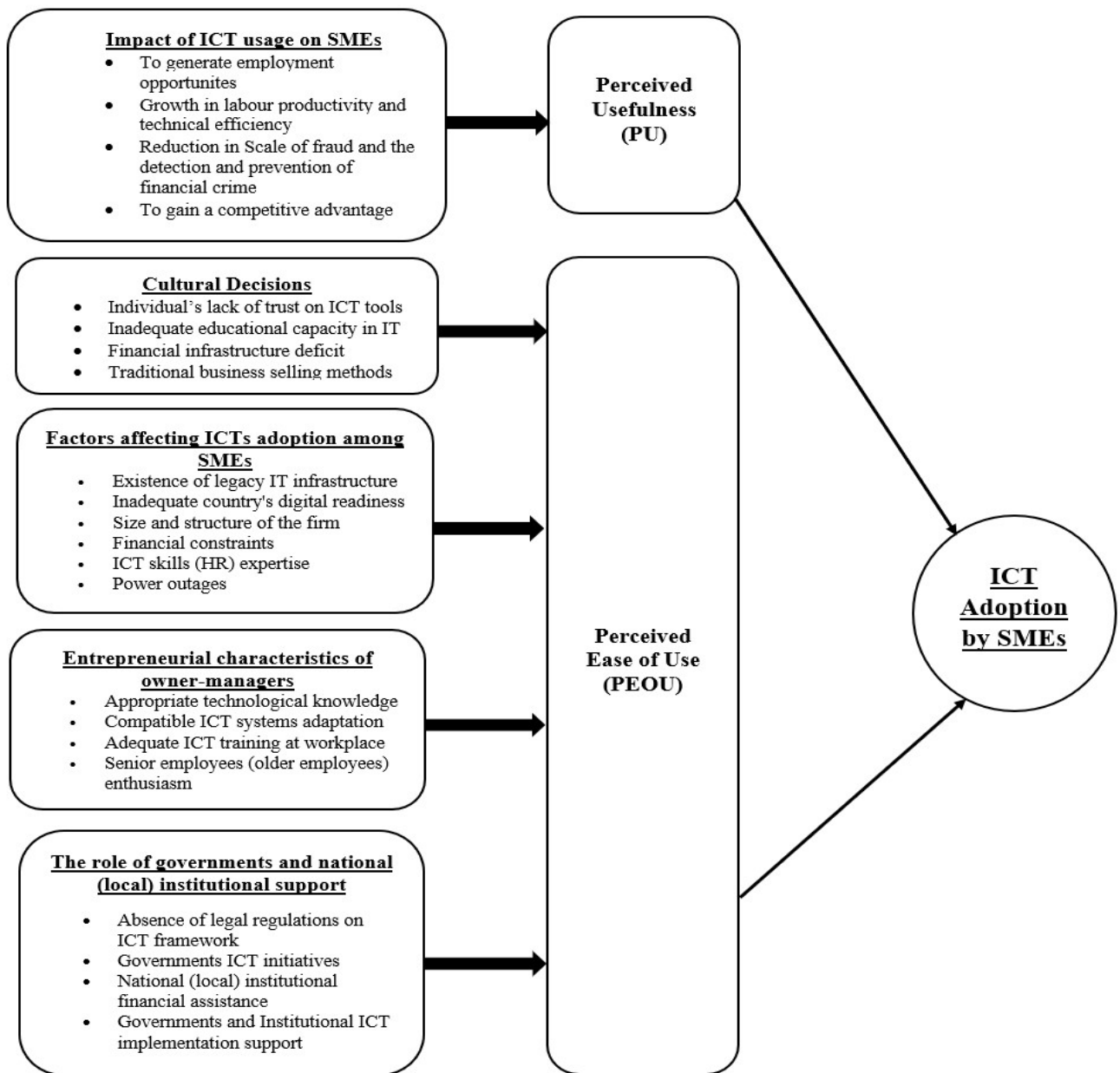


Figure 2: Extended TAM Framework for ICT Adoption by SMEs in Pakistan (Source – Authors)

Discussion

Five (5) themes have emerged from the thematic analysis of the semi-structured interviews with ten (10) owner-managers of SMEs. These themes are shown in the Figure 2 and provide a deeper insight into factors that are important in ICT adoption by SMEs in Pakistan.

First theme captures the **impact of ICT usage on SMEs** and contains four (4) sub-themes in it. These include generation of employment opportunities, growth in labour productivity and technical efficiency, reduction in scale of fraud and the detection and prevention of financial crime and gaining of competitive advantage. Previous studies (Burke, 2010; Okundaye, Fan

and Dwyer, 2019) have shown that owner-managers of SMEs, who adopted ICT in their business, believed that helped them in gaining a competitive advantage. However, our study found that owner-managers of SMEs believe that ICT once adopted not only offers a competitive advantage but could also generate more flexible jobs, increase employee performance, and business financial efficiency. These four advantages contribute to the perceived usefulness (PU) of the theoretical framework (TAM) of the literature. Hence, when ICTs are adopted successfully, with a positive owner-manager attitude by SMEs in Pakistan, are useful and positively impact business operations. Similar to the results of this study, (AlBar and Hoque, 2019) found that how owner-managers might perceive the usefulness of ICT, in particular the benefits they would derive from it, would contribute to the success of their business. Indeed, our study found that SME owner-managers in Pakistan who are the key decision-making and family business leaders can develop new and effective technology strategies that would help them adopt and use ICT in their businesses. Further (Rozmi *et al.*, 2020) have found that ICTs in the 21st century are crucial for preventing human error and increasing safety, financial security and business efficiency. Our study found that SMEs achieve maximum growth in various operations through ICT by becoming more efficient; technically and financially, but also innovative in the treatment of customer experience and communication and economically competitive across the world.

The second theme is **cultural decisions** and includes four (4) sub-themes that inhibit adoption of ICT from end-users' perspective. The sub-themes include individual's lack of trust on ICT tools, inadequate educational capacity in IT, financial infrastructure deficit, and traditional business selling methods. Previous studies (Poorangi *et al.*, 2013; Al-Tit, 2020) have found that people from different cultures think and behave differently with regard to the adoption of ICT. And this influences their perceptions about development and use of technologies. Our study revealed that people of Pakistani culture believe that using or adopting ICT system for various functions would not be effortless. Therefore, in this study, the cultural decisions considered are those important behavioural factors that drive or prohibit Pakistani citizens to use ICT in their daily life. Furthermore, people think that ICTs are not beneficial to them that's why they do not use it. This aspect of behaviour is integrated into some elements of (PEOU) of the theoretical framework (TAM) of the literature. Hence the lack of customers' confidence in ICT devices prevents many SMEs from completely transforming their traditional sales method into ICT. In literature, (Nazir and Roomi, 2021) conclude that individual education plays an important role in any society for the adoption of ICTs. As, in Pakistan, many people do not know how to use and operate ICT-enabled devices; therefore, our study provides similar results that low literacy rate and lack of IT education in Pakistan are hindering the complete adoption of ICTs in the society. Although many previous studies (Awiagah, Kang and Lim, 2016a; Oduro, 2019) argued that, with the help of ICTs, country's financial institutions can now have more control on the financial crimes. However, our study found that as IT literacy rate is lower in Pakistan with financial infrastructure deficit, hackers can easily perform illegal activities with the involvement of ICT tools online. This is the main reason as well why the society is not openly accepting ICT to purchase online commodities and hence behave traditionally. Indeed, the local market culture of any country must be considered for technology adoption (Ebad, 2018). When it comes to cultural barriers, for example, we find that traditional sales methods are a barrier that affects SMEs when adopting ICT. This is related to Pakistan's local business environment in which business is conducted in the traditional way through relationship, word of mouth and personal visits. People avoid transacting through technologies due to low technology awareness. This leads to a lack of confidence in the technology to exploit ICT applications.

The third theme provides adequate information relating to the important **factors affecting ICTs adoption among SMEs** due to internal factors related to firm and environmental factors

surrounding the business. There are six (6) sub-themes which include unavailability of IT infrastructure to support ICTs, inadequate country's digital readiness, size and structure of the firm, financial constraints, in-house ICT skills (HR) expertise, and power outages. Previous studies (Ghobakhloo and Ching, 2019) found that the availability and quality of the latest ICT infrastructure units (hardware and software) were critical for technology adoption; however, Pakistan's poor ICT infrastructure - including hardware and software tools, and a weak network system in the country and communication and security services - is a significant barrier to the adoption of ICT. Among them, power outages were an important factor affecting the successful adoption of ICT for future development; without a continuous supply of electricity, SMEs cannot use basic units on an uninterrupted basis or rely solely on them to manage the business process across systems. With regards to firm's size and structure, our findings are aligned with that of previous studies (Al-Qirim, 2007; Mabenge, Ngorora-Madzimure and Makanyeza, 2020). For example, small SMEs with flatter structures find the adoption of ICT more difficult. This is due to the fact that these SMEs are mainly family-owned and most decisions are in the hands of owner-managers. Therefore, from Pakistan's perspective, the financial and human capacity of companies to make decisions regarding the adoption of ICTs, is more dynamic. We also find that, for SMEs, limited financial budget has affected smooth execution of existing and new technology projects in their firms. Projects such as website development for e-commerce; implementation of accounting, ERP, CRM and in-line system; and upgrading the existing ICT infrastructure also poses an organizational challenge similar to (Bala and Feng, 2019). Our findings also suggest that due to the unavailability of qualified ICT expertise in SMEs, ICT adoption was minimal in all departments. This could be due to the assumed expenditure of acquiring an ICT expert and the limited organizational budgets (Ebad, 2018); therefore, Pakistani SMEs receive technical support from cheaper outsourcing family-based firms whenever ICT related assistance is needed. In this research, Perceived Ease of Use (PEOU) is closely related to system use and ICT adoption among SMEs in Pakistan. Although most SMEs in Pakistan do not use ICT, yet they may find it difficult to use due to several factors as discussed in this study.

The fourth theme provides ample information relating to **entrepreneurial characteristics of owner-managers**. The constituent four (4) sub-themes are appropriate technological knowledge, compatible ICT systems adaptation, adequate ICT training at workplace, and senior employees (older employees) technology enthusiasm. This study identified the extended entrepreneurial characteristics of owner-managers as an important factor that inhibit ICT adoption by SMEs in Pakistan. Our study finds that the negative attitude towards the adoption and use of ICT develops when the owner-manager starts learning too late and subsequently finding it difficult to learn. Studies by (Garg and Choeu, 2015; Eze *et al.*, 2018; AlBar and Hoque, 2019) recommended that innovative entrepreneurs and other employees of SMEs should receive adequate training if they wish to adopt innovations and are motivated to implement ICT applications in their businesses. However, (Alzahrani, 2019; Hand, Iskandarova and Blackburn, 2020) argued that it depends only on the intentions and attitudes of owner-managers who play a vital role in the adoption of ICT. Our study strongly corroborates the earlier findings and shows that entrepreneurs (owner-managers) and senior executives (older employees) in SMEs were unable to communicate electronically and were also reluctant to improve their innovation (ICT) skills, because they thought it was too late to learn and work on computer systems. In particular, the adoption of ICT had been influenced by the experience and know-how of owner-managers and senior employees about latest ICT infrastructure (hardware and software) (Ramdani, Raja and Kayumova, 2021). This ICT knowledge was found to be the critical individual factor associated with ICT adoption in this study and similar to literature studies. It is therefore concluded that those SMEs which are

controlled by owner-managers and senior managers who have good ICT literacy and experience are more likely and quickly to adopt ICTs in their firms.

The final theme is **the role of governments and national (local) institutional support**, which has emerged as a new theme from thematic analysis and an important factor that inhibits or facilitates the adoption of ICTs by SMEs in Pakistan. This theme has four (4) sub-themes and include absence of legal regulations on ICT framework; Governments ICT initiatives; National (local) financial assistance; and Governments and Institutional ICT implementation support. Previous studies (Govinnage and Sachitra, 2019; Rozmi *et al.*, 2020) found that government plays an important role in any country for the successful adoption of ICTs. However, our study contradicts the previous findings of other researchers and found that the GoP (federal and provisional) as well as national (local) business institutions (SMEDA, PTA, MoI, T&T) have not yet implemented appropriate technology policies, legal frameworks or regulations that would stimulate ICT adoption; it was therefore delayed. Consequently, SMEs find it difficult to obtain technology-upgradation loans at lower interest rates, finding it at higher rates and this acts as a barrier to ICT adoption. This situation certainly has consequences for the government and local business institutions, including financial banks. To understand these factors and to encourage and facilitate the level of ICT adoption by Pakistani SMEs and individuals, they need to increase their efforts in promoting effective programs in themselves, start taking initiatives to adopt and use ICT in their departments, and carry out financial transactions and administrative ICT services. Additionally, enacting of regulatory framework and providing implementation support are fundamental factors that could motivate SMEs to use ICTs (Rozmi *et al.*, 2020).

Conclusion

The main objective of this study was to explore the impact and factors affecting the adoption of ICT by SMEs in Pakistan using TAM as an extended theoretical framework. To address the research question, a qualitative study was conducted. Semi-structured interviews were conducted of 10 owner-manager of firms that are operating in two business hubs of Pakistan.

The theoretical contribution of this study is that this research has extended the TAM framework and provides a thorough overview of the impact and factors influencing the adoption of ICT in SMEs. With an extensive theoretical framework (TAM), this research has deepened our understanding about the factors that contribute to perceived usefulness (PU) and perceived ease of use (PEOU). Based on the thematic analysis of the interviews, five main themes and several sub-themes were found that affect PU and PEOU which consequently lead to adoption of ICT in SMEs in Pakistan.

This study has contributed to understand the ICT environment of SMEs as a business strategy to increase the growth, profitability and performance, and to gain a competitive advantage. Together these factors increase the Perceived usefulness. The study further concludes that uptake of ICT is influenced by several other factors. These include cultural factors that represent end-customers' perspectives; internal and external factors; characteristics of owner-managers; and regulatory and institutional support factors. Together these factors constitute the Perceived ease of Use.

This study bridges the gap in existing literature regarding critical factors such as the influence of culture on ICT adoption, power outages, ICT adoption resources, available ICT skills, latest IT infrastructure, country's digital readiness, and ICT knowledge gap among entrepreneurs and government and national (local) institutional support as the primary impeding factors of ICT adoption in Pakistani SMEs. This study confirms that the adoption of ICT is strongly influenced, not only by the perceived characteristics of information technologies, but also by other determinants, and particularly emphasizes the important role of individual entrepreneurs' characteristics and government and local (national) institutional support. Therefore, it can be predicted that SMEs with a greater understanding of the various functions and benefits of ICT

use on perceived usefulness (PU), support from governments and national financial institutions, ICT readiness, and user-friendliness (on perceived ease of use - PEOU) of owner-managers are more likely to become ICT users in Pakistan.

There are several recommendations and implications for owner-managers, SMEs, government, and national (local) business institutions. SME owner-managers need to be aware of the technological resources available to them; and the essential steps to achieve technological business goals. They should identify the appropriate type of new technology systems, the acquisition cost and source of funding for the installation of new technology projects. They need to hire qualified ICT human resources; offer ICT training to employees and encourage staff to use ICT applications; and plan and appropriately manage the implementation phase of ICT projects. This study also suggests that the governments should facilitate the adoption of ICT by SMEs, provide detailed information, and establish a networking platform to improve and expand the knowledge base of SMEs. For successful adoption and use of ICT by SMEs, the regulatory bodies should enact laws and regulations to support SMEs, to import latest equipment that is low cost, or to encourage local manufacturers to assemble that equipment at low cost for the benefit of SMEs, individuals and the economy. Other local financial institutions should offer financial incentives and loan to SMEs for technology upgradation and implementation of ICT projects. Local institutions can collaborate with public and private training centres and take appropriate measures to promote and use ICT not only in SMEs but also in government agencies and take initiatives to modernize society. The most important implication for government and local institutions is to provide the necessary technological infrastructure for owner-managers of SMEs, such as continuous electricity, effective and efficient technological infrastructure, availability of latest low-cost ICT equipment (hardware and software) to support new technologies and ICTs that would lower the cost of doing business.

This study is limited in that it only includes ten (10) SMEs, from four sectors, operating in two urban regions of Pakistan. Future studies could include SMEs from rural areas of Pakistan to further explore additional contextual factors. Furthermore, this study broadened the combined scope of the TAM framework by looking for different factors that impact perceived usefulness and perceived ease of use of ICT. Future studies can broaden the scope by looking at how SMEs in Pakistan are adopting ICT to address some of the Sustainable Development Goals (SDGs). As this is qualitative research based on thematic-analysis method; additional quantitative research is needed to generalise the results. Lastly, one can apply the extended TAM framework propose in this research to other contexts including other emerging economies, in order to better understand the five discussed themes of this study while integrating ICT in their SMEs.

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