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Global Positive Effects of ICT Usage and Adoption in SMEs: A Literature Review Prior to the COVID-19 Crisis

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ABSTRACT

The COVID-19 has certainly increased the uses of Information and Communication Technology (ICT) in all domains. Despite this, ICT had become an integral part of Small and Medium Enterprises (SMEs) that are the backbones of a nation's economic development. This article's objective is to analyze the global positive effects of ICT usage and adoption in SMEs across the world before the COVID-19. Consequently, a systematic literature review methodology was used based on a few steps, namely, formulation of review questions, search strategy devising, study selection criteria, quality appraisal criteria, and finally design of studies to select and download 220 articles published before 2020. Out of them, a total of 85 most significant and well-informing articles' analysis is conducted. The results showed ICT has positive impacts on SMEs production and performance in the world (Asia, Africa, Europe, Australia, Oceania, North America, and South America). It also changes and improves the work approach, technics, and conditions of SMEs. Due to missing data, this research has not included all countries of each continent. Considering results analysis from all countries would give better outcome.

Keywords: *ICT, SMEs, Productivity, Performance, Adoption*

INTRODUCTION

To deal with the COVID-19 at workplace, major measures had been taken to use ICT to help organizations to continue business. If this seems to be a revolution, ICT had been performing an important and silent before the COVID-19 role in Small and Medium Emprises (SMEs) which assume crucial functions in economic development. As the backbone of large companies, they are responsible for ninety percent (90%) of economic activities and fifty percent (50%) of employment across the world (International Finance Corporation, 2012; Bauchet & Morduch, 2013). They are also vital actors in terms of stimulating innovation, job creation, poverty reduction, etc. The impact of ICT (Information and Communication

Technology) in the Small and Medium Enterprise is essential across the world (Rahayu & Day, 2017; Yunis et al. 2017).

Due to the COVID-19 pandemic, ICT is playing an especially important role in the modern society. It is used by enterprises in different industries as well as by individuals and communities (Sianjase & Libati, 2016). ICT can manage and control many organizations (Spanos et al., 2002). Bresnahan et al. (2002) stated that productivity has increased in the organizations that have used ICT; it helps to flow data to achieve goals in any circumstances. Furthermore, it strengthens them to survive in the competitive market. ICT can enhance communication electronically by capturing data (Parliamentary Office of Science and Technology, 2006). It plays a significant role in labor productivity growth (Sichel & Oliner, 2000). In his study, Stiroh (2002) revealed that manufacturing firms used ICT during 1970s, 1980s, and 1990s have got more productivity growth at least by 1% as compared to those had invested less. To reduce the production cost and also for the administrative activities, many of the SMEs are using ICT (Levy & Powell, 1998) which provides different new opportunities to them (Brock, 2000; Corso et al., 2001).

SMEs can be classified under two categories such as economically and statistically. Usually, a firm is recognized as small if it respects the following three criteria: its important contribution to the gross domestic product (GDP), its small share of the market, its contribution to employment and exports, and finally it does exist for its own purpose since it is not a part of the larger enterprise (NCR, 2011). The SMEs contribute to an important part of growth domestic products (GDP) and job creation (Vosloo, 1994 as cited in NCR, 2011). Statistically, SMEs are classified by the number of their employees and turnover (OECD, 2004).

Before the COVID-19, Balocco et al. (2012) stated that SMEs have recognized the importance of ICT increasing productivity and business process and improving product and service development. Internet and computer applications, namely Skype, digital image software and the word processing, etc. are considered as ICT tools (Birkland, 2013). In this century, these tools are used to create knowledge. They are tools are synchronous, asynchronous, computing tools, learning management systems, knowledge databases, professional networking, and the ICT tools for hands-on practice (Agarwal, 2016).

Southern and Tilley (2000) identified different categories of SMEs that use ICT. In the case of ICT medium-level users, SMEs are more expert with the open access company code (e. g. network and file services), separate the IT and communications systems, ICT in production, email, and plans for the delegation for the management and routine upgrading of IT. In the case of high-end ICT users, "leading-edge and innovative IT use, ICT integrated in the business process, a full digital information and communication system, ICT as a formal responsibility with a dedicated manager" have been observed. According to pre-COVID-19 literature review, what are the positive effects of using those technologies and their applications in SMEs? What are the benefits of ICTs uses and adoption in SMEs in Asia, Africa, Europe, Australia, Oceania, North America, and South America?

PROBLEM STATEMENT

According to studies conducted before the COVID-19 in many countries in all continents, it is extremely hard to find SMEs that are not minimally ICT users since this technology provides so many opportunities to SMEs (Brock, 2000; Corso et al., 2001). An appreciate use of ICT increases the productivity and performance. To invest in ICT for the development of SMEs, it faces a lot of challenges in the Asia-Pacific countries (Chacko & Harris, 2006). Although its rapid expansion, ICT misuse can result to higher production cost that can cause low profits (Mokaya, 2012), but it is one of the challenges that are being faced

by SMEs in developing countries due to the lack of skills and knowledge which is required on the benefits of ICT in their businesses. Furthermore, MacGregor and Vrazalic (2005) stated that ICT adoption within SMEs is relatively very low. Even in Canada, CEFRIO (2011) indicated that SMEs still have a long way to go before being able to fully embrace ICT. SMEs do not provide sufficient training for the ICT use to employees since they do not have enough time for employees to get trained externally, although the internal training program is very expensive (Roy, 2015). OECD (2009) found a 10% increase in the number of staff using ICT and this has increased their productivity have increased by 1.3%. However, the study also found that SMEs have incorporated ICT in their businesses, and it has increased 12% productivity as compared to SMEs those who have not incorporated. Showing benefits and impacts of ICT adaption in SMEs across all continents is important to help comparative analysis and better decision making.

AIM AND OBJECTIVES

The aim of the study is to analyze ICT usage and adoption in SMEs in Asia, Africa, Europe, Australia, Oceania, North America, and South America. To achieve this aim, the study will:

i. Summarize the impacts of ICTs usage and adoption on the SMEs in all continents across the world through a literature review;
ii. Analyze the benefits of ICTs on the SMEs in all continents across the world; and
iii. Compare the impact and underline global positive effects of ICTs usage and adoption on the SMEs all over the world.

This study covers a wide range of implementation of ICT within small and medium-sized enterprises (SMEs): ICT usages, ICT training programs, benefits of ICT on SMEs, the impact of ICT on productivity in the economy overall.

METHODOLOGY

This study has used the systematic literature review method based on the formulation of review questions, search strategy devising, study selection criteria, quality appraisal criteria, and finally design of studies (Croucher et al., 2003 as cited in Wallace et al., 2005). It conducted an intensive search of the literature with the following keywords: the impact of ICT in small and medium enterprises in Europe, Asia, America, Australia, and Oceania, considering a review of SME definition around the world. Moreover, a shorter review of studies on ICT impact in Mexico, Panama, Jamaica, Ecuador, Argentina, Colombia, and Peru SMEs is also undertaken.

Considering Google Search accuracy and the number of articles related to the subject which can be found in 2019, the initial search took place using the Google Search engine and Google Scholar. A total number of 220 articles were downloaded and read; out of them, 105 articles were found relevant. From these 105 studied step by step according to the methodology, 85 article results were directly related to SMEs and satisfied the methodological criteria (Croucher et al., ibid.) for this systemic literature review. The approach is illustrated in Figure 1.

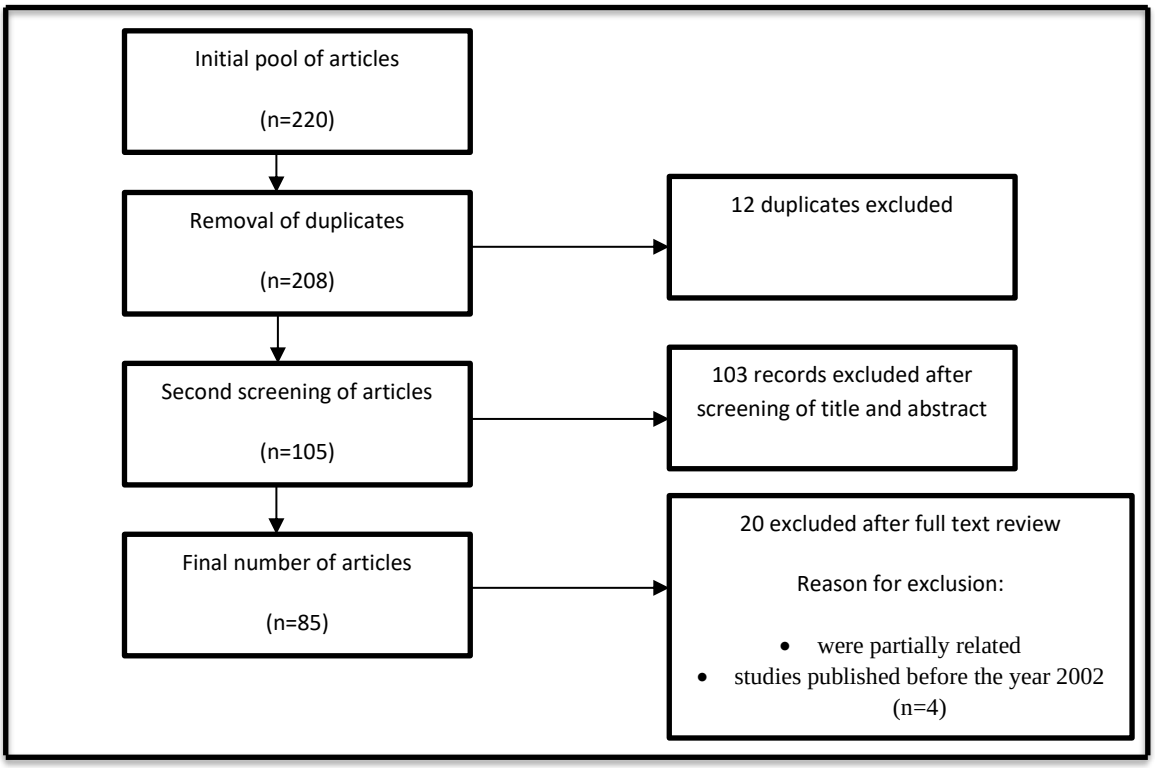

Figure 1. Flowchart of the Studies Included in the Review

LITERATURE REVIEW

The findings underlined two major dimensions: the definition of SMEs and different ICT impacts in SMEs across the continents. Many characteristics could be retained to identify SMEs. Mainly, the size is defined by the maximum number of employees but varies from one country to another. SMEs are considered as non-subsidiary, independent firms that employ a fewer number of employees and these numbers vary based on geographically as well as economically from country to country. Some of the SME's size in each country is shown below (Table 1).

Table 1. Maximum Employees of SMEs in Asia, Africa, Europe, Australia, Oceania, North America, and South America

Continent	Country by SME Size	Maximum# Employees	Continent	Country by SME Size	Maximum# Employees
Asia	Vietnam	300	Europe	Belarus	250
	Thailand	200		Moldova	250
	Bangladesh	100		Switzerland	250
	Pakistan	50		Norway	100
Africa	Egypt	50	Australia	Australia	200
	Malawi	50	South America	Peru	200
	Morocco	200		Brazil	100
	Ghana	100	North America	Canada	<500
	Tanzania	20		USA	<500
			Oceania	New Zealand	Fewer than 20

Covering Asia, Africa, Europe, Australia, Oceania, North America, and South America, this study reveals that ICT can significantly help SMEs to improve their productivity and hence their economic outcome.

Asia:

In *India,* Garg (2016) conducted a study on ICT adoption in SME's and results revealed that ICT changes the organization work style and it helps to increase employees. In a study conducted by Beley and Bhatarkar (2013:4) in India, on ICT role in SMEs using a questionnaire-based survey, results revealed *"a small business managed by leaders who understands the benefits of IT adoption will be able to take advantage of the promised benefits of IT adoption, including improved organizational efficiency and effectiveness."*

In a more recent study in *Kuwait,* Al-Alawi and Al-Ali (2015) studied the factors affecting e-commerce adoption in SMEs in the GCC and their research method was a questionnaire-based survey. Results showed that ICT is positively associated with SMEs.

In *Indonesia,* a study by Rahayu and Day (2017) using a questionnaire-based survey on the 292 SMEs was conducted on the technology adoption by SMEs. The study revealed that most of the SMEs are still at the early stage in terms of using ICT.

In *Malaysia,* Tan et al. (2009) conducted a study using a questionnaire-based survey and these questionnaires were distributed to 406 managers or owners of MSEs in the different regions and the findings revealed that Internet-based ICT adoption provides a low cost to customers. Furthermore, the study also revealed that security is continuing to be a major barrier. Similarly, Gazem and Rahman (2015) in Malaysia, conducted a study using a survey and revealed that ICT roles lead SMEs to consider technologies for increasing organizational performance.

In *Thailand,* United Nations (2008) conducted a study using a survey and results revealed that *"small and newly founded manufacturing businesses, especially the ones located in the north and north-east of the country, should receive more support both in terms of facilitating their access to ICTs can help to increase productivity, improve the quality of products and better respond to demand. Technical information on how businesses implement ICT solutions can provide additional guidance to set industry-specific ICT strategies".*

In *Bangladesh,* Abdullah et al. (2013) conducted a study to analyze the SMEs performance and their study was qualitative; questionnaires were distributed to 150 managers from the industrial areas of the capital city. Results revealed that an ease use of ICT has significant impacts on SME. Furthermore, the study also revealed that the skills and knowledge of ICT have also got a positive influence on the performance of SMEs.

In *Iran,* Gilaninia et al. (2012) conducted a study using a questionnaire-based survey on ICT role in MSEs performance. The study revealed that when ICT applies to the small and medium organization, then there is an impact on quick products and services, on technological solutions and innovations, and ICT also facilitates communication between the business units and the business partners. Furthermore, the study also indicated that the impact of ICT in the SMEs has arisen intra organization activities facilitating the communication between units and the organization.

In *Oman,* Ashrafi and Murtaza (2008) used a questionnaire-based survey and a total of 51 SMEs participated in the study. Results revealed that a few numbers of SMEs are aware of ICTs in Oman. Moreover, the study also exposed that ICT use has positive impacts on their business. Another study took place in Oman by Ashrafi et al. (2014) on the status of ICT

adoption by SMEs and the results of the study revealed ICT infrastructure plays a significant role on the SMEs.

In *Asia-Pacific countries*, Chacko and Harris (2006) conducted a study and the results of the study revealed that SMEs are facing a lot of challenges to get adequate information since the ICT adoption cost is high, and its usage affected by a lack of economic knowledge. They also stated that SMEs do not have enough resources to expand opportunities to be competitive in the international market and these opportunities encourage SMEs to minimize communication cost as well as the new product idea. Having analyzed above research results, it can be concluded that in Asia, ICT plays a significant role in many aspects of SMEs as shown in Figure 2.

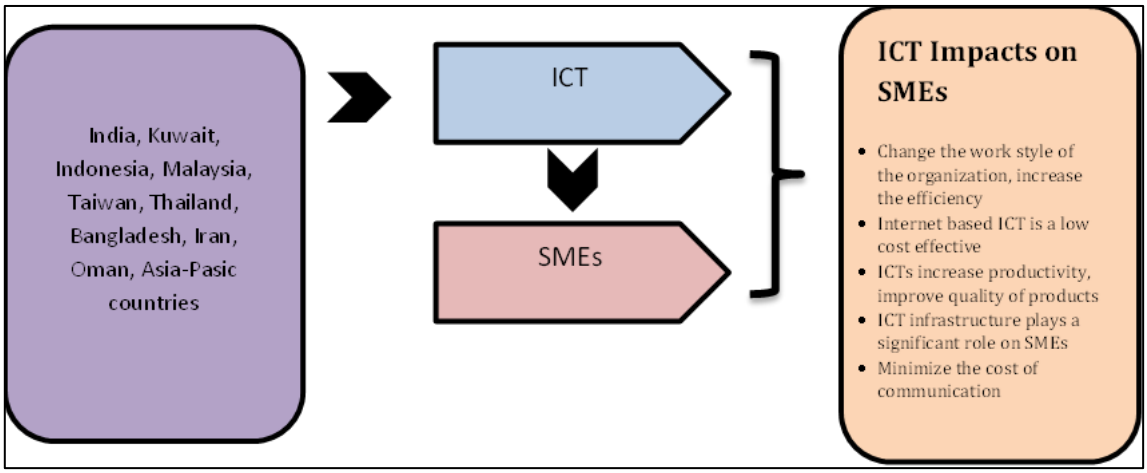

Figure 2. A Schematic Diagram of the ICT Impact on SMEs in Asia

Africa:

In *Kenya,* Manyonde and Choga (2014) conducted a study using a qualitative (interviews) and quantitative (questionnaire) survey. Their study interviewed a total of 11 subjects in qualitative research and a total of 73 participants received from the quantitative survey. Results showed that 72% of SMEs are not using the accounting application. In addition, the study also indicated that it is very important for SMEs to have a mobile accounting application among SMEs. Similarly, another study by Gikenye and Ocholla (2012) on ICT diffusion informal sector (micro and small enterprise – MSEs or small and medium enterprises - SMEs) in Kenya and their study approach was mix method (qualitative method and quantitative method). Data was collected from 390 MSEs that consists of owner/managers and selected employees. These owner/managers and selected employees were from retail clothing stalls, footwear, electronics, curios and crafts and hardware shops in Nairobi as well as in the central provinces. Results revealed that "*poor business performance of the MSEs does not endear them to access and use of computer-based ICTs, rather they have mainly ended up using the relatively inexpensive mobile phone technology. Furthermore, with the exception of the mobile phone, there is low use of ICTs by the MSEs due to their poor performance and small size."*

In *Ghana*, Attom (2013) conducted a study on ICT impact on growth strategies of 162 SMEs. Out of 162 SMEs, 121 were small-scale and 41 were medium scale. The results of the study revealed that most of the SMEs (73.29%) do not use ICT and the majority of the SMEs considered the ICT influence as a negative impact on the SMEs potential growth. The result

also showed that ICT is used by SMEs 27%. Attom's (2013) study reported that maintain ICT in SMEs sector is expensive. Akomea-Bonsu and Sampong (2012) conducted a study and data was collected from 40 SMEs using a questionnaire. Results showed that only a small number of SMEs are aware of ICT benefits and most of the participants use the Internet mainly to locate customer and contract, general information for business, and emailing instead of the raw materials. Moreover, the study also revealed that most of the SMEs have reported positive performance and benefits to use ICTs in their business. Furthermore, the results also indicated "*need for more training facilities in ICT for SMEs, measures to provide ICT products and services at an affordable cost, and availability of free professional advice and consulting at reasonable cost to SMEs*."

In *Nigeria,* Olise's et al. (2014) study was on the ICT adoption to improve SME's performance and results revealed that ICT improves SMEs productivity and competitiveness in the global market. Findings from Adebisi and Adekola's (2016) indicated ICT facilities increase SMEs performance growth, productivity and their study also recommended "*SMEs owners should invest in ICT and its components because they have been proven to significantly influence organization performance*."

In *Zambia,* a study conducted by Sianjase and Libati (2016) on ICT impact on the SMEs performance and data collected from 88 Kitwe-based SMEs. The results of the study exposed that ICT has an "*impact on costs/time reduction compared to sales/revenue increase*" and in addition, the results also showed that ICT has an impact on the supplier-related activities of the SME.

In *Rwanda,* Yusuf (2013) conducted a study on ICT impact in SMEs using a questionnaire-based survey to over 35 SMEs in different fields. Research results revealed that creative use of ICT influences SMEs not only reduce the cutting cost but also it improves their efficiency and to build-up relationships with different customers. Overall results indicated that ICT has a diverse and positive impact for the SMEs growth and competitiveness.

In *Tunisia,* a study conducted on the relationship between ICT use and performance on the SMEs and results revealed that "*there is a significant statistical relationship between the level of ICT use and the performance of Tunisian SMEs in the electrical and electronic industry*" (Kossaï and Piget, 2014).

In *Tanzania,* Melchioly and Sæbø's (2010) study included 30 (thirty) interviews were conducted, representing fifteen (15) that were from three categories, namely, wood carvings, carpentry, and metal fabrication. For each of the categories, a total of 5 (five) owners or managers of SMEs participated. Findings from Melchioly and Sæbø (2010) shown that ICT improves SMEs economic efficiency. In addition, the results also indicated that the usage of ICT by SMEs enhanced productivity and economic growth within the SMEs.

In *Cameroon,* a study conducted on the investments of ICT in SMEs, and they used dataset from the short-term trends survey which was conducted by the Department of Forecasting in the Ministry of Economy and Finance. A total of 60 firms since 2000 included in the data set contain quarterly data on sales, number of employees, and expensive for the gross investment. A total of forty–seven (47) firms was observed from 2003-2006 and the results indicated that ICT has a significant impact in Cameroon on the firm's productivity (Peguy et al., 2009).

In *Botswana, Cameroon, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, Uganda, and Zimbabwe,* Esselaar et al. (2007) conducted a study on ICT use and impact on SMEs profitability. The results revealed that ICT increases

labor productivity and overall profitability. Considering above research results in Africa, ICT impacts on SMEs are numerous and can mainly be summarized as shown in Figure 3.

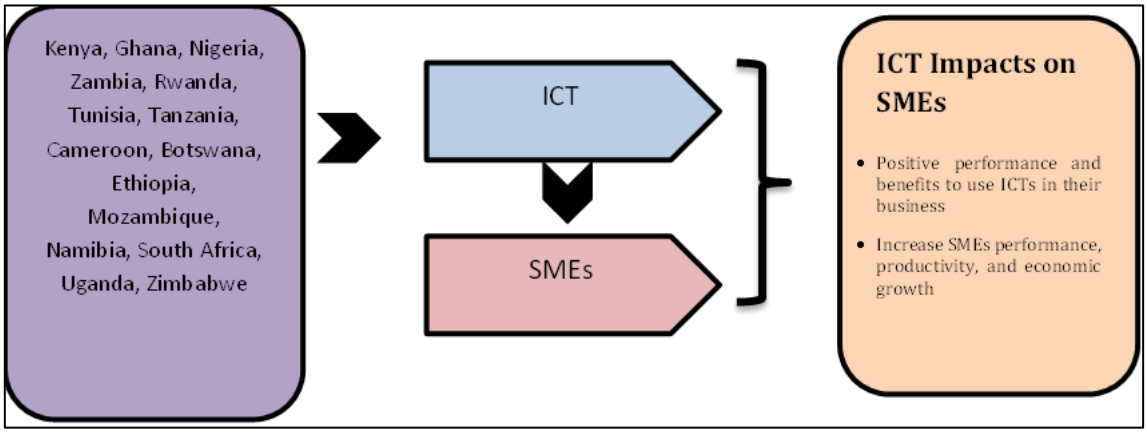

Figure 3. A schematic diagram of the ICT impact on SMEs in Africa

Europe:

In *Albania*, a study conducted by Zoto and Elmazi (2012) using a survey of 128 SMEs and their study was on the acceptance of e-government service as a tool for SMEs that can compete locally as well as internationally. The results revealed 40% of the SMEs are using the broadband technology. On the other hand, 20% of the SMEs do not have the broadband technology and never used Internet. In addition, 26% of SMEs had no Internet access.

In *Germany*, Hamburg and Engert (2007) conducted a study on the training situation of European Small and Medium Enterprises (SMEs), especially regarding the ICT. The results of their study indicated that ICT improves the learning process in SMEs.

In *UK*, in a study by Collins et al. (2003) on the *"small and medium sized tourist enterprises (SMTEs) in the European Hotel sector and their use of the Internet as well as their perception on online learning system."* Their study also indicated that ICT could assist to develop SMTEs. Moreover, the study also indicated SMTEs are using ICT full potentially in their business. The study reported participants preferred to incorporate the course material online to be trending. Therefore, it is concluded that SMEs are interested in online learning and ICT can also play a crucial role in their success.

In Italy, Colombo et al. (2013) analyzed ICT impact on SMEs productivity and performance. A total of 799 firms participated in the study from 1998 to 2004. Results revealed that SMEs are found to benefit from adopting selected advanced ICT applications depending on several contingent factors such economic sector (services vs. manufacturing), the relevance of specific ICT software applications for the operation of SMEs' industry and finally, to undertake a strategic and organizational change.

In *England*, research by Short (2016) on thematic analysis of the ethnographic fieldwork took place in 3 SMEs of varying sizes and different industries/sector in southern England during 2014 and 2015. Short (2016) indicated that employees' ICT is influenced by owner-managers, resource constraints, issues of trust and their need for social interaction in their learning.

In *Germany*, *Portugal*, *Spain*, *Austria*, *Estonia*, *Netherlands*, *Norway*, *Denmark*, Paulsen (2009) conducted a study in eight (8) European countries and a total of eighteen (18) enterprises, namely, 2 enterprises from Germany, 4 enterprises from Portugal, 2 enterprises from Spain, 2 enterprises from Austria, 2 enterprises from Estonia, 3 enterprises from the

Netherlands, 2 enterprises from Norway, and 1 enterprise from Denmark were included in the case study. The case study includes small, medium-sized and large enterprises as well as ICT providers. Results by Paulsen (2009) revealed that SMEs could use ICT successfully based on three different types of courses such as "*Generic courses, sector courses,* and *internal courses."* Also, the study revealed that analyses of 18 cases suggest that seven ICT features are perceived as advantages by SMEs and these are flexibility in time and place, cost reduction, logistical advantages, reduced time to market, increased sales, improved ties between enterprises, and positive organizational effects.

European Commission: A study by Farvaque et al. (2009) on a report commissioned by the European Commission, *Guide for Training in SMEs* believe that ICT is suited to SMEs as it works effectively with a small number of workers and is very flexible and can, therefore, be adapted to the daily workload. Other advantages for SMEs are that costs are relatively low, course length is variable and, provided they are motivated to learn, all employees can benefit. Despite the difficulties, Admirall and Lockhorst (2009) conducted studies in the seven (7) European Countries found, during an extensive survey of 400 owner-managers of SMEs in seven EU countries, that there were positive attitudes of SME managers towards informal learning within the work context. ICT helps SMEs to adopt many applications and these applications are advanced communication and management applications that increase the SMEs efficiency and performance. The previous analysis shows that ICT impacts on SMEs can be considered important in Europe and summarized as mentioned in Figure 4.

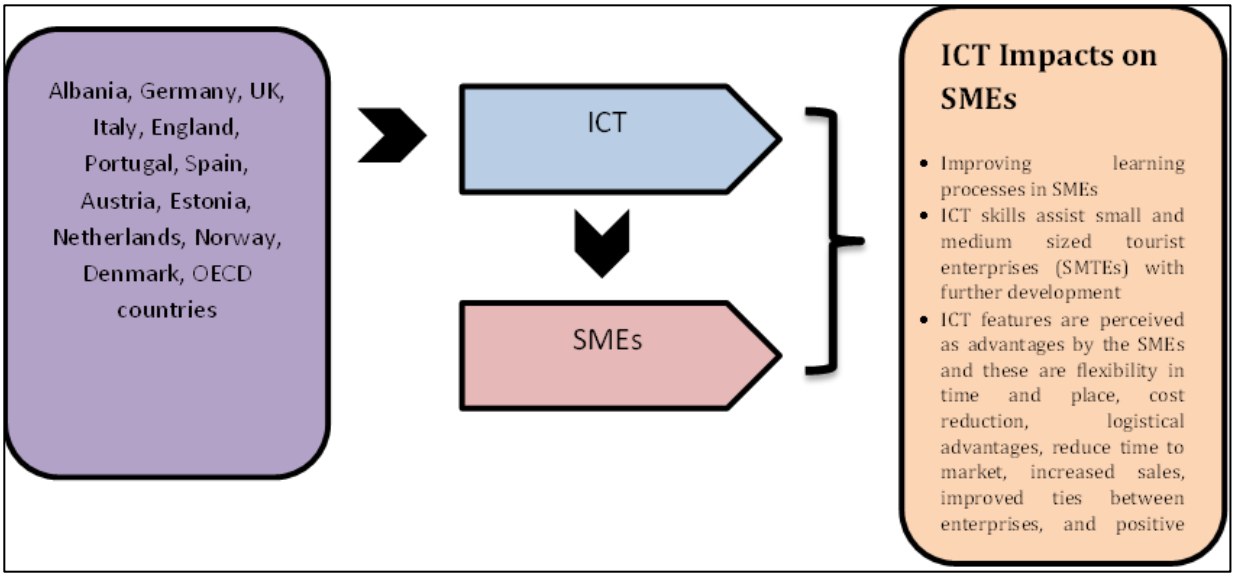

Figure 4. A schematic diagram of the ICT impact on SMEs in Europe

Australia:

In Australia, Hasan and Muljadi (n. d) conducted in a study of small company consists of 9-20 employees, and medium sized companies consisting of 21-250 employees. They used a random sampling of 1100 companies across Australia. Results revealed that respondents believed, in fact, e-learning brings a lot of benefits to the business. "*The number of Australian business using information communication technology (ICT) continues to grow. Computer use has shown a steady growth, rising from 49% at the end of June 1994 to 83% by June 2003. Similarly, the proportion of business with a web presence has grown rapidly, rising from 6% in*

June 1998 to 23% in June 2003. The proportion of business with internet access has also risen from 29% in June 1998 to 71% in June 2003" (Skoko, 2004:31). Similarly, in Australia Zhelyazkov (2012) conducted a study on the impact ICT systems impact on road transport SMEs and the interview duration was 30 minutes. All the participants were from a logistics broker (1) manufacturing companies (2) road transport companies (3) Results indicated that ICT use is very cost effective for the road transport SMEs in Australia. All these results and considerations lead to conclude that ICT impacts on SMEs in Australia can be presented in two main aspects as shown in Figure 5.

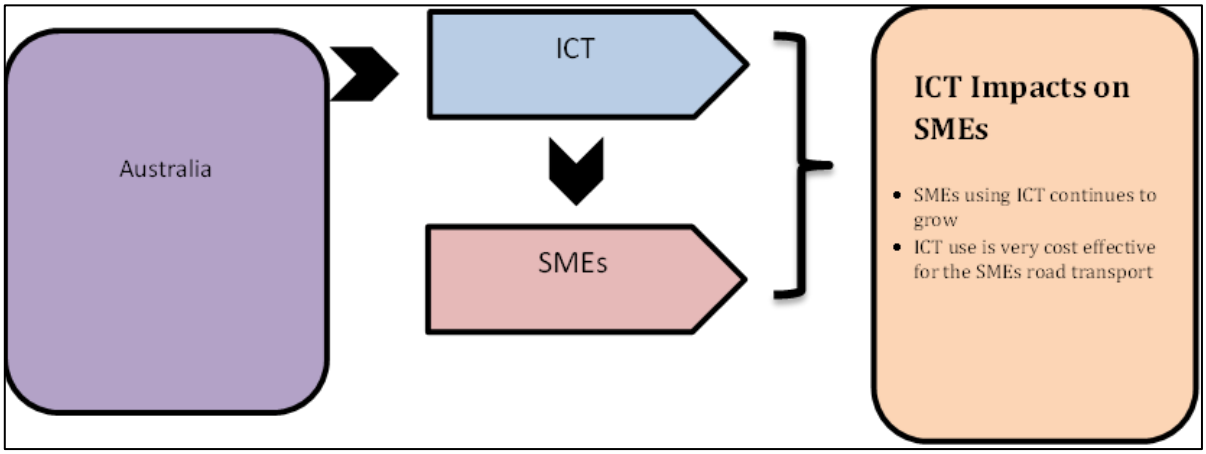

Figure 5. A schematic diagram of the ICT impact on SMEs in Australia

Oceania:

In New Zealand, Locke (2001) conducted a survey of SMEs and the study contacted 1,000 SMEs and a total of 400 SMEs replied. This survey was categorized into three groups such as the Chamber of Commerce (CC), Economic Development Association of New Zealand (EDANZ), and the Local Government (LG). Each of the telephone interview duration was between 4 and 6 minutes. A total of 85% of respondents indicated that they would participate again in future research. Results revealed that most of the SMEs use ICTs in their business and it has significant influence on their business. The study showed that the Government of New Zealand encourages using ICT in SMEs. In addition, Locke (2001) also indicated that the uses of ICT on SMEs help to grow the revenue, reduce the cost, and in general it makes SMEs to have a better business. The World Economic Forum (2008 a, b) ranked as cited in Jia (2008: 57) "*New Zealand as in 25th place for the extent of business internet usage in the world. Most of SMEs have used the Internet extensively in the business environment, especially those "knowledge-intensive*" firms. The uses of the Internet in the firms from primary or secondary industries are also increasingly higher and wider than was expected. Overwhelmingly, it was found by all the researched organizations (firms) to have the internet. Jia (2008) conducted a study on the e-commerce and internationalization in New Zealand SMEs and semi-structured interviews were conducted with CEOs, Managing Directors or the Information Officers of 10 SMEs. A total of 11 participants participated interviewed in the study and the interview took place between 30 to 80 minutes with an average of 45 minutes. Results revealed that most of SMEs is restricted to use ICT with less complexity. In addition, Jia (2008) also indicated that these SMEs are intending to use more advanced applications of ICT. Having analyzed above

research results, it shows that in Oceania, ICT plays a significant role in many aspects of SMEs as shown in Figure 6.

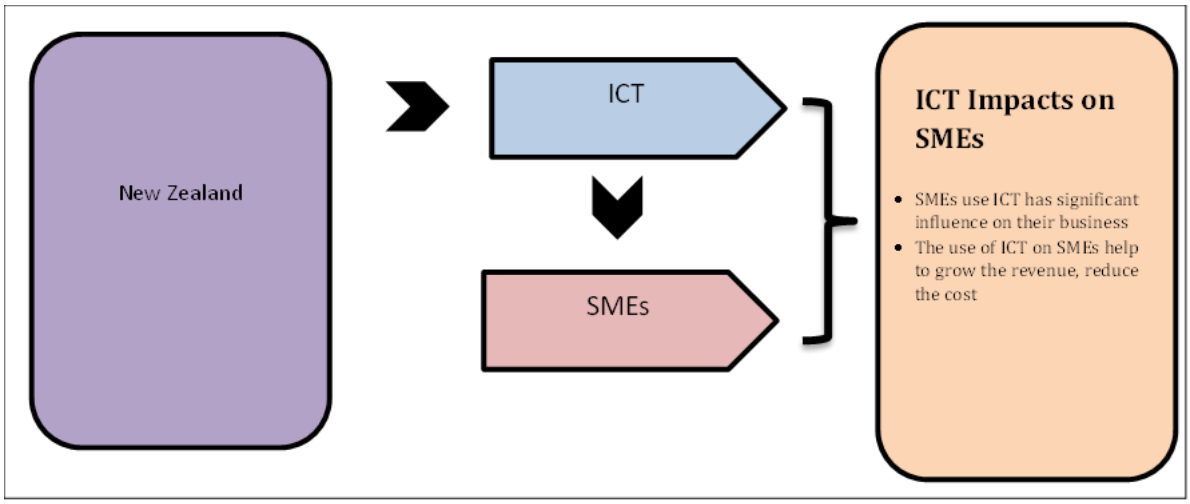

Figure 6. A schematic diagram of the ICT impact on SMEs in Oceania

North America:

In the *USA*, a study questionnaire-based survey was conducted on the firm performance of SMEs that adopts ICT on the United States economy and a total of 1044 surveys was emailed to participants. A total of 429 participants was returned as undelivered (Cereola et al., 2012). Research results revealed enterprise resource planning (ERP) software plays a significant role for the SMEs and these data are not available publicly. Moreover, they also suggested "*(i) the information technology (IT) experience and knowledge of the team and the absorptive capacity of the SME play a significant role in the ability of the firm to assimilate open-source ERP system, (ii) assimilation mediates the role between customisation and operational performance and (iii) the more aligned the open-source ERP system to the SME's business processes, the greater the opportunity to assimilate the technology and achieve higher levels of performance*" (Cereola et al., 2012:1195).

In *Canada*, Roy and Raymond's (2008) study on sixteen SMEs from four provinces (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland) which were located in the Atlantic region of Canada. Each of the SMEs was at least 10 years in the business and these SMEs were very successful and representative in terms of industry and size and these firms had employees between 60 and 485. Roy and Raymond (2008) collected data through the semi-structured tape-recorded interview with SME's human resource managers and owner of the SMEs or manager. Moreover, interviews were also conducted in four different cases with the ICT users. The results of the study revealed that seventy-five percent (75%) of the SMEs were using ICT to train their employees.

In *Mexico*, in a more recent study by Enríquez et al. (2015) on the impact of ICTs on the competitiveness of SMEs and their study population was 435 SMEs. The geographical area of study was Aguascalientes, Mexico and SMEs employees were from 11 to 250. Data was collected through the personal interview with mangers and the response rate was 97.5%. Their study found that ICT positively influence the performance of SMEs, reducing the cost of SMEs, and finally the use of technology by the SMEs. Similarly, another study conducted also in *Mexico* by Guzman et al. (2015) on the IT and competitiveness of Mexico's 400 SMEs. A total

of three hundred forty-six (346) (87%) participants (managers or owners) was taken into consideration. Results from Guzman et al. (2015) revealed that ICT usages have a positive significant influence at the core of SMEs which can constitute a competitive advantage.

In *Panama*, Mojica Peñalba et al. (2015) conducted a study on the ICT effect on Panama SMEs and the study sample was 615 SMEs. It revealed that ICT has significant effects on innovation activities of SMEs in Panama. However, results also showed the size and age of organizations do not have any impact on the SMEs' innovation. Furthermore, Mojica Peñalba et al. (2015:128) recommended that owners or the managers of Panama SMEs should increase the ICT use to search the "*major levels of innovation and to manage this form to improve the levels of competitiveness of the company and to diminish the risks and the uncertainty that generates the environment of the business today*."

In *Jamaica*, a study by Golding et al. (2008) using a questionnaire-based survey on the factors affecting the adoption of ICT by Micro Small and Medium Enterprises (MSMEs) in urban and rural areas of Jamaica. The sample size was 500 MSME and a total of 50 MSMEs were selected from 10 parishes of Jamaica. Golding et al. (2008) argued SMEs play a significant role in national and regional economies and they also have concluded that the use of ICT increases SMEs richness as well as ability of local SMEs to participate in the digital economy.

Considering above research results in North America, ICT impacts on SMEs are numerous and can mainly be summarized as shown in Figure 7.

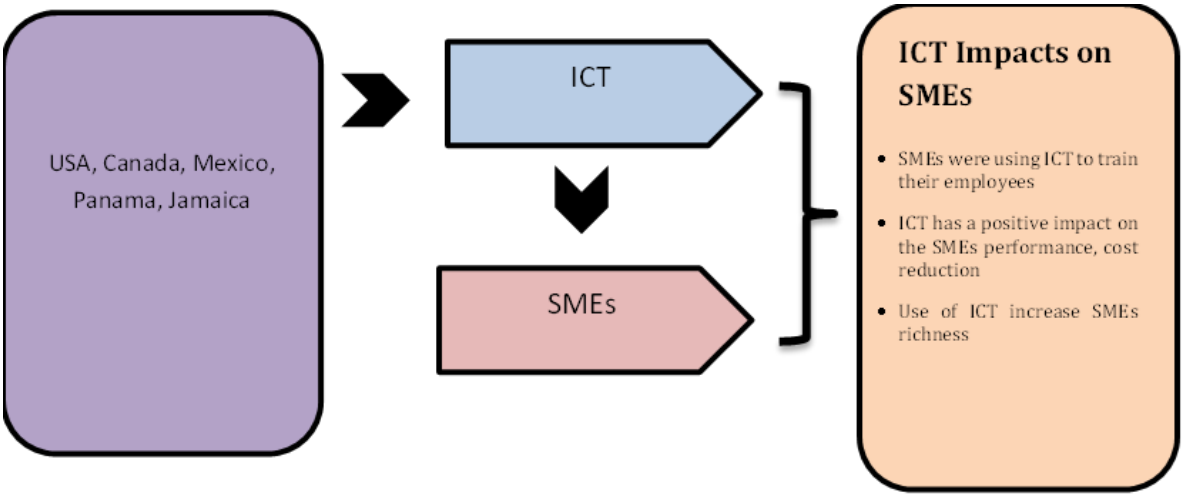

Figure 7. A schematic diagram of the ICT impact on SMEs in North America

South America:

In *Ecuador*, Ibujés-Villacís (2017) conducted a study to analyze the ICT infrastructure on the SMEs of metal mechanic and the results indicated that "*use of ICT also generates significant changes in business management that is displayed when the 95% of the companies consulted said that. It improved its efficiency and productivity, 80% allowed him to communicate quickly to 70% allowed it to reduce costs, the 70% increase their technical capacity, to 60% innovate existing products, 55% access to new markets and a 50% the creation of new products*." Furthermore, the study also indicated companies of Quito (Ecuador) recognized the advantage of ICT usages that can improve SMEs productivity and competitiveness in the competitive world.

In *Argentina*, Dantur and Khaskheli (2017) conducted a study on ICT adoption and its role to grow SMEs and the study revealed many benefits for SMEs to use ICT and these benefits are: transaction cost reduction, efficient communication, elimination of intermediaries. ICT also widens target for the customer market, and finally, increases employees' productivity.

In *Colombia*, in a study by Osorio-Gallego (2016) on factors that influence the ICT adoption by SMEs using a questionnaire-based survey and the study sample size was 474 SMEs. Results revealed that ICT has an impact on the profitability of SMEs.

In *Peru*, a report by Chahud (2005) on ICT for development of SMEs exporters in Peru and the results indicated that it is very important to accept that ICTs have a significant potential to transfer access to information, to improve the internal information systems, and to enhance the methods and scope of information dissemination. The previous analysis shows that ICT impacts on SMEs can be considered important in South America and summarized as in Figure 8.

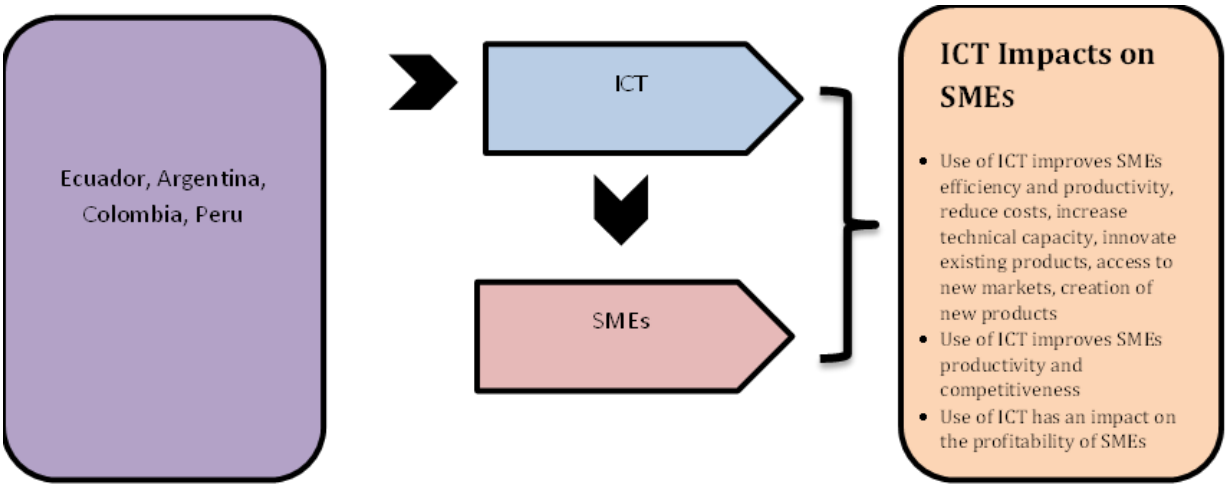

Figure 8. A schematic diagram of the ICT impact on SMEs in South America

RESULTS AND DISCUSSION

Using the systematic literature review method proposed by Croucher et al., 2003 (op. cit. and adopted in Basak et al., 2016) and based on the results of 85 articles, it appears that ICT has benefits in SMEs in *ASIA* (Fig. 2). These benefits concern: organizational efficiency of employee's performance in India (Garg, 2016), lower cost for customers, performance improvement in Malaysia (Gazem & Rahman, 2015), increased productivity, improved quality of products and better respond to demand in Thailand (United Nations, 2008), ICT skills and knowledge on SMEs performance in Bangladesh (Abdullah et al., 2013), the quick delivery of products and services in Iran (Gilaninia et al., 2012). Similarly, ICT has also influenced SMEs in *AFRICA* (Fig. 3) and some of impacts are positive to business (Akomea-Bonsu & Sampong, 2012) (Ghana), SMEs performance (Olise et al., 2014), productivity growth (Adebisi & Adekola, 2016) (Nigeria), cost/time reduction to increase sales/revenue (Sianjase & Libati, 2016), supplier-related activities (Sianjase & Libati, 2016) (Zambia), improved efficiency (Yusuf, 2013) (Rwanda), increase SMEs in the electrical and electronic industry (Kossaï & Piget, 2014) (Tunisia), SMEs productivity and economic growth (Melchioly & Sæbø, 2010) (Tanzania), firm's productivity (Peguy et al., 2009) (Cameroon). For *EUROPE* (Fig. 4), the literature showing that ICT plays a crucial role on the SMEs and some of these benefits are improving learning processes in SMEs (Hamburg & Engert, 2007) (Germany), flexibility in

time and place, cost reduction, logistical advantages, reduced time to market, increased sales, improved ties between enterprises, and positive organizational effects (Paulsen, 2009) (Germany, Portugal, Spain, Austria, Estonia, Netherlands, Norway, Denmark). For *AUSTRALIA* (Fig. 5), literature observed that ICT has a positive impact on SMEs. The benefit is the steady growth in SMEs (Hasan & Muljadi, n. d), cost-effectiveness (Zhelyazkov, 2012). Similarly, *OCEANIA* (Fig. 6), literature indicated that ICT significant influence on the SMEs in New Zealand and some of the benefits are to growth in revenue, reduced the cost and better business (Locke, 2001). In the case of *NORTH AMERICA* (Fig. 7), ICT also impacts SMEs and benefits are customization and operational performance (Cereola et al., 2012) (USA), performance, cost reduction (Enríquez et al., 2015) (Mexico), SMEs richness (Golding et al., 2008) (Jamaica), efficiency and productivity (Ibujés-Villacís, 2017) (Ecuador). Lastly, in *SOUTH AMERICA* (Fig. 8), ICT benefits on SMEs are reduced transaction cost, efficient communication, less intermediaries, wider customer market, employees 'productivity (Dantur & Khaskheli, 2017) (Argentina), profitability of SMEs (Osorio-Gallego, 2016) (Colombia), access to information, improved internal information systems, improved methods, and scope of information dissemination (Chahud, 2005) (Peru).

Table 2. Impact of ICT on SMEs in Different Continent

Continent	ICT Impacts on SMEs
ASIA	• Change the work style of the organization, increase the efficiency • Internet based ICT is a low cost effective • ICTs increase productivity, improve quality of products • ICT infrastructure plays a significant role on SMEs • Minimize the cost of communication
Africa	• Positive performance and benefits to use ICTs in their business • Increase SMEs performance, productivity, and economic growth
Europe	• Improving learning processes in SMEs • ICT skills assist small and medium sized tourist enterprises (SMTEs) with further development • ICT features are perceived as advantages by the SMEs, and these are flexibility in time and place, cost reduction, logistical advantages, reduce time to market, increased sales, improved ties between enterprises, and positive organizational effects
Australia	• SMEs using ICT continue to grow • ICT use is very cost effective for the SMEs Road transport
New Zealand	• SMEs use ICT have significant influence on their business • The use of ICT on SMEs helps to grow the revenue, reduce the cost
North America	• SMEs were using ICT to train their employees • ICT has a positive impact on the SMEs performance, cost reduction • Use of ICT increases SMEs richness
South America	• Use of ICT improves SMEs efficiency and productivity, reduce costs, increase technical capacity, innovate existing products, access to new markets, creation of new products • Use of ICT improves SMEs productivity and competitiveness • Use of ICT has an impact on the profitability of SMEs

Comparative analysis of ICT Impact on SMEs around the World:

A comparison of those findings with the global increasing Internet usages in the world as described in the World Internet user statistics, shows the same contrasted results even the usage of the Internet has drastically increased with the COVID-19. For examples, Asia, which shows many positive impacts has 53% of the Internet World, followed by 13.7% in Europe, 11.9% Africa, 9.9% South America, 6.4% North America, and Oceania/Australia 0.6%. Therefore, these findings can be correlated with the actual trends of Internet Usage and then

help to predict the Internet usage in SMEs with a higher Penetration rate (Internet World Stats: 2022).

SMEs play a significant economic role all over the world and it contributes to creating jobs, income generation and distribution (Temtime & Pansiri, 2006: 55). From the above literature, it clearly shows that ICT reduce the cost for SMEs in North America, Oceania, Australia, Europe, Africa, and Asia. On the other hand, literature did not show for Australia that ICT use improves the SMEs productivity. In Asia (India), ICT changes the organization's work style, whereas existing literature did not show any findings that ICT improves the organization's work style in other countries or continents. For the North America (USA, Mexico), Europe (Germany, Portugal, Spain, Austria, Estonia, Netherlands, Norway, and Denmark), Africa (Ghana, Nigeria, Tanzania, Cameroon), Asia (India, Malaysia, Thailand, Bangladesh, Iran) literature shows that ICT improves the operational performance, whereas Oceania, Australia, no studies show that it improves performance. In Africa (Botswana, Cameroon, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, Uganda, and Zimbabwe) it shows that ICT usage can increase the labor productivity of SMEs, whereas for other continents no study shown on the labor productivity. In Europe (Germany, Portugal, Spain, Austria, Estonia, Netherlands, Norway, Denmark) the above literature shows that ICT use SMEs have the logistical advantages, but on the other hand, literature did not show any study on the ICT use SMEs that have the logistical advantages. Similarly, only in Europe (Germany), show that ICT improves the learning processes in SMEs. A graphical presentation of the ICT impact on SMEs around the World presented in Figure 9.

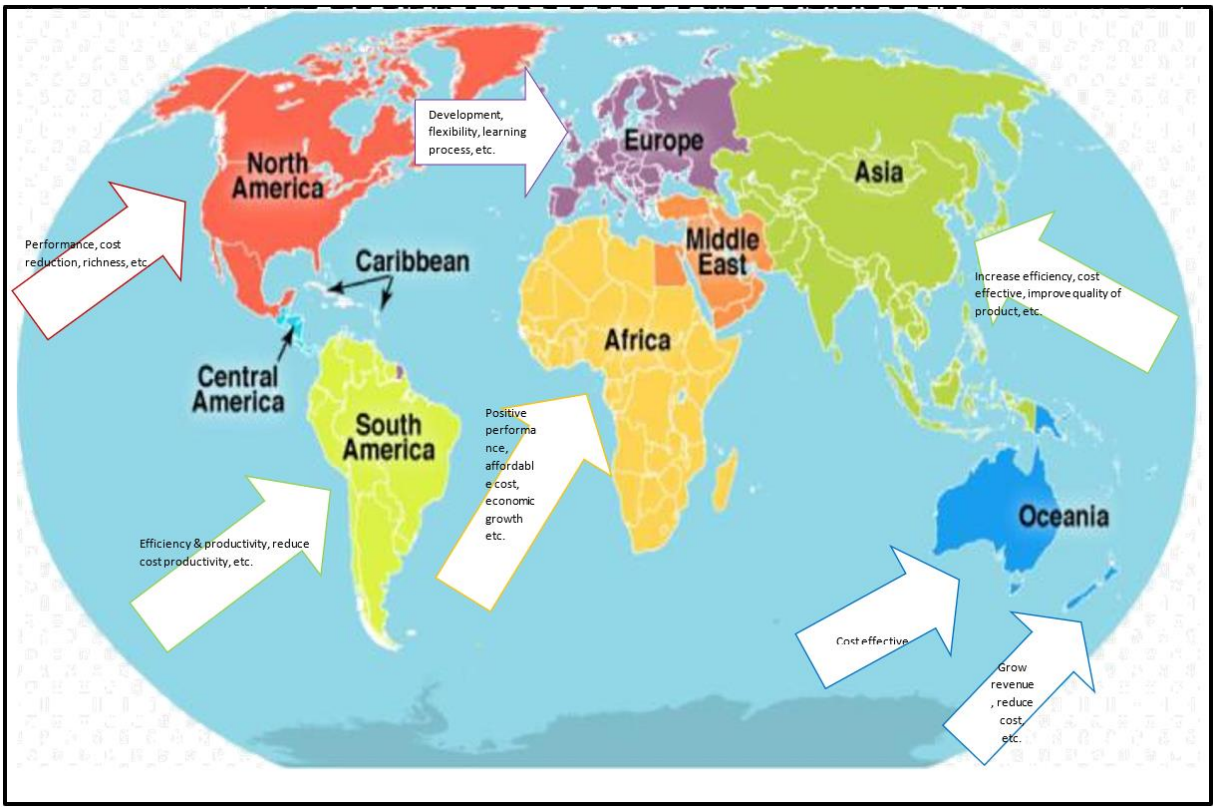

Figure 9. A Graphical Presentation of ICT impact on SMEs Around the World

CONCLUSION & RECOMMENDATIONS

This research analyzed 85 articles related to the evolution on the adoption and usages of ICT in SMEs and finds that ICT has many global impacts on SMEs all over the continent prior to the COVID-19. ICT has benefits in SMEs in Asia, Africa, Europe, Australia, and Oceania, North America, South America. To summarize the study, we conclude that ICT change and improve the work mode, technics, and conditions of SMEs across the world; it highlights a few ICT benefits and impacts for the SMEs in all continents. "*ICT provides the bedrock on which SMEs can build their business information systems aimed at improving their business processes, customer relations and efficient delivery of goods and services to satisfy the needs of cherished customers*" (Attom 2013:27). From the findings in Asia, Africa, Europe, Oceania, North America, and South America, it is manifest that incorporation of ICT in SMEs all over the world develops better expertise and proficiency in their daily activities.

In short, though an additional cost for SMEs, ICTs increase organizational efficiency and productivity by improving techniques and methods, both in production of goods and services as well with the management and marketing approach. It also facilitates communication within and outside the enterprise. Though positive benefits have been demonstrated across all continents, the use of ICTs by SMEs, particularly in Africa, remains lower because of its demand for new investment and more competency. Finally, an important issue across the world is the relevance and hence the possibility of relevant and contextualized training for ensuring the full contribution of all employees in this new action context in SMEs. However, this paper did not consider the COVID-19 intensive use of ICT, socio-economical aspects and cultural context of ICT uses in SMEs. Furthermore, the concept of growth and benefits may not have the same meaning from a study to another. More studies should be conducted for this purpose. In addition, considering the rapid adoption of ICT during the COVID-19, more research should be conducted to update the results of this study. It should also incorporate more countries in each continent to consolidate the actual benefits of ICT usages and adoption in SMEs.

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