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## **A Study of the Role and Impact of Cloud Computing on Small and Medium Size Enterprises (SMEs) in Egypt**

*“Egypt needs to establish an ICT-driven ecosystem capitalizing on a creative and talented youth opportunity that can become the base for an entrepreneurial culture and a startup nation”*

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## Glossary

AUC	The American University in Cairo
B2B	Business-to-Business
BCG	Business Consulting Group
BI	Business Intelligence
CAPEX	Capital Expenditure
CBE	Central Bank of Egypt
CEO	Chief Executive Officer
CIO	Chief Information Officer
CRM	Customer Relationship Management
FDI	Foreign Direct Investment
EFSA	Egyptian Financial Supervisory Authority
EGP	Egyptian Pound
ERP	Enterprise Resource Planning
FMCG	Fast Moving Consumer Goods
GDP	Gross Domestic Product
GOE	Government of Egypt
IaaS	Infrastructure as a Service
IBM	International Business Machines
ICT	Information and Communication Technology
ISP	Internet Service Provider
IS	Information Systems
IT	Information Technology
ITIDA	Information Technology Industry Development Agency
MCIT	Ministry of Communications and Information Technology
MENA	Middle East North Africa
MFI	Microfinance Institutions
NBE	National Bank of Egypt
NGOs	Non-Governmental Organizations
NIST	National Institute of Standards and Technology
OECD	Organisation for Economic Co-operation and Development
O&O	Offshoring and Outsourcing
OPEX	Operating Expenditure
PaaS	Platform as a Service
PC	Personal Computer
PPP	Public-Private Partnership
R&D	Research and Development
SaaS	Software as a Service
SAP	Systems, Applications and Products
SMEs	Small and Medium-Size Enterprises
SM	Social Media
STEM	Science, Technology, Engineering, Mathematics
TPS	Transaction Processing Systems
UNDP	United Nations Development Programme
USB	Universal Serial Bus
VoIP	Voice over Internet Protocol
VC	Venture Capital
XaaS	Everything as a Service Model

## **Abstract**

This paper aims to analyze the business potential of offering cloud computing services to small and medium-sized enterprises (SMEs) in Egypt. It addresses the challenges that need to be tackled to maximize the utilization of cloud computing services and the role and prospects to be played by SMEs in transforming the economy in Egypt. SMEs are invaluable to fuel economic development and growth as well as creating employment opportunities in emerging economies especially in markets like Egypt with a massive youth opportunity represented by the current population demographics and projected growth ratios. The combination of youth, technology and the emergence of an entrepreneurial culture could represent the successful and much needed ingredients for an ideal platform to support socioeconomic development moving forward. Several previous studies indicate a clear correlation between the proper adoption, diffusion and adaptation of information and communication technology (ICT) and the development and growth of revenues and jobs among startups due to the prospects of emerging technologies that can categorically empower SMEs. In the world of cloud computing, ICT can help SMEs leverage an already existing and growing interconnected global community of consumers, businesses, industries and markets of unprecedented and still growing size. This study highlights some of the facts and developments in the space of SMEs and the emerging role ICT is playing in the entrepreneurial ecosystem with a focus on cloud computing deployment and the associated challenges, opportunities and underlying potential in the context of an emerging economy, Egypt.

## **Keywords**

Entrepreneurship, cloud computing, innovation, information technology, computing, development, developing countries, emerging economies, information technology transfer, small and medium-sized enterprises, startups, Egypt.

## **Research Focus**

The focus of the research is to study the understanding, use, diffusion, role and impact cloud computing have on SMEs in Egypt being the primary engine for the development and growth of the economy. The research addresses the landscape of cloud computing, the challenges, opportunities and the associated impact on performance, productivity, efficiency and resource optimization in the context of SMEs.

## **Research Objectives**

The research has identified a number of objectives in the context of ICT and SMEs in Egypt that could be summarized as follows:

- To demonstrate the landscape of information and communication technology.
- To highlight the magnitude and impact SMEs have on the economy.
- To define the concepts, uses, and prospects created by cloud computing for SMEs.
- To provide an analysis of the current landscape of cloud computing as deployed by SMEs.
- To identify the existing policies and regulatory framework governing cloud computing.
- To identify the impact on SMEs as a result of implementing cloud computing technologies.
- To propose what policy and regulatory frameworks need to be introduced to render the environment more effective for the deployment of cloud computing in the context of SMEs.
- To suggest the actions that might be taken to promote and accelerate the deployment of cloud computing in the context of SMEs.

- To propose future research opportunities that could be addressed in the space of cloud computing usage in SMEs in emerging economies.

### **Primary Research Question**

What is the role, impact and prospects of cloud computing on SMEs in Egypt?

### **Secondary Research Questions**

- What are the existing policies governing the space of cloud computing?
- What is the impact of cloud computing on performance and productivity in the context of SMEs?
- How is the environment set to introduce and encourage emerging ICT tools and applications?
- What are the primary challenges and opportunities that could deter or promote cloud computing in the context of SMEs?
- How SMEs perceive cloud computing as a platform to improve and grow their businesses?
- What programs exist for training and professional development on different ICT and cloud computing applications for SMEs?
- How effective are ICT and cloud computing deployed strategies in managing, promoting and growing SMEs?
- Who are the major stakeholders in the space of cloud computing?
- What are the primary policies that need to be introduced to accelerate the introduction and deployment of cloud computing services in the context of SMEs?

### **Research Methodology**

The research methodology deployed in the study is primarily based on qualitative data generated through a series of one-to-one semi-structured interviews with different representatives of various stakeholders including, but not limited to industry, business, government, academia and civil society experts as well as a diversified group of entrepreneurs from multiple sectors. These stakeholders, primarily entrepreneurs, come from the following sectors/industries: information technology; transportation, academia, telecommunications, government, printing, consulting, finance and investments, food and beverages, agri-business, business associations, publishing, media, non-governmental organizations (NGOs), development, ready-made garments, retailing solar energy, security, manufacturing, firefighting and more.

The 105 focused interviews targeted the accumulation of diversified responses to the primary and secondary research questions. The initial approach was intended to 115 interviews. The positive response rate was 105 (91%) with 3 (3%) declining to participate and 7 (6%) did not respond to the initial invitation sent to join the interview sample. The pool of interviewees included a combination of SMEs and information technology (IT) experts with diversified experiences across different economic sectors. There was also a set of meetings with entrepreneurs and SMEs experts for their views and positions on the status of SMEs and cloud computing in Egypt. The study also provides a literature review in terms of SMEs deployment in emerging economies in general and in Egypt in specific and the role of ICTs and cloud computing through desk research and an analysis of the documentations and resources that were available and more importantly accessible. It is worth noting that 84 (80%) of the interviewees provided extensive comments and suggestions in addition to responding to the set interview questions.

The SMEs selected, are based on the set definitions of the Central Bank of Egypt (CBE) and the National Bank of Egypt (NBE) that identify SMEs as those companies generating a turnover of maximum 20 million Egyptian pounds annually equivalent to 2.6 million US dollars<sup>1</sup> for small size enterprises and between 20 and 100 million Egyptian pounds annually equivalent to 13.1 million US dollars for medium size enterprises. The instrument utilized (appendix A) addresses the primary and most important issues that concern SMEs in terms of awareness, introduction, deployment and impact of cloud computing on performance, productivity, marketing, flexibility, outreach, efficiency, and cost savings among others.

## **Overview**

Information, knowledge and increasingly the emergence of big data is undoubtedly key for growth and success for businesses (Srikumar, 2013). The emergence of cloud computing and its growing impact on business in general and on SMEs in specific is gaining traction around the world. Click and mortar companies such as Google and Salesforce.com reflect the model of cloud computing through sharing web infrastructure in terms of data storage, scalability and computation (Kambil, 2009). In many ways, the role complements the invaluable role of ICT that has been increasingly emerging with a growing impact since the early 1980s, which then took a major boost with the proliferation of the Internet and the World Wide Web a decade later. According to Abeer Gamal, who works for one of the leading business associations in Egypt dealing mainly with SMEs: “ICT is the driver of the organization and especially SMEs; it keeps us competitive compared to our peers.” On a more macro scale and at the global front, according to Gartner research, cloud computing global market reached 150 billion US dollars in 2013 (Gartner, 2013). Moreover, according to a Boston Consulting Group study (2013) “technology adopter firms have increased their annual revenues 15% faster than firms with lower levels of technology adoption.”

With the growing penetration of mobility and Internet access worldwide and having people accessing data from different outlets including smart phones, tablets, desktops and laptops, businesses are being interconnected 24/7 anytime anywhere. Historically, the early adoption of cloud computing occurred with the implementation of web-based electronic emails services such as Yahoo, Google and many others. However, such platforms were extended to different businesses and industries including, but not limited to trading, tourism, healthcare, education such as electronic learning (eLearning), electronic government (eGovernment), electronic commerce (eCommerce), entertainment, banking and specifically electronic banking (eBanking) becoming widely diffused around the world and more. Moreover, today, many companies whether involved in electronic business (eBusiness) transactions such as Amazon or eBay, social media such as Twitter or Facebook and online recruitment platforms such as LinkedIn are all extensively relying on cloud computing to help manage and grow their businesses. Cloud computing is affecting large corporations as well as SMEs and startups alike with varying degrees depending on size and volume of business. Such a growing trend applies to the developed world as well as to the emerging economies. As the companies increasingly go virtual in the cyberspace having realized the significance of such an environment, their businesses enjoy multiple advantages such as reduced costs, efficient business processes, better unified communication platforms and more. Moving forward, as startups and new ventures mature into becoming successful SMEs, they will become significant and effective contributors to their economies while creating jobs and positively boosting the gross domestic product (GDP).

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<sup>1</sup> One Egyptian pound = 0.1312 US dollar according to the exchange rate on May 15<sup>th</sup>, 2015.

In the space of ICT and specifically focusing on cloud computing, the outsourcing model which led to the on-demand notion as a service model has been transformed and had taken off with increasing adoption of cloud-computing and mobility. There are a number of models including the software as a service (SaaS), the platform as a service (PaaS); and the infrastructure as a service (IaaS). The advantages of cloud computing could be simply summarized in the fact that it provides a lower cost of doing business as one of the primary reasons, but there are also a variety of different and diversified reasons that include, but are not limited to, reduced software applications and maintenance, reduced physical storage space and requirements, ease for group collaboration and decision making processes and the reduction in the cost for overall business transactions and logistics and more. Based on Dina El Mofty, managing director of Injaz Egypt “ICT coupled with qualified human capital have the greatest impact on SMEs.” Table 1 demonstrates some of the advantages that cloud computing provides for different organizations and specifically SMEs whereas cloud computing help in supporting the decision making process while capitalizing on state-of-the-art ICTs and the use of notions such as big data analytics.

Element	Description
Infrastructure as a Service (IaaS)	IaaS allows customers to rent space on servers in the cloud while being responsible for the application’s installation and upgrades. It is basically access to software applications, usually for a specific function, delivered online and with a cheaper yet licensed pricing model. This type of cloud computing requires competent IT staff to configure and manage applications and server operating systems. Upgrades to the latest operating systems and applications are available. IaaS reduces the cost of hardware and application upgrades. Examples include salesforce.com’s customer relationship management (CRM) applications, Microsoft’s Office365 and SAP or Oracle enterprise resource planning (ERP) applications.
Platform as a service (PaaS)	PaaS is a computing platform that allows customers to develop applications with the service provider’s tools and infrastructure with limited amount of control given to the client software developer. The service providers have some control over how and what can be hosted on the servers provided to customers. Licensing requirements is an issue since the service provider has rights to some extent to the software being developed on the service providers’ platform. One of the benefits to SMEs is having access to timely development tools making it rewarding for customers with limited in-house resources. The consumer; therefore, is freed from having to purchase and maintain its own hardware and software stacks. The provider facilitates the deployment of applications, the develop-test-release cycle.
Software as a service (SaaS)	SaaS is the most useful platform for SMEs. Generally, it is hassle free having the application running directly from the cloud infrastructure. Access is possible from multiple client devices and SMEs do not manage or control the cloud network. The primary benefit for SMEs is the pay-as-you-go aspect as well as the delegation of operational issues. SaaS can be rented or leased from a software vendor where the vendor provides maintenance and continuous support. Services are offered over secured Internet connections and resources are accessed electronically. Knowledge transfer between companies and the service provider happens seamlessly. The provider usually manages the networking, storage, servers and virtualization, while the consumers have the flexibility to manage the operating system, middleware, application stacks and data.

Table 1 – Advantages of Cloud Computing



In other words, cloud computing is a model for enabling on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned with minimal management effort (NIST, 2011). SMEs and startups are represented, through cloud computing, with an opportunity to benefit from on-demand self-service, broad network access, resource pooling, rapid elasticity, and pay-per-use measured service (Srikumar, 2013). Cloud computing is also defined as an online service model by which hardware and software services are delivered to customers depending upon their requirements and pay as an operating expense without incurring high cost (Bandyopadhyay et al, 2009). The variety of the definitions is a reflection of the growing blend of services and the adaptive mode in the ICT that are increasingly becoming visible moving into the cloud environment. In general, it is basically a set of services that provide infrastructure resources using the Internet and data storage from another provider using three dimensions software, platform and infrastructure services (Fox, 2009). Consequently, it is up to SMEs and startups to keep pace with ICT deployment, enable them to improve efficiency, connect with different global markets, outreach to more and diversified business opportunities and compete on a more global scale. They can capitalize on a wide variety of emerging ICT tools that include productivity software, Internet connectivity and cloud computing services (BCG, 2013).

Cloud computing is a very popular subject at the moment. The importance stems from the fact that while accessing information is important, the ability to store information and access them whenever needed is essential (Srikumar, 2013). Larger companies adopt cloud computing and they understand the potential and know how to utilize it to its full effect. However, SMEs are yet to realize the full potential of cloud computing solutions especially in the context of emerging economies, and Egypt is no exception. They are still exploring how cloud computing represents a different proposition when compared to the more accustomed-to classical IT tools and applications. In the context of SMEs, the notion that data centers and storage platforms are not located at their premises always raises some security, privacy and trust issues, arguably most of these concerns are psychological and culture-related; some think otherwise. Elements such as reliable technology infrastructure, communication bandwidth, level of awareness and education, size and type of the business always play an important role in the perception of cloud computing.

There are four different cloud deployment models including public, community, private and hybrid cloud environments. For example, SaaS usually operates within the public model whereas it is available to everyone with an Internet connection such as salesforce.com serving business-to-business (B2B) companies. Salesforce.com focuses on managing customer details and running sales campaigns; a typical customer relationship management (CRM) platform.

In the business-to-business domain, public cloud deployments are exemplary models of the pay-as-you-go commercial platform. They are easy to purchase and take care of scaling issues so if you need to carry out a big job instantly, they make all the necessary resources available. The whole infrastructure is obtained and managed on behalf of the SME that do not have to worry about the associated capital costs resulting in reducing the overall operating expenses, providing a predictable cost and paying only for what the SME uses. The remaining challenge is the perception of control where the SME relies totally on the supplier/provider such as the Internet service provider (ISP) who enables hopefully successful access to different information systems and information repositories, including broadband, bandwidth, speed and more. Table 2 demonstrates

the difference between traditional software applications and cloud computing applications in terms of consumer-vendor responsibilities.

Computing Element	Cloud Computing Applications			Traditional Software Applications
	SaaS	IaaS	PaaS	
Usage	Consume application	Build Application	Host Application	Do-it yourself
Application	Vendor managed	Self-managed	Self-managed	Self-managed
Data management	Vendor managed	Self-managed	Self-managed	Self-managed
Runtime	Vendor managed	Vendor managed	Self-managed	Self-managed
Middleware	Vendor managed	Vendor managed	Self-managed	Self-managed
Operating system	Vendor managed	Vendor managed	Self-managed	Self-managed
Virtualization	Vendor managed	Vendor managed	Vendor managed	Self-managed
Servers	Vendor managed	Vendor managed	Vendor managed	Self-managed
Storage	Vendor managed	Vendor managed	Vendor managed	Self-managed
Networking	Vendor managed	Vendor managed	Vendor managed	Self-managed

Table 2 – Traditional Software Applications v Cloud Computing Applications

There are many opportunities that could be created in the context of SMEs if cloud computing is properly implemented, the right infrastructure is in place and the human capital needed are in charge. The resulting value-added could be demonstrated in cost savings, increased productivity, expansion and growth beyond other implications.

### Egypt Profile

Egypt is a regional hub linking the Mediterranean, Europe, Asia and the Middle East. With a population of over 87+ million, it is the most populous country in the region ([www.idsc.gov.eg](http://www.idsc.gov.eg)). About 28% of the population, 21+ million, are enrolled in educational programs (schools, universities and technical institutes); 58% are under the age of 25 and around 7.1 million are working as civil servants (Kamel, 2015). Egypt has been witnessing its reincarnation into a modern, liberal and private sector-led market driven emerging economy since the early years of the 21<sup>st</sup> century but has seen multiple challenges since the 2011 uprising which led to multiple deteriorating statistics that hampered the development and growth of the economy in most recent years. The current economic growth rate stands at 2% with an inflation of 9% ([www.indexmundi.com](http://www.indexmundi.com); Muthuthi, 2014). In 2007, it is worth noting that economic growth had reached 7% ([www.idsc.gov.eg](http://www.idsc.gov.eg)); however, the problem was that the growth had not trickled down to the unprivileged communities that represent the bulk of the population. Estimates show that unemployment is standing at 14% and the labor force is growing at around 2.7% annually now standing at 28 million ([www.amcham.org.eg](http://www.amcham.org.eg)). Within the ICT spectrum, the Internet is a major driving force of change in the global market place (Kamel, 1995).

In Egypt, with an economy relying primarily on SMEs that represent 75% of the total private employed workforce and 99% of non-agricultural private sector establishments (OECD, 2014); the Internet and eCommerce can empower SMEs to become global players without the need of the massive resources of a multinational corporation (ITU, 2008). However, despite the massive penetration of mobility and the Internet in Egypt, eCommerce is still in its early stages even compared to other countries in the region such as Saudi Arabia and the United Arab Emirates (Kamel, 2014a; Payfort, 2014).

## ICT in Egypt

The growth in the ICT over the last couple of decades demonstrated that the sector could be one of the flagships of the economy (Helmy, 2015). Since the mid-1980s, the ICT has been gaining traction from both the government and the private sector and the accumulation of such efforts led to the creation of a cabinet office in 1999 namely the ministry of communications and information technology (MCIT). The ICT sector being a dynamic and attractive sector succeeded to attract many talented human resources working in diversified fields. Therefore, the number of ICT employees increased to over 212,260 in December 2011 compared to 175,000 in December 2008 with an annual growth rate of 8.1% and the number of IT companies reached 4,250 as opposed to less than 3,000 in 2008. The ICT sector is a major engine of economic growth in Egypt contributing to real GDP 3.98% in the 4<sup>th</sup> quarter of 2011 as compared to 3.34% in the 4<sup>th</sup> quarter in 2008 (MCIT, 2011). The ICT sector is one of the fastest growing sectors in Egypt. It has managed to transform itself from a sector that consumes resources in the infrastructure build-up phase into a sector that generates revenues and provides employment opportunities and a platform for development and growth through its variety of value-added services (Kamel, 2014b).

Multiple initiatives and projects were introduced in recent years all aiming at preparing the community for the information society such as the free-Internet model, personal computer (PC) for every home (PC2010), establishment of IT clubs, and the introduction of broadband services in addition to a variety of projects related to a large number of key sectors such as education, health, banking, and public administration amongst others (MCIT, 2005a). These projects have helped improve the digital demographics of the community at large especially when the infrastructure was diffused to reach communities in the remote and unprivileged areas. Table 3 demonstrates the status of electronic readiness (eReadiness) in Egypt showing the number of Internet users, PC penetration rates and the total number of IT clubs and employees in the sector<sup>2</sup>(Kamel, 2009; Kamel, 2005a; Kamel 2004 and MCIT, 2011).

Indicators	Oct 1999	Dec 2004	Dec 2006	Dec 2008	Dec 2011	Dec 2012	Dec 2013	Jul 2014
Internet Subscribers	300K	3.6m	6m	11.4m	29.8m	36.8m	37.1m	44.5m
ADSL Subscribers	N/A	N/A	206K	593K	1.65m	2.24m	2.49m	2.89m
Internet Penetration per 100 Inhabitants	0.38%	5.57%	8.25%	16%	35%	44.11%	44.2%	52.2%
Mobile Phones	654K	7.6m	18m	38m	79m	97m	97.5m	97.6m
Mobile Phones Penetration per 100 Inhabitants	0.83%	9.74%	23%	51%	98%	117%	118%	114%
Fixed Lines	4.9m	9.5m	10.8m	11.4m	8.96m	8.56m	6.84m	6.80m
Fixed Lines Penetration per 100 Inhabitants	6.2%	12.1%	13.8%	15.2%	12%	10.51%	8.28%	8.11%
Public Pay Phones	13K	52K	56K	58K	24K	15K	14K	14K
<b>IT Clubs</b>	30	1,055	1,442	1,751	2,163	2,163	2,163	2,163
<b>ICT Companies</b>	870	1,870	2,211	2,621	4,250	5,083	5,237	5,965
IT Companies	266	1,374	1,970	2,012	3,599	4,116	4,245	4,877
Communications Companies	59	152	244	265	295	375	390	410
Services Companies	88	148	211	242	356	592	602	678
Number of Employees in the ICT Sector	48K	116K	148K	174K	212K	216K	221K	223K

Table 3 – eReadiness in Egypt (www.egyptictindicators.gov.eg)

<sup>2</sup> There are over 87,000 indirect workers in both IT clubs and Internet cafés.

One of the effective platforms that helped diffuse ICT in Egypt across different segments of the community during the last decade has been the spread of the model of IT clubs. There was a variety of models used but the most successful reflected a public-private partnership (PPP) initiative providing affordable Internet access throughout the nation's 27 provinces. The locations include youth centers, culture centers, non-governmental organizations, universities, schools, public libraries and information centers amongst other locations. The total number of clubs currently stands at 2,163 as compared to 30 in 1999 (MCIT, 2009). All IT clubs are equipped with computers with Internet connectivity (MCIT, 2007). They have the facilities to invest in human resource capacities by offering training programs to help promote ICT awareness and utilization. Among the expansion plan for the IT clubs are the provision of an electronic library, dedicated space for trainees with special needs, and the provision of access to eGovernment, and eLearning services amongst other facilities. The model of IT clubs in Egypt reflects the typical telecenters available in many other developing nations (Kamel, 2004). In the case of Egypt, the objective of these telecenters goes beyond ICT diffusion with more focus on using the IT clubs as platforms supporting economic development of the local community especially in remote and unprivileged areas (Kamel, 2005b). More importantly, it disseminates among the community in Egypt, overwhelmingly youth, the importance of ICT and demonstrates how the technology platform could be one of the key success factors in any new venture and start-up.

An ideal ICT strategy should guide the development of a sound information environment in order to deliver convenient and universal access to information, improve communication, support collaboration and learning and ensure flexible, responsive and above all reliable systems. The objective of the strategy is to develop and implement a business-driven institutional IT strategic plan that positions IT as a strategic asset and provides a context for institutional decisions regarding IT investments, governance and organizational structure. The economic growth of the ICT sector during the 4<sup>th</sup> quarter of 2008 was 19.2% compared to 15.5% in 2007. This average was exceptional during that period and it went down as indicated earlier but maintained a steady growth from 1999 to date indicating that the recent slowdown in growth is mainly caused by the recent developments Egypt is going through. During the 1<sup>st</sup> quarter of 2009, the indicators demonstrate the steady growth of the sector despite the implications of the global economic downturn (MCIT, 2009); the sector was growing due to massive diffusion and universal access across the nation.

Investment in the ICT sector grew from 8% to 15% annually out of the total investment compared to 3% in 2006. In 2008, 93% of total investments in the ICT sector were through private investments either local or based on foreign direct investments (FDI), which averaged over one billion US dollars in 2007, 2008 and beyond. It is important to note that despite the slow growth post 2011, the sector has been affected due to the overall status of the economy, there was still healthy signs of a quick recovery as soon as the nation settled which has been clearly the case over the last 18+ months. According to the minister of ICT, the sector is expected to go back to its double-digits growth by end 2015 (Helmy, 2013) to match the growth that was taking place during the period 2009-2010. Such development is expected to drive the growth of other economic sectors moving forward. While projections in the short-term had indicated that the ICT sector will grow from 6% (2011-2012) to 10% (2013-14) and that contribution of the sector to the GDP would rise from 3.2% to 4.1%; projections for the long-term indicate that by 2017-2018, annual growth rate will reach 20% and account for 6% of GDP and the sector will help create 500,000 jobs (Helmy, 2013).

Reference Egypt's strategic vision, the government is sustaining its ongoing economic and institutional reforms, investment incentives, infrastructure development and global integration to enhance its competitiveness regionally and globally and to support investment in different fields especially in the ICT sector. Egypt planned to increase ICT exports to 1.1 billion US dollars by 2010 (MCIT, 2005b); which was realized and was coupled with a continuous growth in the local market. These projections were based on the increase in ICT investments due to the government efforts to improve the business climate, which led to foster economic growth during the period (2004-2010). In terms of investment in human capacities, MCIT has made a commitment to invest in the future by working to ensure that today's students and employees receive the education and training that will prepare them to lead Egypt in the information society. MCIT in collaboration with its different partners is focusing on developing basic and professional ICT skills by coordinating with government ministries, agencies as well as multinationals and companies from the private sector to develop a variety of training programs designed to provide a wide range of ICT-related concepts and applications. Some of the initiatives and projects that contributed in the investments in human capacities included the smart schools network, the eLearning competence center as well as the support received from Egypt's ICT Trust Fund which was established in cooperation with the United Nations Development Programme (UNDP) in 2002 (ICT Trust Fund, 2007).

The deployment of the current national ICT strategy (2012-2017) moving from the planning to the execution phase clearly indicates the support of the government and the growing role of the private sector in promoting ICT as a building block in the economic development plans. The strategy aims at positioning Egypt as a hub for the Middle East and Africa (MENA) region when it comes to the deployment of ICT. The strategy includes multiple components and addresses a number of emerging concepts including but not limited to big data, the Internet of everything, cloud computing and most importantly innovation at large (MCIT, 2012). The ambitious strategy focused on realizing concrete growth during the next decade in various dimensions including industry development, the digital society and transforming Egypt as an ICT hub with a vision to provide affordable universal access to all citizens to the ICT infrastructure anywhere any time. Table 4 demonstrates the ICT sector targets for Egypt for 2020 (Helmy, 2014).

Item	2014	2020
ICT GDP	LE 58.3 billion	LE 195 billion
ICT contribution to GDP	3.8%	8.43%
Growth rate	10%	18%
Job opportunities	15-45K	250-750K
ICT services exports (O&O)	LE 11 billion	Le 23 billion
Electronics industry	LE 14 billion	LE 70 billion
Broadband penetration (fixed)	13.95%	N/A
Broadband penetration (USB)	4.49%	N/A
Broadband penetration (mobile)	22.61%	N/A

Table 4 – 2020 ICT Targets for Egypt

One of the main highlights of the Egypt ICT strategy 2012-2017 is supporting the SMEs sector. For example during 2013-14, the incentives provided to the SMEs sector amounted to 300 million Egyptian pounds (39.4 million US dollars) supporting more than 300 SMEs who faced multiple challenges since Egypt's uprising in 2011 and beyond (Helmy, 2014). Moreover, the support provided in the strategy for the ICT industry development through encouraging and enabling innovation and partnerships would help attract FDI and promote the proliferation of a startup

culture is directly related to the creation of SMEs and job opportunities in the entrepreneurial space. In addition, the investment in state-of-the-art technology infrastructure is also a key pillar of the ICT strategy given the strategic location of Egypt and could help encourage startups and SMEs in the ICT space that could be primarily dependent on outsourcing and offshoring which is another dimension that Egypt has shown potential for over the last decade or so is that it could be one of the major players worldwide. Egypt becoming a hub for outsourcing for many companies could enable a diversified line of opportunities for SMEs.

Investing in human capital is a key component for the optimal deployment and utilization of ICT tools and applications. Therefore, it is important to note that one of the key components of the strategy is investing in people and regularly leveraging their skills and capacities through a variety of training programs and initiatives. Such trend is important for community development at large and also in spreading the awareness and knowhow of the capabilities that ICT can offer for different businesses and especially SMEs where ICT can provide concrete added value.

Finally, the notion of cloud computing usually brings the issue of data security and privacy especially among SMEs owners while entertaining the idea of deploying cloud computing capabilities. Therefore, it is encouraging to see the Egypt ICT strategy addressing such issue and revisiting that space through four main channels; firstly, the amendment of the electronic signature (eSignature) law; secondly, the development of a cyber-security law; thirdly, the development of a data privacy, security and right of access law and fourthly, the telecommunications law. Moreover, part of the comprehensive plan is to formulate a high council for cyber security to protect the information infrastructure (infostructure) and for data privacy. This is coupled with a full framework of legislation and policies that will be put in place (Helmy, 2015). All this in many ways helps in the awareness creation as well as the use and dissemination of the concepts related to the digital economies, cyberspace, cloud computing and more.

The realization of the ICT strategy 2012-2017 will depend primarily on the private sector where the planned resources needed are in the neighborhood of 120 billion Egyptian pounds (15 billion US dollars). It is envisioned that 80% of these resources will be provided through multiple channels by the private sector representing an opportunity for SMEs in Egypt, especially in the ICT space where the vast majority of the players in the sector are relatively SMEs (Helmy, 2015). It is important to note that moving forward the government should primarily act as an enabler and provide the proper legal framework facilitating the process for startups and SMEs to go about doing their businesses. It is up to the private sector to invest resources and prepare the human capital required to develop, grow and compete to meet market needs.

It is important to note that the ICT sector in Egypt is innovative and entrepreneurial (Ducker, 2014). With the growing interest in the sector and the startups focusing on mobile applications that are attracting venture capital (VC) and angel investors as well as the growing triangular collaboration since the late 1990s between the private sector, the civil society and the government through multiple forms of PPP, the sector can be a role model for other sectors in the economy.

### **Small and Medium-Sized Enterprises in Egypt**

In the context of Egypt, SMEs are a good employing base whereas the spillover for the larger economy could be significant. With startups maturing into SMEs they gradually become

significant contributors to employment, job creation, and the GDP. Whether, they are entrepreneurs in the form of low-end merchants driven by necessity and they seek to satisfy basic needs or high-value entrepreneurs who are innovative and able to recognize and capitalize on opportunities; both can benefit from the diversified offerings enabled by cloud computing services (Strategy&, 2011).

SMEs play a vital role in driving economic growth, innovation and prosperity of all economies and specifically those of developing countries. SMEs drive economic growth through job creation for developing economies. In fact, SMEs are the key means by which entrepreneurs provide the economy with a continuous supply of ideas, skills and innovation. In countries with a youth opportunity like Egypt, SMEs become a possible platform for employment and job creation in major cities as well as in remote locations. The spillover effect is invaluable and has the potential to create a momentum that could trigger the development and growth of different businesses and industries. It has to be dealt with as an invaluable competitive advantage. SMEs employ the biggest share of Egyptian workers totaling 70% of the population and contributing 25% to the economy; 90% of which are family business. Some family businesses have been involved in the marketplace in Egypt and beyond for decades and some for centuries. Consequently, the market in Egypt is huge for cloud computing. SMEs want easy to use, reliable and scalable application to be able to expand their business (Srikumar, 2013). Cloud computing in many ways presents an optimal solution to achieve this objective, the critical success factor is to develop cost-effective and efficient delivery models given the transformational shift of ICT spending towards cloud computing.

Family business have always been a strong and growing force in Egypt. They are a clear factor in doing business in Egypt's private sector and have always been. However, moving forward the key is to work on supporting the notion of family business while providing support to both startups and existing SMEs who are focused on growth (Ducker, 2014). As other emerging markets, family business will remain a significant element of the economies in emerging markets (Bjornberg et al, 2014). SMEs and startups represent a blend of low-end merchants addressing the basic needs of the society and high value entrepreneurs who are focused on innovative technology-based and technology-driven startups. In many ways, SMEs represent one of the backbones of the economy in Egypt. Whether SMEs or not they have proven resilient through multiple times and economic crises.

In the context of Egypt, the very fact that they are family businesses may have had advantages in the market, especially historically in the agriculture, textiles, furniture sector and more recently moving into other industry and service sectors. There are many examples in Egypt where family businesses are stronger and more successful than their non-family counterparts with respect to management practices, leadership, and deployment of state-of-the-art ICT, a shared vision, a set strategic direction, employee engagement, creativity, innovation and a more disseminated spirit of entrepreneurship. However, they still need to address issues such as governance, transparency and more proper succession planning. Finally, in the context of emerging markets in general, it is important to address the role of regulation as many governments are struggling to strike a balance between denying family-owned businesses excessive privileges and opportunities to make profits, while fostering entrepreneurship to promote their economies (Bjornberg et al, 2014). In that context, there is a need for new development models that can promote sustainable economic

growth, global competitiveness and business and industry development and technology can play an effective and influential part in the process (Shediac et al, 2013).

It is important to note that technology continues to shape the way the market operates in Egypt and that is primarily based on a fast growing, vibrant, dynamic, and passionate workforce that is one of the youngest connected labour forces in the world. They understand the notion of deploying ICT and cloud computing and what it means to their respective startups and SMEs in terms of access to global markets, scaling-up while capitalizing on the power and reach of technology, spreading and diversifying the risk and lowering the costs. Moving forward and to give hope to the massive youth opportunity in the market place represented by the youth demographics, Egypt needs to implement policies that will help its SMEs space to capture the benefits of global value chains especially in the area of ICT and especially given Egypt's large market, language advantage, geographical location and the overall passion and drive to develop and grow a competitive private sector and an entrepreneurial culture (Muthuthi, 2014).

The private sector is the primary platform that can enable Egypt to achieve real economic transformation. It is important to note that, 64% of the overall investments in Egypt in 2012-2013 were undertaken by the private sector. Moreover, the private sector share of GDP reached 61.4% in 2012-2013 up from 60.8% in 2011-2012, and there is still room for development and growth. However, it is worth noting that most SMEs are informal and face huge challenges and impediments in gaining access to finance. There are varying reports on the percentage of the informal economy in Egypt that it is close to 40%, but it is probably anywhere between 70% and 80%. The development of the private sector needs to be orchestrated by all market stakeholders and there needs to be set and clear policies on how to reinforce the roles of SMEs and address their challenges as well as work on building trust and confidence with the private sector (Muthuthi, 2014). As part of the government of Egypt (GOE) efforts, it announced that it will transform a major state-owned bank into a lender platform for SMEs, plans and timings for such move are not clear yet. On a more positive note, there was clear progress in registering more micro-finance institutions in the credit bureau information repository. In addition, many local banks are studying the possibilities of facilitating financing of SMEs, a step that could see the surge of startups in the coming few years, despite the fact that recently, interest rates on commercial loans to SMEs climbed to a high of 24% which does not make life easy for them (Knecht, 2014).

In developing countries, the potential of SMEs still remains largely untapped and this also applies to Egypt. SMEs face major constraints in acquiring the capital that they need to expand, around half of the SMEs in developing countries identified "access to finance" as a key challenge (European Investment Bank, 2011). Other challenges include business regulations, human resource capabilities and technological capabilities. It is estimated that in Egypt there were around 3.3 Million SMEs operating accounting for around 38% of total employment (Ministry of Trade and Industry, 2015). Around 65% of SME activities are focused on trade and services (Abdelghaffar and Elmessiry, 2012). In terms of geographical distribution, a census commissioned by CBE to study the SME landscape in Egypt shows that SMEs were highly concentrated in Cairo and the Delta (north of the country) region. Around 40% of SMEs were concentrated in the capital Cairo, and the governorates of Sharkeya and Gharbeya. SMEs in Egypt are still unable to compete on the international level, although some of them have succeeded to operate in niche industries, this includes the textiles, IT, agribusiness and furniture industries among others and have therefore



increased their export volumes. However, still, it is estimated that only 6% of SMEs export while the rest are limited to serving the needs of the local market (Central Bank of Egypt, 2008).

The definition of SMEs varies from one country to another and from one entity to another within a single country. Factors that are taken into account in defining SMEs include the company revenue, the number of employees as well as the company capital and/or a combination of the three. The World Bank defines SMEs as “enterprises with a maximum of 300 employees, 15 million US dollars in annual revenue and 15 million US dollars in assets.” In Egypt, the ministry of trade and industry defines SMEs based on the number of employees whereas SMEs were defined as having up to 50 employees. Small enterprises range from 5 to 14 employees while medium enterprises ranged from 15 to 49 employees (Ministry of Trade and Industry, 2015). However, the NBE, the country’s largest public sector bank defines SMEs based on the company’s revenues. A small-size enterprise is a company maintaining an average revenue up to 20 million EGP (2.6 million US dollars) during a period of three years; while a medium-size enterprise is a company maintaining an average revenue above 20 million EGP and up to 100 million EGP (13.1 million US dollars) for the same period (National Bank of Egypt, 2015). Some restrictions and variations sometime apply.

However, so far, in general, SMEs in Egypt are facing several challenges to boost their growth and to enable them to play their vital role in economic growth. These challenges include limited resources in knowledge, marketing and information technology (Abdelghaffar and Elmessiry, 2012). In addition, SMEs have some difficulty in accessing sufficient means of finance. It is estimated that only 50% of SMEs in Egypt are working with banks or benefit from banking financial services (Central Bank of Egypt, 2008). A few years ago, venture capital and angel investment hardly existed in Egypt but now the space is slowly growing along with the startup environment witnessing the establishment of multiple funds supporting SMEs and the formulation of Cairo Angels as a network working with promising startups (Williamson, 2014). The space of angel investment providing seed capital to turn ideas into startups have been slowly multiplying in Egypt over the last few years, but there is still a need for much more given the size of the market and the huge potential untapped. The primary platform that is lagging behind is the banking sector where it is virtually impossible to obtain funds to finance startups (Williamson, 2014). Most recently, the ministry of investment launched in 2013 its Bedaya<sup>3</sup> fund managed by Al-Ahly for Development and Investment which is established to provide capital for SMEs in the IT, telecom, agriculture and manufacturing sectors (Williamson, 2014). This is an important step moving forward but still the reality on the ground is that with score of enterprises competing for a tiny pool of investors, the majority of entrepreneurs spend 30-40% of their time fundraising (Knecht, 2014). Most recently, in the last quarter of 2014 and during 2015, a number of financial institutions have been in advanced discussions and some have initiated funds to support startups which is considered a very positive sign and could be a good platform to build on.

IT capabilities still remain underutilized by SMEs in Egypt. There is no doubt that with the proliferation ICTs, the growing youth opportunity and a growing interest in developing a startup culture and the development of an agile and competitive private sector that emerging ICT tools and applications such as cloud computing could transform the stature and growth of SMEs. A research conducted by google indicated that only 7% of SMEs have online presence and 61% did

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<sup>3</sup> Bedaya is an Arabic work that means “start”.

not even consider having a website for the company<sup>4</sup>. These figures continue to improve providing both hope and a concrete opportunity to capitalize on the power created through ICT. Moreover, the Internet is still perceived as mainly a space for entertainment and awareness and it is yet to be perceived in a larger scale as a platform to boost productivity, which still remains low (Aggour, 2013).

The SMEs sector continues to attract growing investments which is good news for the economy given the potential it represents to such emerging market. While funding is coming from local and international development agencies, it is important to continuously entertain emerging technologies and the means it can provide for the improvement of performance and productivity, especially with massive investments also directed towards investing in skills and competencies totaling over 300 million US dollars over the last two years (Daily News Egypt, 2015a). Given the size of SMEs in Egypt as indicated above, there are multiple efforts from the GOE to support the SMEs sector including recently issuing a law to organize funding and confirming the government's interest in developing small companies and providing job opportunities for the youth. All such efforts are directed towards combining both formal and informal economies and addressing the recurrent deterrents and challenges facing the entrepreneurial space in Egypt.

In the context of Egypt, the key challenge remains to provide funding for SMEs given the percentage of activities that take place under the umbrella of the informal economy (Daily News Egypt, 2015b). However, the CBE is planning to implement major changes in the subsidy of SMEs growth as well as facilitating the opportunities they get for funding such as lowering the rate of bank reserves in return for their loan wallet directed towards small projects as well as the establishment of small bank branches in across Egypt with incentives to subsidize SMEs. Finally, the CBE is currently working to implement financial inclusion through offering all financial services to all banks (Daily News Egypt, 2015b). In addition, one of the deterrents that need to be addressed is the lack of timely information on the SMEs sector among financial institutions.

As a boost to the collective efforts by the private sector, the government issued in the 4<sup>th</sup> quarter of 2014, Egypt's first law regulating microfinance services. The law regulates microfinance funding by non-bank sources including companies and non-governmental organizations and puts them under the authority of the financial regulator; the Egyptian Financial Supervisory Authority (EFSA); banks will continue to be regulated by CBE. The primary objective of the law is to the provision of extremely small loans which could help to create jobs by giving individual entrepreneurs a start; something very much needed for the entrepreneurial culture growing faster than ever in Egypt. In addition, the law aims at strengthening the regulatory framework and practices, in order to attract local and international investors. According to the Economist Intelligence Unit's report titled global microscope on the microfinance business environment and released in 2013, among the 55 countries assessed for their regulatory framework and practices, supporting institutional framework including transparency and client protection and stability in terms of political situation; Egypt advanced from 50<sup>th</sup> to 49<sup>th</sup> position compared to a year earlier. More analysis of the rank indicates that Egypt came 41<sup>st</sup> in terms of regulatory framework and practices while 46<sup>th</sup> in supporting the institutional framework and 55<sup>th</sup> in stability (The Economist Intelligence Unit, 2013).

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<sup>4</sup> For the purpose of the Google study, SMEs were defined as all companies that have less than 250 employees.

The space of microfinance services in Egypt is provided by four banks and over 400 NGOs and microfinance institutions (MFI) as well as a number of growing angel investor networks and venture capital platforms such as Cairo Angels, Sawari Ventures, Ideavelopers, 138 Pyramids and many more. Finally, the space is regulated/supervised by three main players including CBE, the Ministry of Social Solidarity, and EFSA. Moreover, there are many organizations who are increasingly playing a role in the startup space with a tilt towards the utilization of ICT and innovation techniques in supporting the development of various ICT-based SMEs and startups. They mostly promote ICT and the use of technology in starting different types of businesses. These organizations include The American University in Cairo's (AUC) Venture Lab, Flat6Labs and many more. Other players whose services vary according to their focus such as promoting, supporting, mentoring and incubating startups in Egypt include Injaz Egypt, Ashoka, Nahdet El Mahroussa and RISE Egypt, mainly for social entrepreneurship, Rise-Up Summit and more.

### **Cloud Computing in Egypt**

The national ICT strategy developed for Egypt (2012-2017) has identified a number of primary directions as indicated before, one of them is an initiative for private cloud computing (MCIT, 2012). This is coupled and supported by one of the pillars of the strategy that is building an online information infrastructure enabling access to a wealth of digital content that includes sectors such as education, health, justice, culture and tourism; all with concrete implications and prospects for an agile and competitive SMEs sector once the infrastructure is completed and fully deployed. The national ICT strategy is formulated with a focus on a variety of policies addressing among its long list the notion of cloud computing. The policies are supposed to represent standards that should apply to all projects, programs and activities implemented by the ICT sector. The strategy includes a list of 40 programs and is divided into 120 different projects all targeting the improvement and scalability of the impact, efficiency and effectiveness of ICT in the economy. The policies include, but are not limited to; cloud computing, eCommerce, open-source software, and educational reform using ICTs (MCIT, 2012).

It has to be made clear that the development of the SMEs sector is invaluable a national priority given the demographics of the society and the role a vibrant, agile and active private sector can play in the economy. Such effort needs to be developed collectively between the different stakeholders in the community as indicated before, this is imperative for its success. An integral element in the process is the proper introduction, adoption, diffusion and adaptation of ICTs as well as availing the required human capacities required. The support of the government as an enabler and the expansion of the use of ICTs among the private sector and primarily SMEs will positively impact their efficiency. This can be realized through the maximization of the use of ICTs among SMEs and the development of related information systems (IS) and tools and applications such as mobile applications and more.

There are multiple efforts in Egypt that are developing to provide the proper environment to enable a cloud ecosystem. For example, IBM is building a cloud ecosystem in Cairo by providing computing expertise to 100 Egyptian software companies to help drive innovation and develop skills in the region. Such initiatives are becoming increasingly important since one of the major deterrents for the proper diffusion of cloud computing especially among SMEs is the awareness and knowledge acquired by management and staff related to cloud computing. IBM's initiative is developed in collaboration with Egypt's Information Technology Industry Development Agency

(ITIDA) and the plan for the ecosystem is to help make Egypt become the center of cloud computing in the MENA region. In many ways, the IBM initiative is an important step towards stimulating the growth of cloud computing applications, expertise, knowhow, promoting the culture, and the use of cloud computing in the local market. The initiative aims to support local software companies in acquiring skills and expertise in cloud computing as a source of innovation in the region. The objective is to help SMEs operating in the field of ICT expand their business base and enter new regional and international markets.

To date, the spending on public cloud services in Egypt is lower than in other countries in the region. However, the market in Egypt was expected to grow 67% by Q4 in 2014 making the market the fastest growing market in MENA. Cloud computing is important for SMEs according to Amr Talaat, general manager of IBM Egypt where he believes that “it will enable SMEs to grow without large capital costs, it is a real bonus for Egypt’s fast-growing entrepreneurial clusters, which often lack funding or physical IT infrastructure.” ITIDA has been consistently working to provide support for SMEs in the IT sector to enable them to expand their offerings into new markets and help grow the economy by focusing on emerging ICT trends such as cloud computing and big data analytics. For example, the IBM cloud computing initiative is helping to enable SMEs to use data and apply analytics on a massive scale, privately and securely. There are already 20 SMEs benefiting from the initiative by developing and testing cloud solutions and offering them through the cloud outreaching a larger global audience. In the context of SMEs, they always want easy to use, reliable, secured, sustainable and scalable applications that can help them become competitive as well as grow their business; in that sense, cloud computing could offer an ideal proposition.

### **Cloud Computing and SMEs**

Cloud computing can impact the economics and business models of SMEs and startups (Srikumar, 2013). It is always important to assess what are the true prospects and benefits of cloud computing for SMEs. There is no doubt that the cloud can deliver invaluable benefits to SMEs, but there is a chance that there is also a lot of hype around the subject. Therefore, prior to adopting any cloud computing solutions, SMEs should properly assess the feasibility and appropriateness of cloud computing solutions depending on their type and size of business. There are a number of issues that need to be addressed and that includes, but not limited to: (a) identify the IT needs in terms of computing infrastructure and services; (b) estimate the IT growth for a few years and that includes storage capacity, volume of applications and more; (c) assess if there are solid reasons whether to move into the direction of cloud computing; (d) understand the cloud computing business implications on the type of business involved and that includes access, reliability, cost efficiency, flexibility potential and security issues; (e) evaluate the cloud computing value-added proposition to the business, and (f) invest in human capital awareness and knowledge of the prospects and opportunities of cloud computing (Srikumar, 2013).

The cloud platform is increasingly proving to be more than just a trend or a buzzword. Cloud computing offers a set of new ways of working, collaboration and access to information on demand (Srikumar, 2013). Additional companies are adopting cloud solutions to run their business in an easier, more cost effective way. There is a variety of advantages that SMEs can benefit from what cloud computing has to offer. Scalability is surely one of the primary advantages whereas cloud computing enables SMEs to do business on a larger scale at a lower cost, it also provides access

to enterprise-level applications and makes functions like marketing through electronic mail more easy, more efficient and less expensive. In the context of Egypt, cloud computing dissemination is expected to grow by at least 50% during 2015 according to several reports and as predicted by Talaat at the launch of the second phase of the IBM initiative.

According to multiple reports on cloud computing and SMEs, the potential for SMEs using cloud computing is more than 59% likely to generate additional revenues than those who do not use the technology which is in many ways related to the element of productivity improvement that is empowered by SaaS and the optimization of number crunching, diversified collaboration as well as file sharing applications and more. As for the security element, which is becoming increasingly invaluable for SMEs and other larger businesses when handling and storing different data repository, a large number of organizations are no longer interested in storing critical data locally either for space purposes and/or to protect against data hacks and for privacy purposes. It is important to note that the cloud computing infrastructure makes it easy to recover data and applications if a technology is down for whatever reason. Moreover, the portability element is another advantage where data can be accessed through any platform/device at any time and from anywhere. The cloud computing environment is clearly contributing to the 24/7 internet networked enterprise.

In addition, one of the primary advantages of cloud computing is the enabling of big data and data analytics where today most if not all businesses have their own web presence to outreach and attract new customers and markets while catering to the different and changing needs of their existing customers. Moreover, most businesses with penetrating the digital space are increasingly employing analytics to track the different ways people use their website, what they need, and what they are looking for and more. Web and data analytics help SMEs target their customers, study their trends and directions as well as efficiently monitor and analyze the traffic on the website to be able to close the gap between what the company offers and what the market wants. For example, Google analytics is free and by far the most comprehensive and easy to use application to analyze website traffic and behavior.

The world of business is a constantly changing and if companies want to stay agile, they have to keep up with ICT and its emerging trends and applications. Some are already benefiting from some of the aspects of cloud computing such as CRM applications that are increasingly being managed more efficiently and more effectively through the cloud. Cloud computing can help streamline operations and give businesses the ultimate control of the workplace environment. The advantages of using cloud computing when compared to on-site resources such as servers, networking, and data centers used to be considered as part of the capital expenditure (CAPEX).

In addition, with the ongoing need for upgrades and updates of equipment and software more costs were incurred. However, the emergence of everything as service model (XaaS) has driven the market to develop core competence in IT delivery through the rise of IaaS, PaaS and SaaS service models. Consequently, SMEs among other organizations can outsource their back-office and IT requirements to cloud service providers and move the related associated costs to operating expenses (OPEX). With the continuing emergence of such cloud service models, today there are value-added cloud services that combine expertise of talented human capital offering bundled services for business functions aimed at both the business and the consumer such as GoDaddy,

Zoho, Asana, and others. The move to the cloud computing space is not only affecting the click-and-mortar world but also the brick-and-mortar companies such as Uber, Airbnb, Kayak, Google Flights, and others. Cloud computing represents an excellent proposition to SMEs with well-designed and up-to-date service catalogs with smaller usage units compared to in-house IT. However, in many ways, there are concerns around security and sensitivity of data that require more control leading to people opting for private clouds with in-premise infrastructure can be better solutions.

### **What SMEs need is Innovation-Driven Entrepreneurship**

In an attempt to build an entrepreneurial culture where startups play an effective growth in economic development, innovation in ICT should take center stage. Therefore, different education, professional development and vocational training programs should be driven by innovative curricula that capitalize on steadily improving technological capacities and applications. For example, in the world of the digital economy, there exists equivalent market-entry opportunities; thus, course design, teaching methods, faculty training, extracurricular programs, and executive education must constantly innovate to maintain relevance and induce new opportunities across the private sector.

### **Research Findings**

The research methodology deployed in the study is primarily based on qualitative data generated through 105 semi-structured interviews that were conducted using different technology platforms such as phones, Viber, FaceTime and Skype as well as some interviews were conducted based on face-to-face meetings. The interviewees represented different stakeholders including but not limited to industry, business, government, academia and civil society experts as well as a diversified group of entrepreneurs from multiple sectors. These sectors included information technology; transportation, academia (marketing, IT, entrepreneurship and computer science), telecommunications, government (postal services and regulators), printing, consulting (marketing, public relations, advertising), finance and investments, food and beverage, agri-business, incubators, business associations, publishing, media, NGOs, development, ready-made garments, retailing solar energy, security, manufacturing, firefighting and more. The interviews lasted on average from 30 to 60 minutes, with an average of 28 minutes per interview. Moreover, there was extensive desk research conducted with a comprehensive coverage of the studies that recently covered IT in Egypt, SMEs in Egypt and the role of IT in the SMEs space and the associated laws, policies and regulations. Appendix B provides details of the interviews conducted.

In general, most respondents indicated that there is a direct correlation between the adoption of ICT and the awareness level of human capital of what ICT can offer and the productivity level of SMEs. In many ways, ICT was perceived as the driver for growth, even if, in many cases the deployment of ICT was either limited or mainly based on personal use rather than comprehensive organizational diffusion and institutionalization. In the case of cloud computing, from an SME perspective, due to their small size and limited resources, SaaS brings added value to the organization (Srikumar, 2013); something that was clearly confirmed from this study with 46% already adopting it. It is still early days, but cloud computing is slowly gaining grounds in Egypt due to its cost effectiveness as well as its efficient delivery timely methods. With more investments in human capital and the increasing investment in formulating the required skills and capacities, more ICT spending will be shifting towards cloud computing among SMEs in Egypt. For example,

preliminary findings indicated that SMEs are still outsourcing their websites while it is increasingly becoming fashionable that SMEs knowing the benefits of hosting their own websites given the possibility of better brand-building as well as better cost-effective marketing opportunities.

### Analysis of Findings

Based on the analysis of the research findings, following are some key highlights reflecting the profile, demographics and background of the sample interviewed and the corresponding industries and sectors. The total number of people interviewed was 105 whereas 70% were male and 30% were female representing a promising percentage of females involved in startups and SMEs given that the unemployment rates are relatively higher among the youth generation and especially female. The sample constituted a diverse set of businesses and industries. In total those interviewed belonged to 37 different industries/sectors and lines of business as outlined in chart 1; including but not limited to, agribusiness, food and beverage, healthcare, media, education, furniture, advertising, ready-made garments and others. It is important to note that 53% of the interviewees were owners and/or part of family businesses. The sample indicated that most of the SMEs interviewed were in the ICT sector (8%) followed by the food and beverages sector (7%). ICT is a growing sector and has shown that over the last few decades despite the fact that the accomplishments are still way behind the prospects that could be achieved. Following the space of consulting (6%), the findings indicate that agribusiness, education K-12, Internet startups, higher education and VC/angel investments all come with (4%) confirming an interesting triangle among Egyptians that combines some of the priority sectors in the economy including education, agriculture and the associated investments and growing number of startups.

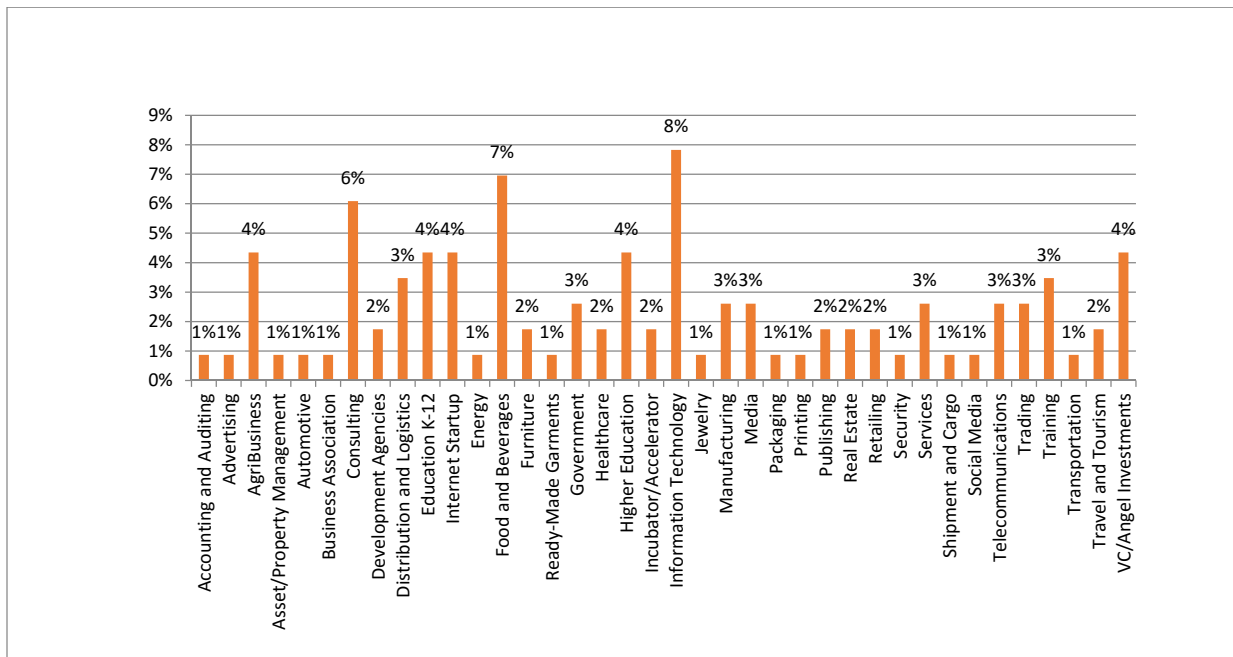


Chart 1 - SMEs Sector/Industry Representation

The findings indicate that 70% of the interviews were conducted by Skype and land line phones. Chart 2 provides more details of the communication platforms used in conducting the interviews. It demonstrates a growing trends of using non-conventional communication platforms and a

growing reliance on Voice over IP (VoIP) such as FaceTime and Viber that were also utilized but not as frequently as Skype, landlines and cell phones. It is becoming more of a habit to use VoIP. In addition it reflects the growing penetration of mobility in Egypt and the eagerness to becoming more cost conscious with the use of telephony, especially in a community where phone calls usually last for an average longer time than the usual when compared to other usage levels in other economies, developed or emerging.

Unlike the conventional wisdom that Egyptian entrepreneurs are risk averse, I would like to note that the experience of the interviews conducted throughout this study indicated that entrepreneurs are passionate, creative, willing to learn, ready to take risks whether in the business or in using cutting-edge IT tools and applications. They are out there to deal with the business environment and meet the challenges of the changes taking place in the marketplace both locally and globally. More entrepreneurs are willing to take more risks especially with the deployment of cutting-edge ICT tools and applications.

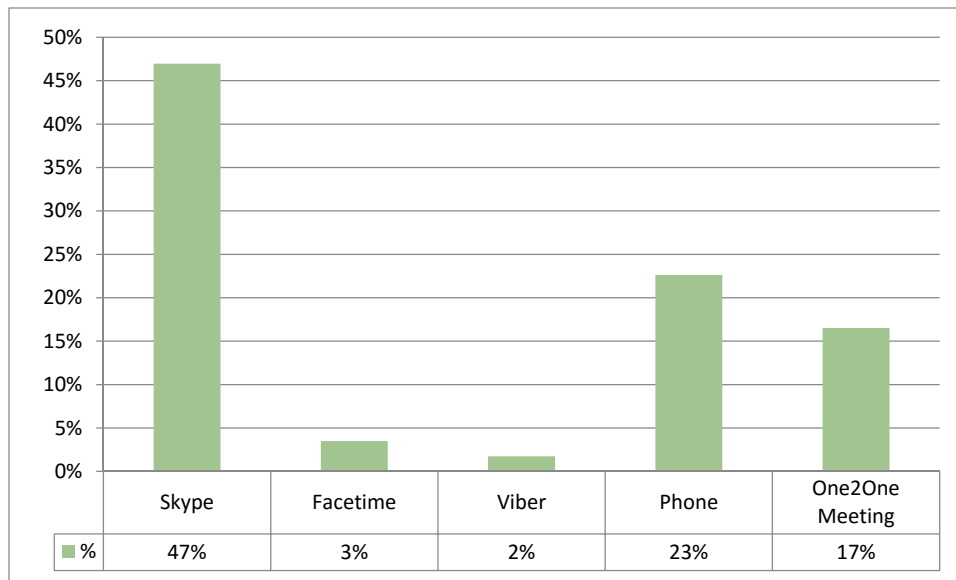


Chart 2 – Communication Platforms used in conducting Interviews

The sample interviewed included a good balance of SME owners/entrepreneurs as well as experts and practitioners in the fields of IT, including cloud computing support services and SMEs. Overall, (49%) of the sample were entrepreneurs, (13%) were entrepreneurs with experience in IT and (6%) were entrepreneurs with professional expertise in SMEs, entrepreneurship and startups. Chart 3 demonstrates the diversity of the background of the interviewees. Based on the type of the study, the researchers also opted to have among the interviews a group of experts in the areas of IT and SMEs either from the academic or consulting worlds as indicated in the chart. The general characteristic among such group is that they are mostly young and come from diversified backgrounds. This includes engineering, art, political science, psychology, mathematics, science as well as business and economics.



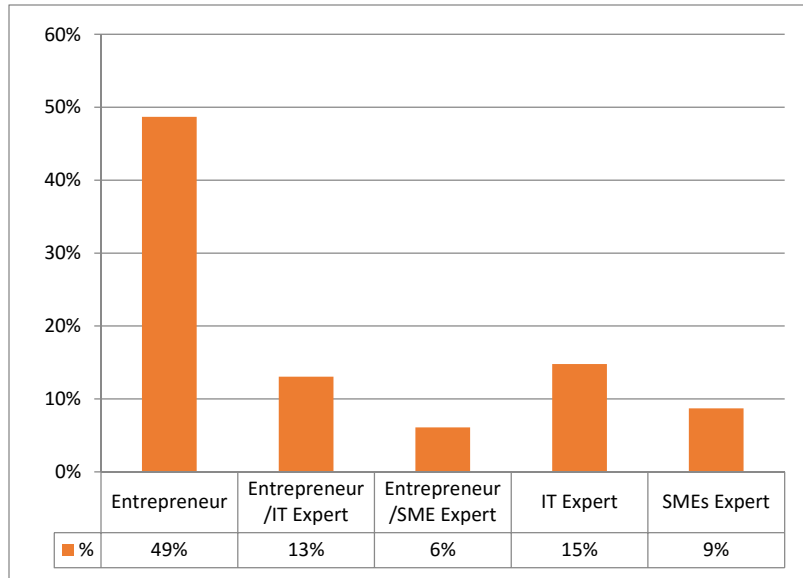


Chart 3 – Background and Experience of Interviewees

The sample included a diverse combination in terms of organizational scope whereas (45%) had a strategic scope and focus while (35%) had both an operational and strategic scope and more than (43%) of the sample had at least 10+ years of experience. Chart 4 demonstrates the level of involvement of the interviewees in their respective organizations. The fact that (35%) of the sample are both addressing strategic and operational issues indicates the size of the businesses which is primarily small. This matches the type of businesses in the marketplace in Egypt which is predominantly small compared to other markets. The corporate size in developed markets and relatively emerging markets in more advanced stages, hardly exist in Egypt. There is a large variations in terms of size, capital and number of employees.

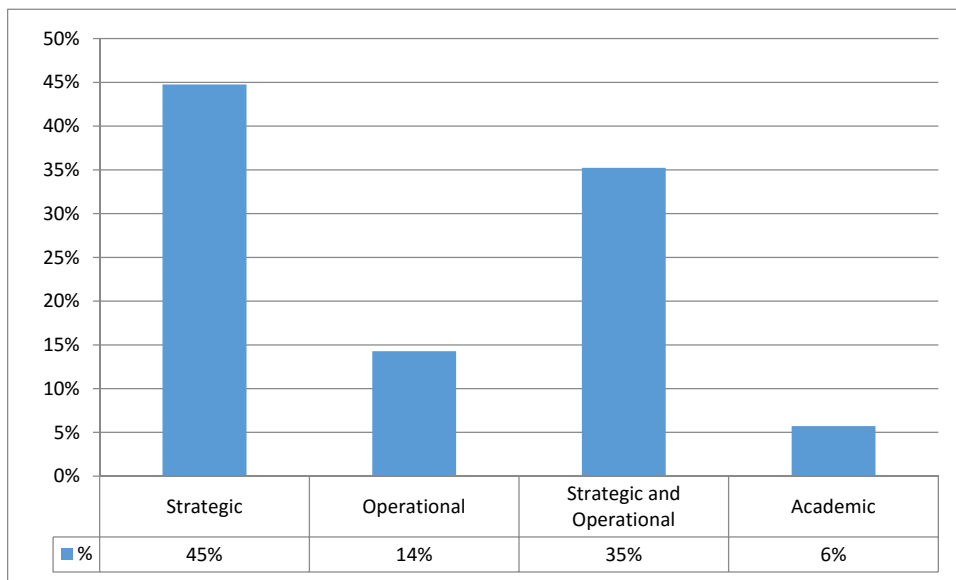


Chart 4 – Interviewees Profile/Scope

Based on the findings, (70%) of the SMEs interviewed had strong experience in their fields and had been operating for more than 10 years. In addition, (51%) of the SMEs interviewed had a staff size between 11 and 100 and only (10%) had more than 100 people.

Chart 5 demonstrates the positions and the titles of the interviewees in their respective SMEs. It was important to get a blend of owners, chairmen, managing directors, and experts among the mix. Among, the interviewees (47%) were founders, owners and partners. This was followed by (39%) chairmen, CEOs and presidents and in the third position there were managing directors, general managers and executive directors (20%). Other categories included staff, professionals, experts and managers; vice chairmen and vice presidents and finally academics with (6%). In Egypt, one of the issues that needs to be addressed in different SMEs is the governance model and the clear and transparent differentiation of the roles of both owners/partners and management. Such area has seen significant growing interest recently but still surely there is a lot more than needs to be done in terms of board formation and governance models available or deployed.

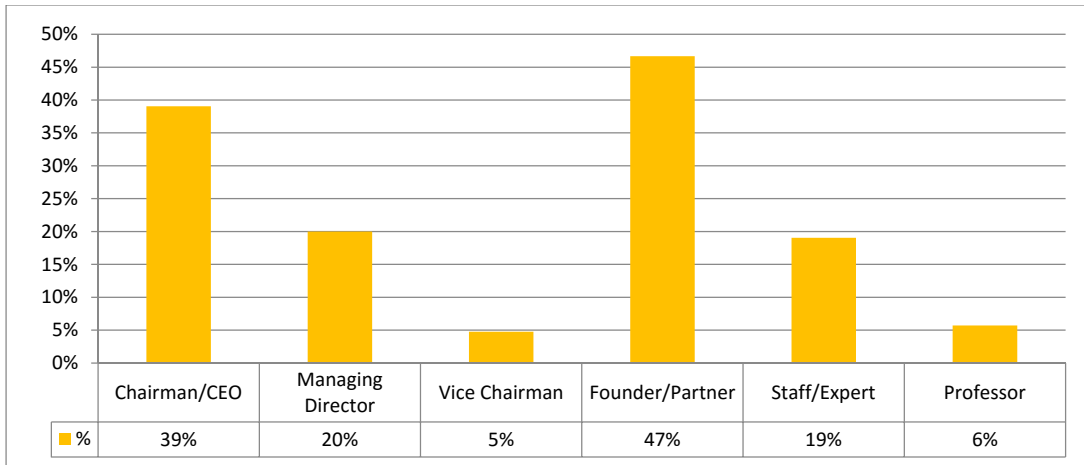


Chart 5 – Interviewees SMEs’ Positions/Titles

Chart 6 indicates the accumulated experiences of the interviewees with the different SMEs. The findings indicate that over (43%) had 10 or more years of experience with the SME, this was followed by (20%) who had spent there between 4 and 6 years. Those who had spent 1 year or less were (6%). In addition, in terms of the size of the staff among the sample of SMEs interviewed, around (34%) had between 11 and 50 staff members; (24%) had over 100 staff members and around (8%) had between 5 and 10 staff members representing the smallest group of SMEs interviewed.

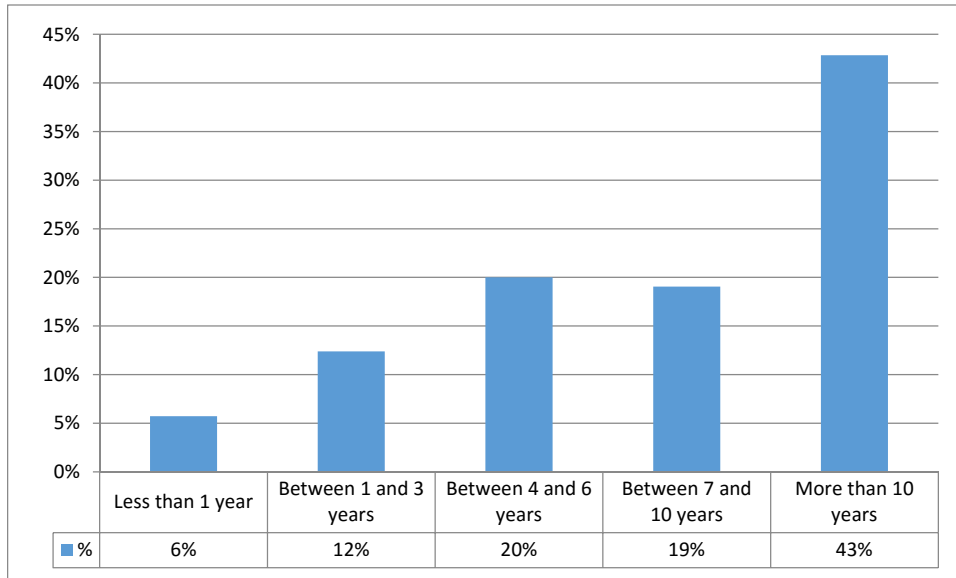


Chart 6 – Interviewees Experience with SMEs

Chart 7 demonstrates the numbers of years the SMEs have been in operation. The findings indicate that over (69%) had 10 or more years of experience followed by (10%) who spend between 7 and 10 years in the business and (4%) have been in the business for less than 1 year. This is relatively healthy in terms of span of life of SMEs and their success ratios.

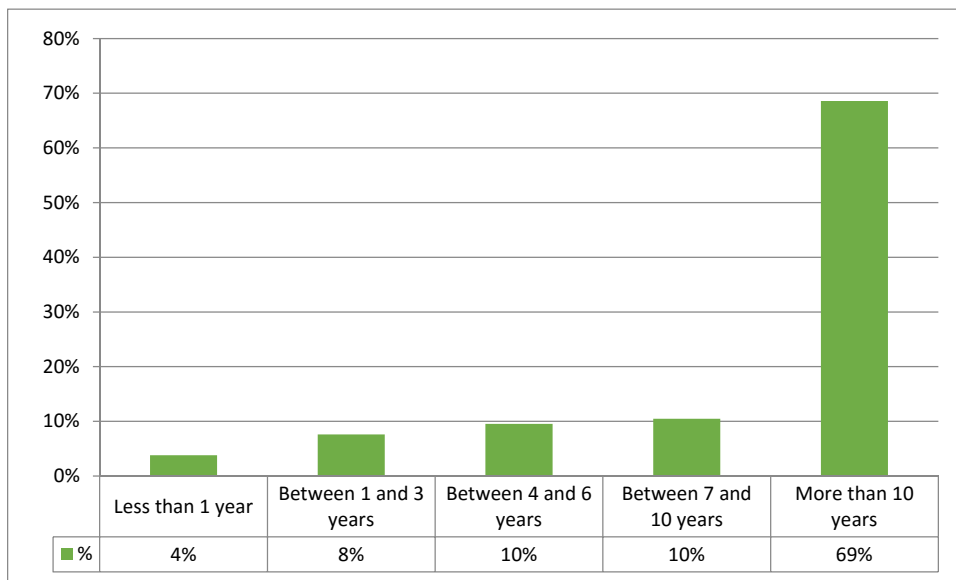


Chart 7 – SMEs Years in Business

Chart 8 demonstrates the analysis of the sample in terms of market coverage showing (67%) operate in some or all of Egypt's 27 provinces; (59%) operate only in Cairo; and (44%) operate in some countries in the MENA region and only (20%) having businesses in other parts of the world besides Egypt. It is worth noting that SMEs in certain sectors are successful both in Egypt and in other countries as well. This includes industries like textiles, IT, agribusiness, furniture, trading and readymade garments. The venue to export, promote and develop businesses beyond Egypt

provides huge prospects to the economy and ICT can surely play an invaluable role in that domain. In the context of the opportunities that could be enabled through ICTs and cloud computing, this could be multiplied several times given the relative less expensive labor in Egypt and the outreach platforms that are available.

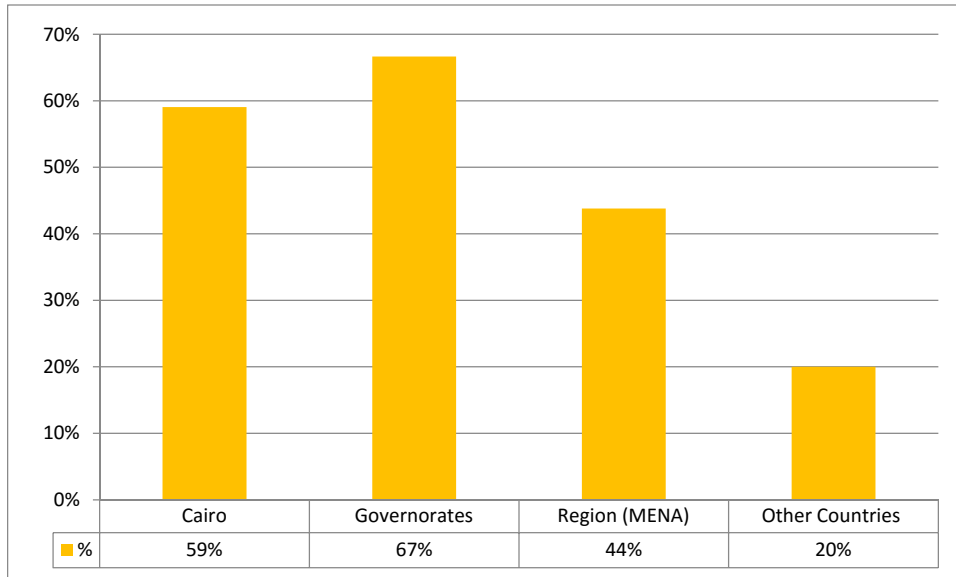


Chart 8 – SMEs Geographical Coverage

Chart 9 demonstrates the annual turnover of the SMEs surveyed. All figures are shown in Egyptian Pounds (EGP). The figures indicate that 47 company (45%) have a turnover of around 5 million Egyptian Pounds. This is followed by a group of 16 companies (15%) who have a turnover between 1 and 2 million Egyptian Pounds. It is important to note that 12% of the SMEs were not comfortable to disclose the details of the SMEs turnover despite the fact that the data was going to be published only in aggregate format. However, this percentage is considered a much improved ratio when compared to a few years back indicating in many ways that the notion of sharing data is becoming relatively more acceptable than before. Having said that, there is still room for improvement through the establishment of the proper policies for information access, something that is documented and mentioned in the ICT strategy (MCIT, 2012).

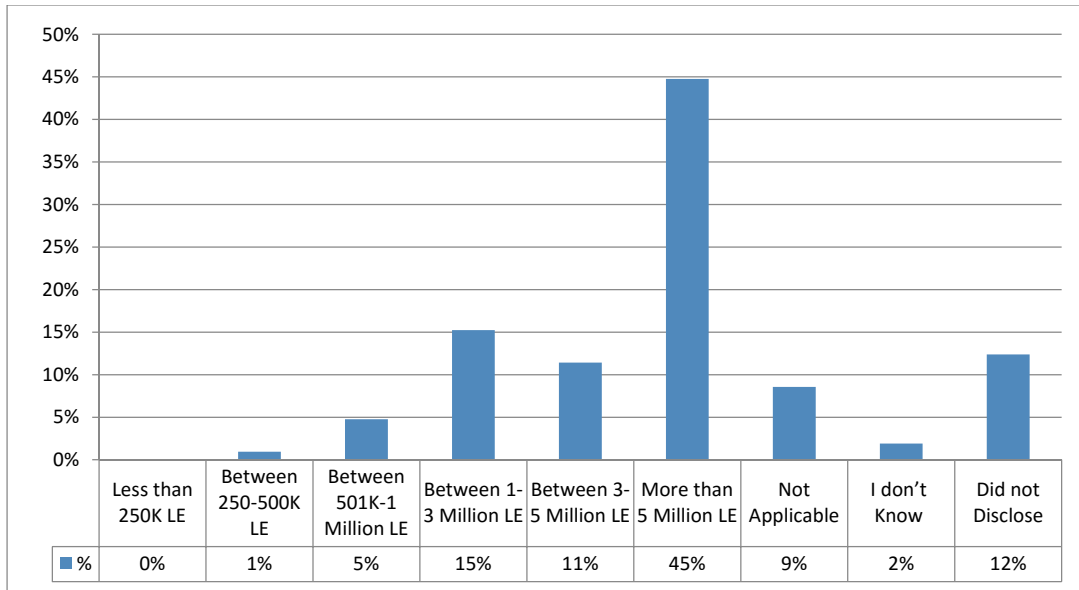


Chart 9 – SMEs Annual Turnover

In terms of the ICT landscape, following are some findings that relate to the ICT deployment, readiness, the level of ICT skills and capacities at the leadership and management levels as well as the level of ICT usage at the staff level.

Chart 10 demonstrates the deployment of hardware, software and communication platforms, tools and applications among the SMEs surveyed. The results clearly indicated that the SMEs interviewed have well introduced and diffused ICT infrastructure with (99%) having Internet access (mostly broadband), followed by (93%) and (89%) who have computing devices and software applications deployed. According to Alaa Hashim, an entrepreneur and a founder of a new startup, an angel investor and also offering incubator services for a number of other startups “ICT is core to our operation and cloud computing is taking center stage.” Moreover, one of the brand managers in a leading global fast moving consumer goods (FMCG) company interviewed indicated that “SMEs will benefit tremendously with the universal access across Egypt of a reliable broadband Internet service.” According to MCIT, disseminating ICT among SMEs has been one of the initiatives launched post Egypt’s uprising and in the coming few years, consequently, SMEs would start realizing the resulting impact and hopefully enjoying the associated dividends. The overwhelming usage of notebooks, smart phones and tablets provides remote access to different businesses and SMEs owners and staff are not bound to specific locations to fulfil their job requirements, something that could be categorically boosted through the deployment of cloud computing applications. It is important not note, that such comment was frequently mentioned by of the entrepreneurs interviewed for this study.

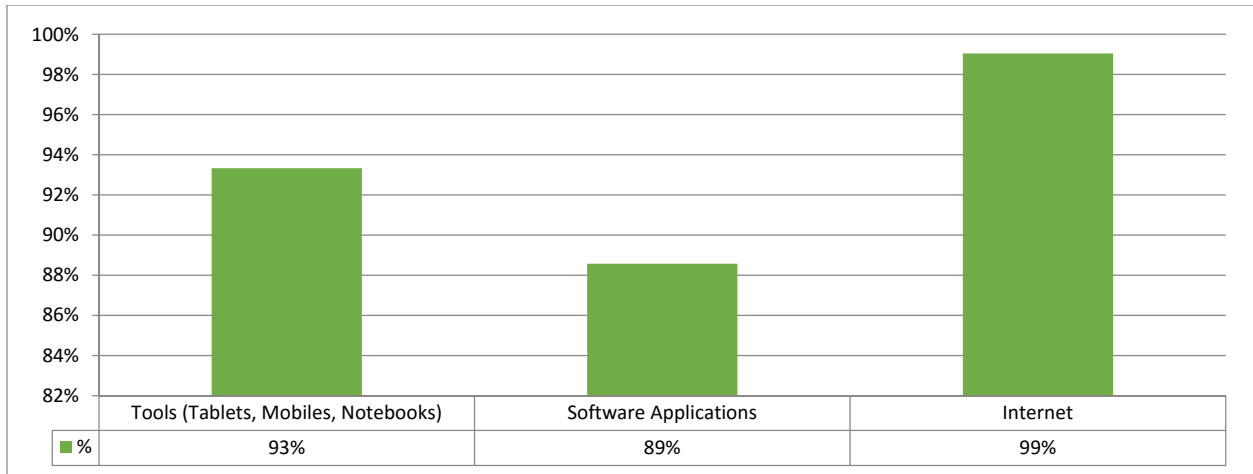


Chart 10 – ICT Infrastructure Diffusion

Most SMEs had a basic IT infrastructure, chart 11 demonstrates the status of the ICT landscape among the SMEs covered. The analysis indicate that (51%) of the companies had basic infrastructure; (25%) had advanced infrastructure, and (23%) had full-fledged infrastructure based on the assessment of the SMEs’ representatives interviewed. The difference between the three levels relates to the level of infrastructure utilized, the complexity of the software applications utilized, the ratio of computing versus the management and staff head count and the degree of deployment of the ICT infrastructure whether it is only at the executive and management levels or if it is also diffused at the staff and operational levels. While chart 10 indicates that ICT is well diffused among the SMEs studied, chart 11 demonstrates that the level of ICT deployed is basic. However, the available infrastructure could be a good base to improve into an advanced and more customized platform to better fit their needs. In general, the usage of cloud computing in specific was more personalized rather than institutionalized. It was mainly well understood and used at the management and executive levels than elsewhere in the startups or the SMEs.

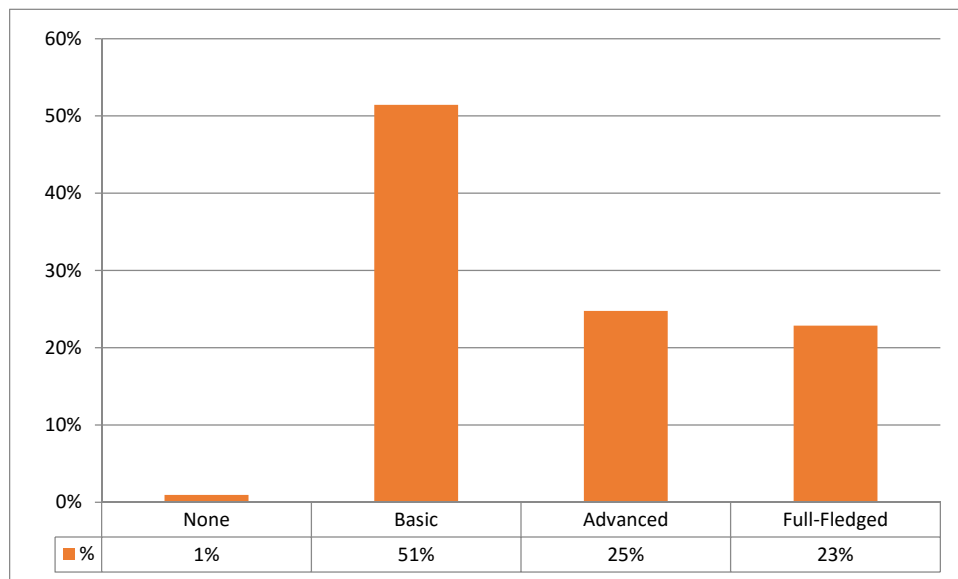


Chart 11 – ICT Infrastructure Readiness

Chart 12 demonstrates the primary IS applications and platforms deployed where the Internet was diffused and effectively used among 97 companies (92%), followed by transaction processing systems (TPS) 50 companies (48%) and preliminary eCommerce use accounts for 23 companies (22%). While this chart reflects the actual utilization of the available ICT applications and platforms, chart 10 demonstrates the diffusion and access of the ICT infrastructure only. Chart 12 clearly demonstrates the low utilization of the prospects of eCommerce totaling (30%) whether preliminary or advanced use despite the multiple and diversified opportunities created through the marketplace given the level of mobile and Internet penetration in Egypt. It is important to note that no less than 40%, if not more, of the mobile sets in the marketplace are actually smart phones, enabling even a greater prospect for mobile commerce (mCommerce). It is worth nothing, that eCommerce could quickly flourish in Egypt given a number of aspects, however the proper infrastructure and the enabling environment including payment facilities, legal environment, and more needs to be in place. Ironically, grocery stores that are predominantly SMEs have been using a credit-base offline eCommerce model for over many years whereas customers would order by phone for a week or month or even more and pay at a later set date with the grocery store owner with no interest. In fact, such process preceded the phones by many years, in other words the culture and mindset for such payment process was there in a more basic way. Therefore, the plug and play of a more advanced eCommerce infrastructure could prove to be a success if the right setup is in place and an adapted awareness campaign is well formulated and disseminated among the society.

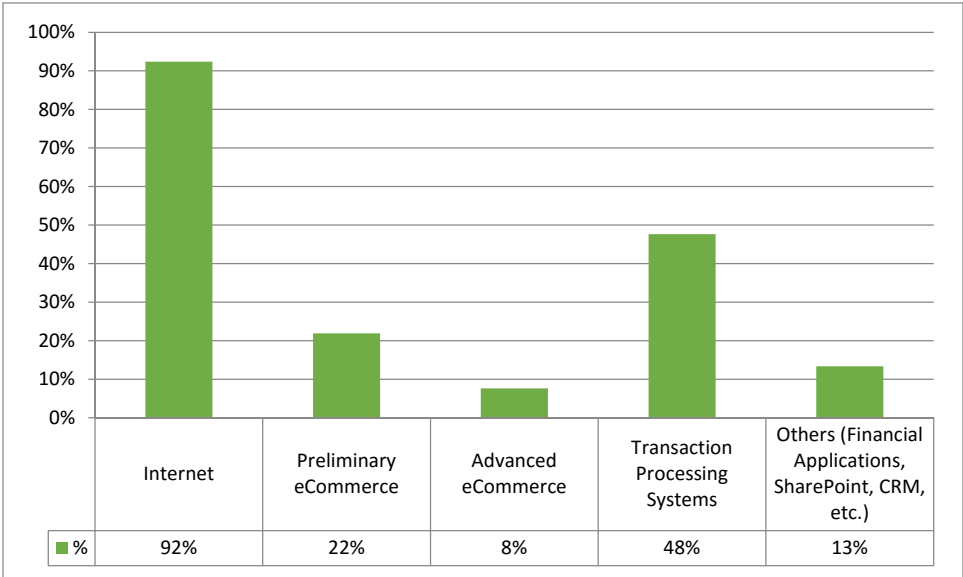


Chart 12 – IS Applications/Platforms Deployment

Chart 13 demonstrates the three most highly outsourced services as indicated by the interviewees and that included company website (63%); electronic mail services (52%) followed by data storage (41%). The fact that data storage is outsourced by more than half of the sample covered indicates that there is ample opportunities for cloud computing to get disseminated since the privacy and security issues although visibly available, entrepreneurs are still willing and determined to venture into using emerging technology tools and applications such as the newly emerging world of the cloud. In addition, the added bonus with the accumulation of the wealth of knowledge is the possible deployment of big data analytics that could have effective implications on the decision

making process of different SMEs and respectively puts them in a more competitive position than their counter parts and could help them improve their productivity, performance and efficiency levels.

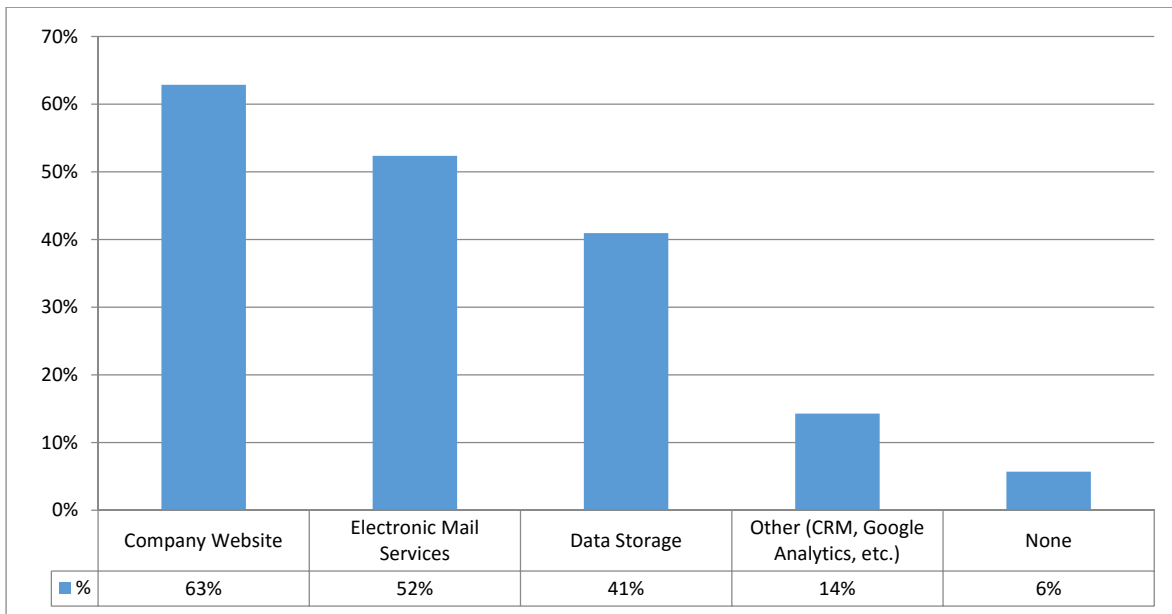


Chart 13 – IT Outsourced Services

Chart 14 demonstrates the level of cultural dissemination and utilization among the SMEs interviewed. The findings indicate that (40%) of those interviewed understand the concept and relate the prospects of ICT to collective organizational and individual staff productivity. This is followed by (22%) who have advanced understanding of the potentials of ICT and represent the technology champions among their respective SMEs and finally (19%) have demonstrated relatively extensive understanding of the cloud technology. Only a few had not heard about cloud computing before the interviews were conducted. It is interesting to note that even among those who did not know cloud computing well, they could still figure out in a way what it would offer and how it can contribute to the decision making process whether individual or group decision making, its role in the rationalization of the use of the available resources and the competitive edge it can bring to SMEs. These reactions and thoughts were reflections and projections of what cloud computing can bring to SMEs without really knowing much about it. That too was a very good and promising sign from a group that largely were average ICT users.



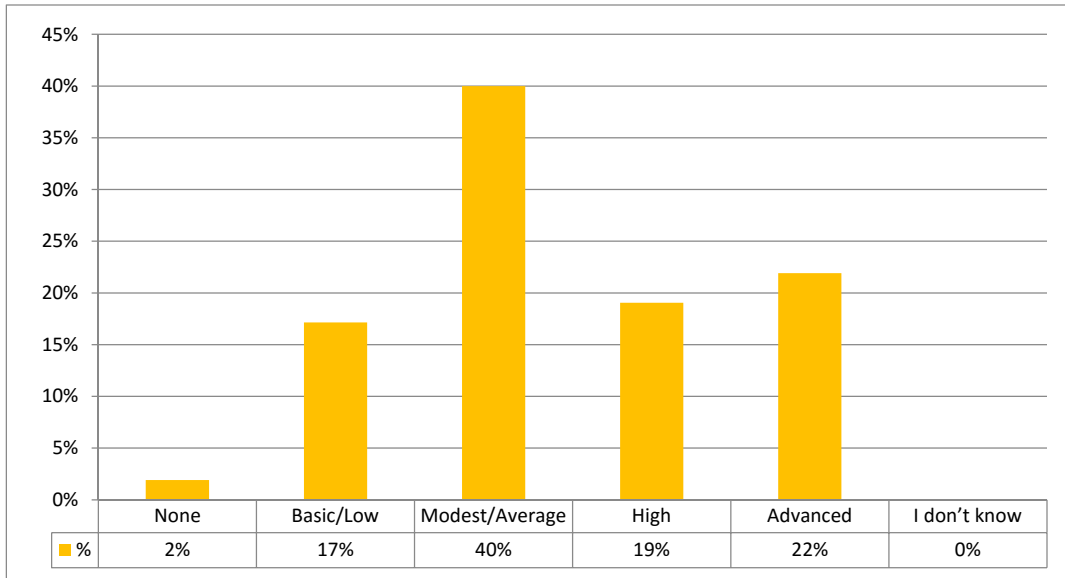


Chart 14 – ICT Culture Dissemination/Utilization

It is important to note that (58%) of the SMEs interviewed did not have a preset ICT budget but they mainly relied on allocating resources as per their emerging needs and requirements throughout the year. The findings indicated that only (42%) of the SMEs interviewed had allocated budgets and (58%) would spend on ICT based on emerging needs year on year. Chart 15 demonstrates that of the SMEs who had preset allocated ICT budgets; (24%) budgeted more than 100 thousand Egyptian Pounds (13K US dollars); (24%) budgeted between 10-20 thousand Egyptian Pounds (1.3-2.6K US dollars) (22%) budgeted 21-50 thousand Egyptian Pounds (2.7-6.5K US dollars) and (19%) budgeted between 51-100 thousand Egyptian Pounds (6.7-13K US dollars).

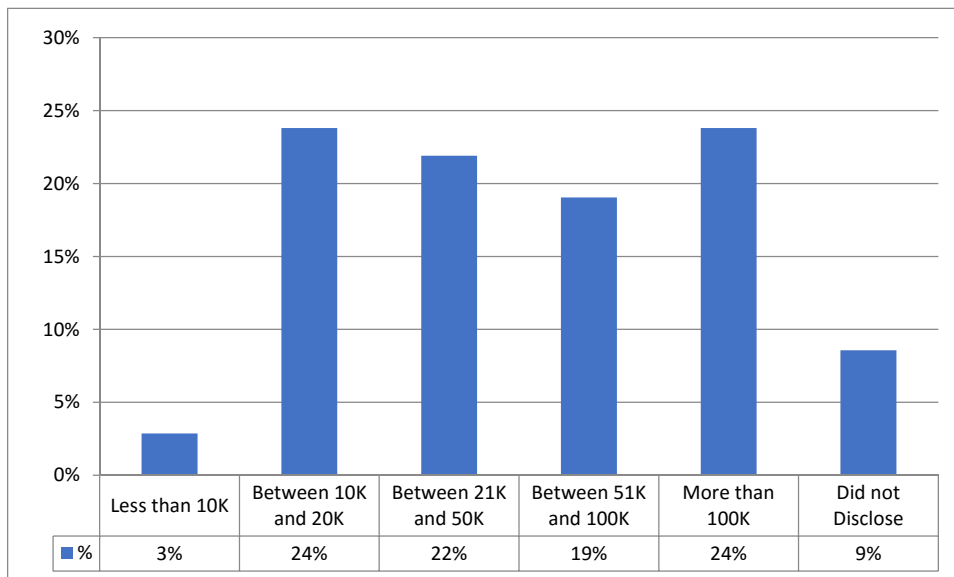


Chart 15 – Range of ICT Allocated Budget

In terms of awareness of cloud computing and the diffusion and utilization levels, the analysis of the findings indicated the following aspects:

Around (92%) of the sample was well aware of the concept of cloud computing, its importance and its growing impact on different organizations and especially SMEs given that it provides them with a level playing field with the larger organizations in the local market as well as other organizations in different markets both off and online. However, there was no general agreement on what exactly cloud computing constituted. As indicated earlier, it was basically reactions from their readings and self-awareness and also based on their general usage of different technology tools and applications.

In general, as demonstrated in chart 16, the three primary themes/notions that cloud computing represented according to the sample surveyed were cost reduction (79%) in other words they felt it is a good platform for cost savings, efficiency (73%) and that it is the next generation of ICT across individual and organizational levels in terms of Internet use and ICT penetration and utilization (59%). In addition (44%) thought it was a good platform for data sharing and data storage. According to the one of the IT directors interviewed he indicated that “cloud computing at this stage is more diffused and beneficial at the personal rather than the professional level, in the context of organizations it is perceived as the ideal solution for disaster recovery by most users.” Even within many organizations studied, the level of cloud computing usage is not organizationally institutionalized. It is used by managers in their own offices and in coordinating with other organizations. This is primarily because in many cases the gap between management and staff in terms of skills and capacities is quite wide due to lack of regular training and exposure. It is worth noting that (42%) of the sample interviewed felt that cloud computing not just helped internally in the management of different resources and running the business but also externally in reaching out to other business and supporting in different business development activities.

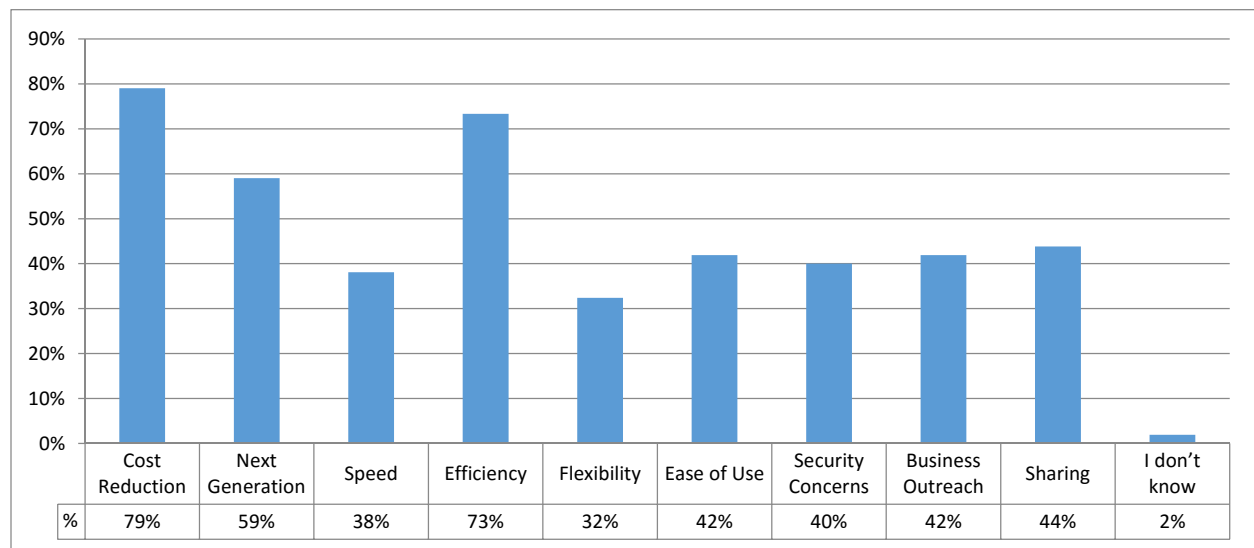


Chart 16 – Primary Perceptions of Cloud Computing

The findings indicated that (57%) of the sample were already adopting some form of cloud computing; (14%) were considering adopting some form of cloud computing and at this point (24%) had no plan of adopting it and (4%) did not know whether the SME is considering using cloud computing as indicated in chart 17. The accumulation of these results show that (72%) of the total sample interviewed believed that at some point they will be adopting cloud computing technologies, if they are not already doing so. These are good figures that should be supported in

terms of seeing their conceptual development being translated into decisions and actions. According to the findings of the research, no less than 90% of the interviewees felt that cloud computing would provide a fully-integrated IT ecosystem enriched with a set of functional processes related to marketing, finance, human resources, sales, and more. One of the SME owners indicated that “despite the availability of multiple providers, there is still no clear proposition available to SMEs when it comes to cloud computing.”

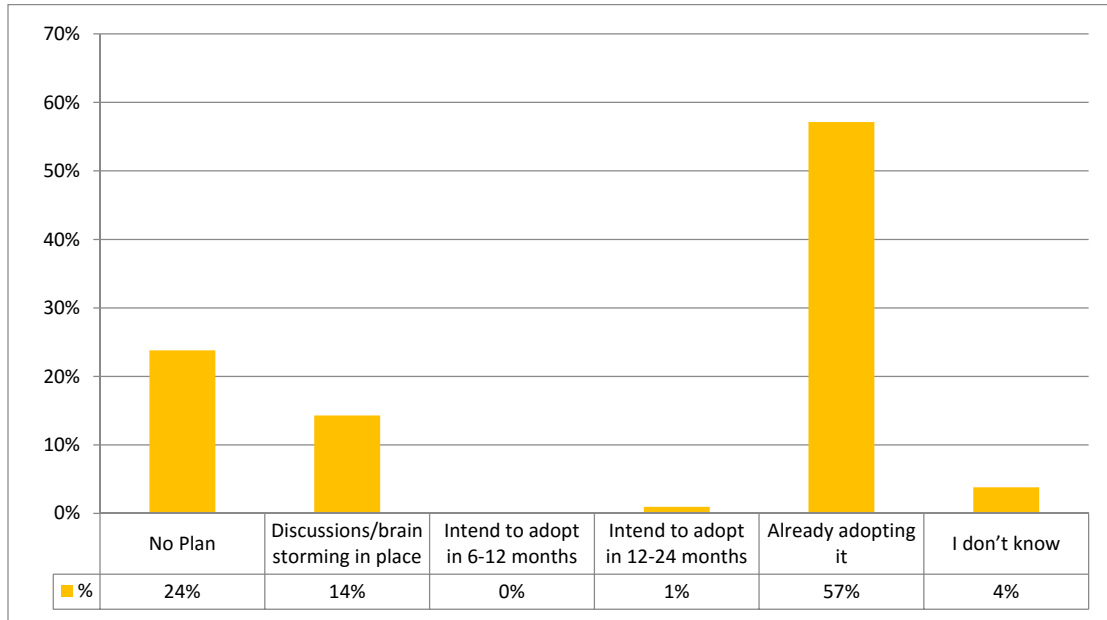


Chart 17 – Cloud Computing Adoption plan/Primary Perceptions of Cloud Computing

Chart 18 demonstrates that (15%) of the sample had a basic level of adoption while (30%) had a modest level and (14%) had an advanced level of adoption as described by the interviewees. Based on an interview with a managing director of a fast growing SME with a business outreach that is penetrating a number of countries, she indicated that “based on our experience when efficiently deploying cloud computing, sales were quickly and positively affected.” She believes that the level of usage in terms of maturity and institutionalization is still in an early stage but the rapid level of dissemination and the increasing growing role of information/big data and ICTs will be increasingly effective for SMEs in the years to come demonstrating a key success factors for those startups providing them with a level playing field in a globally competitive and interconnected marketplace. More than 70% of the sample interviewed indicated that their belief that the level of resistance to change to technology deployment is rapidly diminishing.

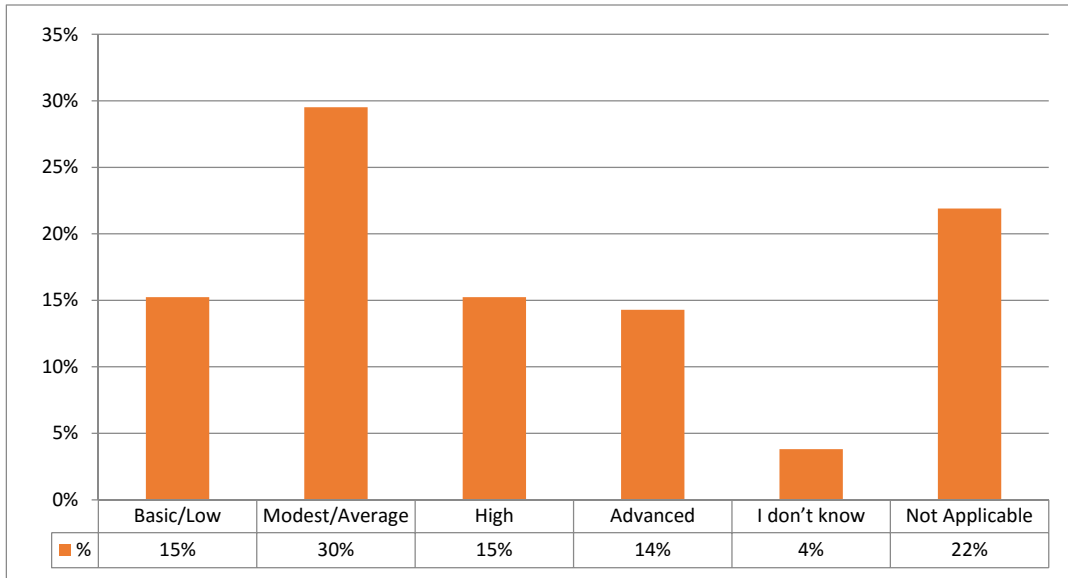


Chart 18 – Cloud Computing Adoption Level

In terms of cloud computing applications and solutions, the majority of SMEs implemented SaaS cloud solutions (46%), followed by (26%) implementing security services. IaaS and PaaS were only adopted by (9%) and (6%) respectively. Chart 19 demonstrates the differences of usage in terms of cloud computing solutions. From an SME perspective, due to the limited requirements, SaaS brings maximum value to the organization as confirmed by many interviews. According to most interviews, the level of universal training in the space of cloud computing is lacking. Therefore, it is good to see that the ICT strategy is offering a number of options in terms of training and professional development both in terms of technical and non-technical training (MCIT, 2012).

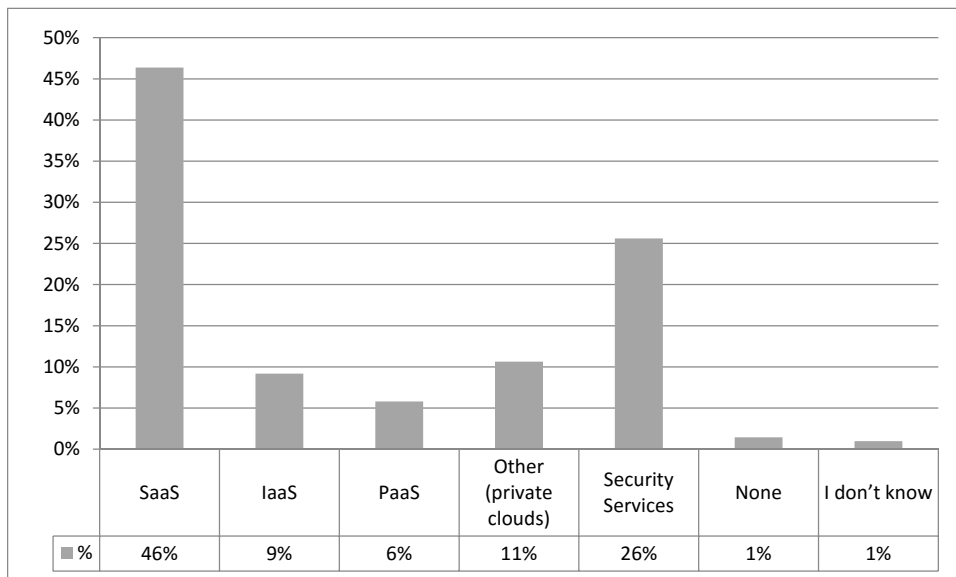


Chart 19 – Cloud Computing Solutions Adopted/Used

The most highly implemented cloud computing tools included Skype (16%), Dropbox (16%), followed by social media applications (11%) and Google applications (10%). Chart 20 provides

more details on the tools utilized. These findings confirm earlier deductions that most of the usage is personal rather than institutional so far however with the proper orientation and training, managers and users of cloud computing could act as role models for others operating within the SMEs setting/environment. Generally, interviewees indicated that functions like marketing, planning, operations, accounting as well as other organizational functions are all positively affected by the proper and effective application of IT and cloud computing and that they could have further transformational effect on other organizational functions.

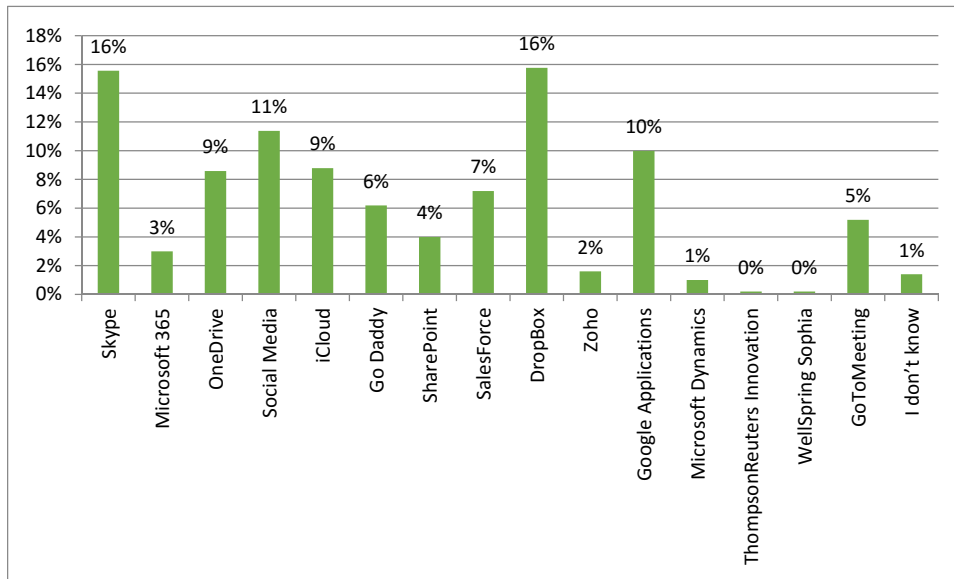


Chart 20 – Cloud Computing Tools Used

Chart 21 demonstrates the familiarity of different cloud computing concepts among the different interviewees. The sample was most aware of the following cloud computing applications; file storage and sharing (97%), communication platforms (96%), website hosting (86%), file backup (83%) and CRM (71%), others concepts and applications were also utilized by the sample was less aware of them. According to Mohamed Shahin, a founder and CEO of an Internet startup, indicated that “there are a variety of cloud computing applications that are increasingly being used in the marketplace in Egypt such as Fileboard (sales engagement platform), Wave (accounting platform) and Slack (communication platform).” One of the owners of a leading service-oriented company interviewed indicated that given the security and privacy issues, even if it is only a perception that could be gradually changed, most SMEs that use cloud computing opt for using mainly private rather than public clouds. Such response was shared by over 77% of those interviewed stating that security is definitely a concern. According to another interview with an entrepreneur and an SME owner, he indicated that “private clouds’ rules given the lack of trust in the confidentiality of data and the lack of awareness programs can help change that perception.” In general, based on the feedback received, many indicated their preference to private clouds, yet they felt that security is more of a perception that can be gradually changed/improved.

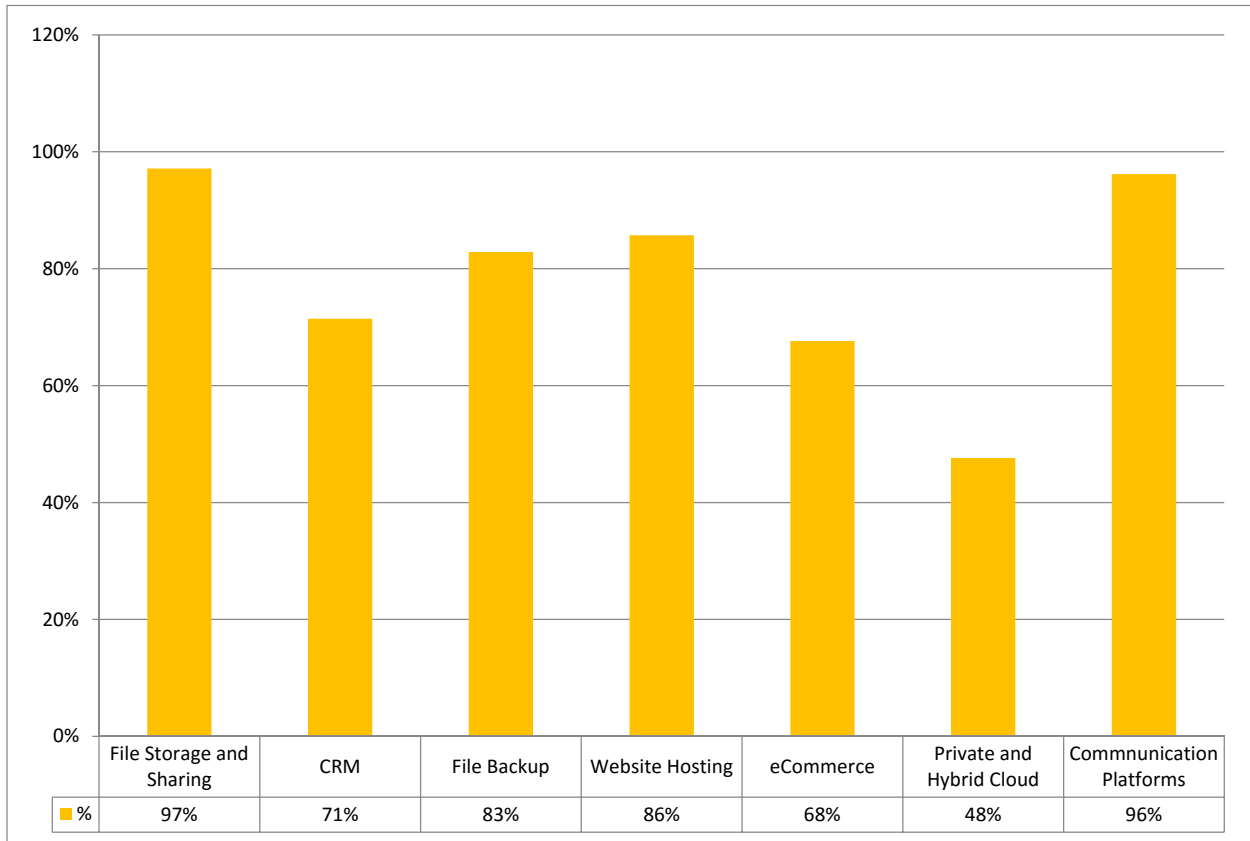


Chart 21 – Cloud Computing Concepts Familiarity

In terms of the cloud computing challenges and benefits within the context of SMEs in Egypt, following are some of the findings that relate to the deployment, advantages, benefits and challenges of cloud computing.

Chart 22 demonstrates the top four cloud computing advantages as identified by the sample and they included cost reduction and savings due to the deployment of a subscription-based model (91%), followed by efficiency and streamlining of processes (78%) and mobility, accessibility, communication and sharing of resources (72%) and security followed by ease of use and reduced IT complexity (46%) and (45%) respectively. Moreover, some of the clear implications of cloud computing applications as indicated through several interviews, they help turnaround productivity and leverage effectiveness. However, the key is to have the right and much needed set of skills and capacities required among the staff. It is important to note that security, privacy and ease of use were mentioned often during the conversations with the same studied.

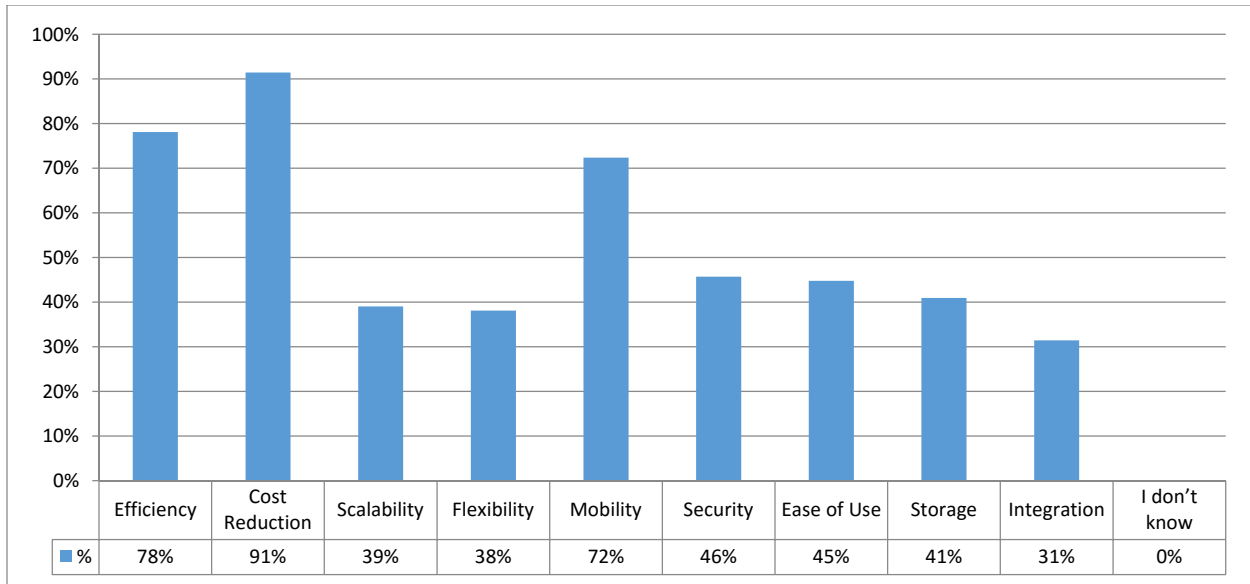


Chart 22 – Cloud Computing Benefits

Chart 23 demonstrates the top four barriers and impediments as identified by the sample interviewed and they included awareness of the concept at large and the available services in specific (75%) followed by security concerns and IT reliability both at (70%), and then comes the issue of privacy at (46%) which has been clearly identified by the majority of the sample as a psychological barrier. As it has been repeatedly mentioned by many interviewees, awareness or rather the lack of it, always comes on top. Investing in human capital remains an invaluable elements in effectively and efficiently diffusing ICT and cloud computing among SMEs. Moreover, “the level of reliability on the services needs to be improved to transform the perception currently skeptical to primarily rely on technology in the form of cloud computing” as indicated by one of the managing directors interviewed.

According to Ehab Osman, Chairman of a leading ICT company indicated that “It is not the technology itself that counts it is the added-value that it brings to SMEs.” In many ways that primarily relies on the skills and capacities in terms of human resources and how both management at the strategic and macro level and staff at the operations and micro level introduce, adopt, diffuse, and adapt cloud computing. Moreover, as indicated by the majority of those interviewed, the providers of a quality service in Egypt are rather limited in number or are not well known in the marketplace indicating the need for more awareness campaigns from the providers of different IT services. With many years of experience in the education sector and a focus on K-12, Karim Rogers indicated that “human capital is a key element in the development of the marketplace and consequently the economy, there is an information-based culture that needs to be created.” In many ways, Egypt has seen such trend at the personal level over the last three decades, however, organizationally there is still some way to go. As one of the interviewees, Maged Mansi entrepreneur in the retail business, indicated “for now, personal use of cloud computing dominates.” There were more than (40%) of those interviewed who shared the same feeling. In addition, Omar El Sahy, General Manager of souq.com Egypt indicated that “SMEs are ideal for cloud computing where disruptive technologies offer them scalability and out of the box solutions.”

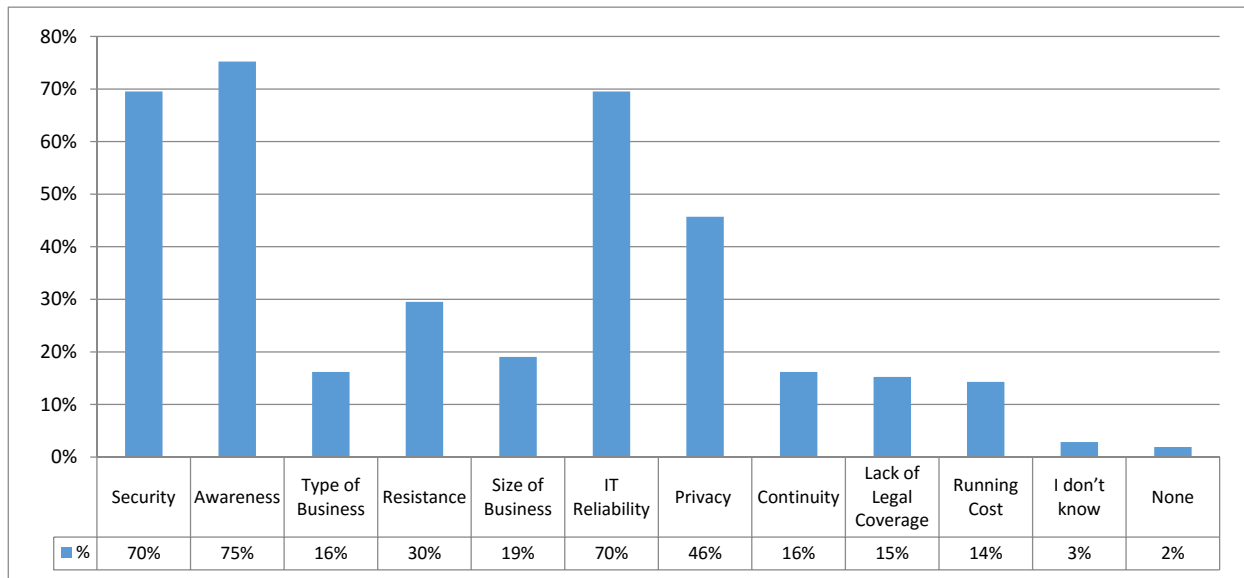


Chart 23 – Cloud Computing Challenges/Impediments

It is important to note that (66%) of those interviewed ranked private and hybrid clouds as the least important application. In many ways, such finding was due to the lack of awareness, which in reality could be contributed to the lack of familiarity of SMEs with the concept of private clouds, something that contradicts many who indicated the importance of private clouds due to security and privacy concerns.

### General Findings

From an organizational perspective, (71%) of those interviewed ranked file storage and sharing with (30%) followed by CRM (27%) and website hosting (14%) as the most important three applications in cloud computing. There has been general neutrality towards eCommerce with (44%) ranking it in 5<sup>th</sup> place in terms of impact on financial results and (43%) in terms of organizational impact. Table 5 demonstrates the detailed findings of the study on the assessment of cloud computing from an organizational perspective.

	Rank 1		Rank 2		Rank 3		Rank 4		Rank 5		Rank 6		Don't Know	
	FreQ	%	FreQ	%	FreQ	%	FreQ	%	FreQ	%	FreQ	%	FreQ	%
File Storage and Sharing	32	30%	25	24%	12	12%	14	14%	11	10%	14	15%	1	7%
CRM	28	27%	20	19%	15	15%	22	22%	16	15%	2	2%	1	7%
File Backup	15	14%	24	23%	21	20%	31	31%	8	8%	5	5%	2	13%
Website Hosting	11	10%	10	10%	44	43%	18	18%	11	10%	8	8%	2	13%
eCommerce	4	4%	23	22%	8	8%	13	13%	45	43%	8	8%	4	27%
Private and Hybrid Cloud	15	14%	3	3%	3	3%	3	3%	14	13%	59	61%	5	33%

Table 5 – Cloud Computing Rankings from an Organizational Perspective

The top 3 impediments to cloud computing were lack of awareness of available services (75%) followed equally by 3 other impediments security concerns (64%); bandwidth and reliability of suppliers, each with (63%). Findings clearly indicated that the lack of knowledge of available services is the primary challenge to cloud computing implementation. This should be a key priority in the plan and efforts being put together for the development and diffusion of cloud computing among SMEs in Egypt. As some of the interviewees indicated this is primarily due to perception,



lack of awareness and lack of understanding. More efforts need to be allocated in the space of promoting cloud computing solutions to SMEs, primarily not as a technology platform but rather as a solution for organizational success and growth given the outreach it provides and the opportunities it enables for better decision making and allocation of resources. According to Youssef Henry, Channel Sales and Marketing Manager Middle East and Africa at Intel Egypt, “cloud computing boosts the efficiency of SMEs and there is a need for a government initiative to support it.”

In terms of key cloud computing benefits and incentives (61%) ranked minimal upfront investment followed by on demand self-service (20%), elasticity and scale (14%), improved data reliability and scale (13%) as the most important cloud computing incentives. As for the cloud computing deterrents, lack of knowledge and awareness have been by far the highest deterrent with (52%) as the primary challenge. As for data privacy and confidentiality, they came second in the list of deterrents with (18%) choosing it as the top deterrents to cloud computing. Therefore, Baher Esmat, Vice President, Global Stakeholder Engagement Middle East at ICANN, indicates that “risk brought with the cloud needs to be addressed to be able to benefit from the scalability of the use.”

### **Future Research**

With emerging ICT tools and techniques, it is increasingly visible that technology-based SMEs and startups have bigger opportunities and options to create a diversified potential for business development and growth. This reality is further magnified with the diffusion of cloud computing giving all SMEs and startups regardless their location, size or type of business access to a wide variety of tools, capabilities and services that until recently were only accessible by larger organizations. Cloud-based IT provides SMEs and startups access to a globally connected community of businesses and customers. Moving forward, cloud computing is emerging as one of the priorities for IT professionals, CIOs and CEOs. The adoption, diffusion and adaptation of cloud computing in emerging economies is getting increasing coverage in the information technology research literature but more needs to be done focusing on demonstrating how cloud computing can help bring down cost, improve security, and lower risk as well as help improve performance through rationalizing resources, promote innovation and support the development of a secured technology setup that caters for scalability, business continuity and retention of skilled human capital in the ICT space. This will be important for the academic as well as the business community to regularly be updated with the developments taking place in the local marketplaces given its size, growth and massive untapped opportunities.

On the one hand, most of the owners of the SMEs indicated that the low infrastructure setup required for cloud computing whereas the bulk of the administration is taken care of by the provider works well in the case of Egypt since most of the staff, not management, are ICT illiterate. On the other hand, it was clearly stated by many entrepreneurs and SME owners that the lack of awareness and training is holding back many SMEs from making optimum use of cloud computing services, let alone ICT at large. More focus on what are the specific awareness and training needs is another priority to invest and leverage the human capacities. In the meantime, from a cultural and tradition perspective, Shady Diab, managing director at Carandani operating in the food industry, he believes that to date “manual systems dominate.”

Moving forward it would be interesting to study the implications of emerging IaaS and SaaS-based solutions such as productivity, CRM and business intelligence (BI) on SME development and growth statistics. Cloud computing will not be successful in the long term unless a proper ecosystem is in place. This will only be realized through technology-enablers, a growing community of interconnected users, massive awareness campaigns among different stakeholders, and a fairly large market that producers and consumers that benefit from the opportunities available. According to Amr Abou Allam, founder and CEO of Lotus Management, specialized in asset ad property management, he believes that most of the cloud computing usage is basic and personal and that institutional dissemination is not there yet, he indicated that “the culture needs to be built first through investing in human capital.”

### **Recommendations**

Investing in cloud computing will undoubtedly serve promoting and growing the private sector and help creating an entrepreneurial culture. There are a few things that need to be realized in order to improve the effective use of ICT tools and applications such as cloud computing. For example, there is a need to develop an integrated framework for the development of an ecosystem of industries involved in cloud computing. Moreover, there is a need to use a media campaign including traditional platforms and emerging social media (SM) venues in formulating interest groups that can have an open discussion on how to better deploy cloud computing in a way to effectively serve SMEs.

Following is a set list of recommendations that could be useful moving forward in the space of ICT deployment in the context of SMEs. The recommendations address what the government, private sector, policy makers, regulatory institutions, SMEs as well educational and training institutions can explore and consider.

#### *Suggested recommendations to the government:*

- To facilitate the creation of an environment that entices the creation of a knowledge-based economy and that is driven by the development and dissemination of information, information access and knowledge through the effective use of emerging innovative ICT platforms, tools and applications.
- To develop specific ICT policies that accommodate and leverage the invaluable and competitive characteristics of ICT usage in the SMEs context; cloud computing, big data and the Internet of things included.
- To work on developing strategies that are built on participatory and cooperative approaches involving the government, the private sector and the civil society to promote and support the dissemination of ICT usage among SMEs.
- To enable the legislative environment and issue the appropriate policies and regulatory framework where cloud computing can flourish including privacy laws and other security concerns addressed.
- To support the development of clear policies and sound practices to protect consumers’ privacy and improve security practices to address cybercrime, hacking and other emerging threats.

- To develop the required policies that ensure that tax laws are encouraging and promoting the investment in emerging technologies.
- To study the barriers and impediments that face SMEs and make sure that they are reduced gradually and hopefully removed altogether.
- To expand the eGovernment initiative and other electronic services (eServices) to help create a culture that is accustomed to operate, interact, trade and do business online.
- To assess the policies and regulations related to broadband availability, cost, dissemination and more.
- To establish a platform for effective communication and cooperation between the government, the ICT and SMEs community to initiate a facilitation programs that supports the use of emerging technologies in the context of SMEs and that would enable policymakers understand the timely and changing needs and priorities of SMEs such as cost reduction, efficiency, improving productivity and boosting revenues.

*Suggested recommendations to the educational and training community:*

- To support the establishment of university-based incubators in different public and private sector establishments to nurture, mentor and support a growing pool of youth focused on deploying IT platforms and applications in IT-based startups that address different market challenges.
- To invest in research and development (R&D) as a priority in the domain of IT deployment, SMEs and innovation to help SMEs leapfrog and realize the optimal impact it can have on the economy.
- To help establish a universal culture among the community through awareness, education and training programs demonstrating the importance of digital literacy across different services including government, public and private sector environments.
- To develop young and promising ICT-based entrepreneurial programs that are embedded into innovate, current and adaptable curricula that reflects local and global changing market needs.
- To promote educational opportunities in the domains and disciplines of science, technology, engineering and mathematics (STEM).
- To revisit the curricula and elaborate more on the possible prospects and opportunities from the proper deployment and use of ICT in different economic sectors including the space of SMEs and start-ups.

*Suggested recommendations to the private sector and SMEs community:*

- To formulate public-awareness campaigns that emphasizes the importance of ICT tools and applications for supporting economic growth and especially in the context of SMEs given its associated competitive edge and business outreach.
- To promote the cooperation between businesses, industries, universities and research institutions.
- To formulate a mentoring program with a business-IT focus that blends with the academic content yielding generations of IT-literate graduates engaged and aware of market needs and requirements.
- To cooperate with the education, training and ICT communities to help create the required awareness about cloud computing as well as other emerging technologies and what needs to be done to effectively use them.

*Suggested recommendations to the ICT community:*

- To promote cloud computing as an innovative platform that could be perceived as part of the modernization process of businesses with an emphasis on SMEs and startups.
- To promote the digital economy by inspiring and supporting online confidence and trust.
- To help diffuse the broadband services universally across the community given its important role in disseminating the use of cloud computing.
- To establish an information infrastructure through collecting and analyzing data and statistics on the deployment of different ICT tools and applications and assess their impact on productivity, job creation, efficiency, competitiveness growth and more.
- To coordinate with the government, the SMEs and ICT communities to create awareness and understanding of the socioeconomic implications and benefits of using cloud computing in the context of SMEs.
- To exert more efforts in promoting the concepts of cloud computing including the associated opportunities, challenges, risks, potentials in assisting SMEs and startups, and more.
- To encourage technology-neutral principles in government procurement and other policy initiatives in order to be able to fully understand the potential and prospects of different technology applications.

**Conclusion**

Cloud computing is arguably the most innovative breakthrough the IT industry has witnessed since the move from mainframes to personal computers. Entrepreneurs are increasingly looking at cloud solutions for regular analysis of data that can help grow their businesses. However, with the opportunities created that are mentioned above such as organizational cost savings and flexibility

to scale-up or down the IT infrastructure, there are still a variety of impediments. In the context of SMEs in emerging economies, there is a great interest in cloud computing given the less complexity required and the opportunities created. SMEs are invaluable for any economy, they are the primary platform for job creation for the economy. They are often labeled as the silent drivers of different economies and especially emerging ones while driven by innovation and capitalizing on the marketplace.

SMEs have the ability to enable different growth opportunities including new products, services and processes. Naturally, entrepreneurs tend to be innovative, risk-taking, technology savvy and more responsive to adapt to change and to deploy cutting-edge technology tools and applications allowing them to pursue more opportunities. Such development is independent of the sector; hence, providing a variety of spectrum for development and growth.

Cloud computing provides economies of scale whether they are public or private, and provide extreme flexibility in the case of public clouds. The key reason for adopting the “everything as a service” model however is the predictability it can offer on the costs of such services, with key metrics like cost per user, total cost of ownership and the level of accuracy for forecasts. With continued cloud computing, mobile and the advent of big data bolstered by cheaper bandwidth, it is more likely to see the move towards everything as a service in the foreseeable future. Both the private sector and the government should make it a priority to provide and empower SMEs with the emerging ICT tools and applications that can help them move to the next level and compete at the local and global levels.

Based on this study and confirming other previous studies, greater use and diffusion of ICT among SMEs and with the rapid penetration of cloud computing by SMEs, the potential to boost productivity and create job opportunities could be magnified. In other words, the concrete impact could be both economical and societal. In general, the adoption of cloud computing offers smart, quick and efficient services that can help achieve local and global competitiveness, the critical success factor remains the availability of the required human skills and capacities. Arguably, with the proper deployment of emerging technologies and new business practices, SMEs can grow by about 20% per year as indicated by many of the entrepreneurs and experts interviewed for this study. However, effective investment in human capital is a priority. They are the differentiating factor and they need to be aware and knowledgeable of what technology can offer.

While the bulk of the attention of SMEs is currently focused on efficiency and more cost effectiveness, the real impact will be realized and will be sustainable when the focus is directed towards continuous improvement given the resources made available through optimization whether financial or non/-financial and more importantly innovation. It is recommended that the government in collaboration with the private sector represented by the SME community, the ICT sector, and the civil society at large should regularly work together to build the ecosystem that enables and continuously promotes the development and growth of SMEs. The institutionalization of the process and that of the environment are key success factors for its sustainability long term.

Moreover, entrepreneurs need a mindset that is ready to accept a transformational change so they become more focused on growth opportunities. This change will make them attractive for angel investors and VC companies. However, the financial market and instruments themselves need to

undergo their own transformational change by availing the products, processes and distribution channels to support SMEs and startups and help build an entrepreneurial culture.

The concept of cloud computing, based on the findings of the study as well as from other sources, is definitely picking-up in emerging markets, Egypt included. More SMEs across different sectors are coming forward to understand it, introduce it and adopt it. However, the providers and enablers of cloud computing have still some work to do with respect to making it cost effective. Investing in ICT in general and cloud computing in specific represents a unique opportunity for different stakeholders in the marketplace in Egypt including the government and the private sector, especially SMEs, to improve productivity, enable economies of scale, enhance effectiveness, rationalize costs and create job opportunities.

The unemployment rate in Egypt is relatively high especially among women and the youth, and technology could be the proper platform to make a difference especially in creating opportunities not just in the major cities but also in the remote and underprivileged locations, which is vital in terms of socioeconomic and political perspective. The notion of youth should be perceived and dealt with as an asset and an opportunity rather than a liability or a bulge. Entrepreneurial education will change how people think, generate ideas, perceive opportunities, promote innovation, develop alternative solutions, become impact-driven and more. Some people claim that entrepreneurship cannot be taught; others believe that some are born gifted with entrepreneurial skills while others are not. However, there is no doubt that everyone has a chance to contribute positively to socioeconomic development and growth by capitalizing on his/her skills and capacities and by developing themselves through lifelong learning.

The promising future of Egypt as is the case of many emerging economies will depend less on a few large leading projects in traditional industries and businesses and more on the widespread of unconventional innovative and entrepreneurial ideas and projects that would engage the technology savvy youth community and that can help create a platform for job creation and employment. Startups and SMEs are agents of change and vehicles for economic development and new industries, new breakthroughs and new ventures were always created by new and growing companies.

To sum it up, Egypt needs to establish an ICT-driven ecosystem capitalizing on a creative and talented youth opportunity that can become the base for an entrepreneurial culture and a startup nation.

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## Appendix A

### Interview Questions

#### **A. Interview Facts**

1. Name of researcher/interviewer \_\_\_\_\_
2. Date of the interview \_\_\_\_\_
3. Duration of the interview \_\_\_\_\_
4. Interview was conducted by
  - Phone \_\_\_\_\_
  - Skype \_\_\_\_\_
  - In person \_\_\_\_\_

#### **B. Interviewee Profile**

5. Name of Interviewee \_\_\_\_\_
6. Title \_\_\_\_\_
7. Role \_\_\_\_\_
8. Date of joining the organization \_\_\_\_\_

#### **C. Organizational Profile**

9. Name of the company \_\_\_\_\_
10. Type of business/sector \_\_\_\_\_
11. Year of establishment \_\_\_\_\_
12. Geographical reach
  - City \_\_\_\_\_
  - Nationwide/governorates \_\_\_\_\_
  - Regional/countries \_\_\_\_\_
13. Number of staff \_\_\_\_\_
14. Annual turnover \_\_\_\_\_

#### **D. ICT Infrastructure**

15. What is the current ICT infrastructure deployed? Describe the infrastructure in place in general.
16. What is the culture of the ICT infrastructure and utilization among staff?
  - None \_\_\_\_\_
  - Basic/low \_\_\_\_\_
  - Modest/average \_\_\_\_\_
  - High \_\_\_\_\_
  - Advanced \_\_\_\_\_
  - I don't know \_\_\_\_\_
17. Do you have the following information systems applications in your organization?
  - Internet \_\_\_\_\_
  - Preliminary eCommerce \_\_\_\_\_

- Advanced eCommerce \_\_\_\_\_
- Transaction processing systems \_\_\_\_\_
- Other (specify) \_\_\_\_\_

18. Are there any IT services that are outsourced by the organization?

- Website \_\_\_\_\_
- Electronic mail \_\_\_\_\_
- Data storage \_\_\_\_\_
- Other (specify) \_\_\_\_\_

19. Do you have a specific budget for ICT infrastructure, tools and applications? If yes, what is the range of annual budget?

20. In what ways the staff use the following ICT aspects?

- Tools (tablets, mobiles, desktops, notebooks) \_\_\_\_\_
- Software applications \_\_\_\_\_
- The Internet \_\_\_\_\_

### ***E. Cloud Computing***

21. Are you aware of the concept of cloud computing? If yes, to what extent, explain your thoughts?

22. Is cloud computing adopted in your organization? If not, are you considering it?

- No plan \_\_\_\_\_
- Discussions/brainstorming in place \_\_\_\_\_
- Intend to adopt it in 6-12 months \_\_\_\_\_
- Intend to adopt it in 12-24 months \_\_\_\_\_
- Already adopting it \_\_\_\_\_
- I don't know \_\_\_\_\_

23. If cloud computing is adopted, what is the level of usage/knowledge among staff?

- Basic/low \_\_\_\_\_
- Modest/average \_\_\_\_\_
- High \_\_\_\_\_
- Advanced \_\_\_\_\_
- I don't know \_\_\_\_\_

24. If cloud computing is adopted, which of the following services are adopted?

- Software Services (SaaS) \_\_\_\_\_  
Examples include office software “Microsoft Office”; messaging software “Google Gmail and RightNow”, meeting and collaboration “GoToMeeting”; payroll software “Workday”; DBMS software “Oracle”; accounting software “Concur”, customer relationship management “SalesForce”; enterprise resource planning “NetSuite”; human resource management “Oracle’s Taleo”, and content management.
- Infrastructure Services (IaaS) \_\_\_\_\_

Examples include Amazon Web Services, Microsoft Azure and Google Compute Engine).

- Platform Services (PaaS) \_\_\_\_\_  
Examples include Apprenda and Microsoft.
- Security Services \_\_\_\_\_
- Others \_\_\_\_\_
- None \_\_\_\_\_
- I don't know \_\_\_\_\_

25. Can you identify the primary cloud computing tools that are deployed by the organization? If yes, list them.

26. Do you know/are you familiar with the following cloud computing tools/platforms?

- File Storage and sharing \_\_\_\_\_
- (iCloud, Dropbox, One Drive, etc.)
- Customer Relationship Management \_\_\_\_\_
- (SalesForce, etc.)
- File Backup \_\_\_\_\_  
(Securstore, Acronis, etc.)
- Website Hosting \_\_\_\_\_  
(Rackspace, Blackbaud, GoDaddy, iPage, etc.)
- eCommerce \_\_\_\_\_
- Private and Hybrid clouds \_\_\_\_\_
- Communication platforms \_\_\_\_\_  
(Skype, Viber, Facebook, Tango, etc.)

27. What are the top four advantages in your mind in using cloud computing (mix between qualitative and quantitative aspects)?

28. Please rate in order of importance which of these tools would benefit your business most? Either financially or organizationally (1 being the most important and 6 being the least important)

- File Storage and sharing
  - financially \_\_\_\_\_ organizationally \_\_\_\_\_
- Customer Relationship Management
  - financially \_\_\_\_\_ organizationally \_\_\_\_\_
- File Backup
  - financially \_\_\_\_\_ organizationally \_\_\_\_\_
- Website Hosting
  - financially \_\_\_\_\_ organizationally \_\_\_\_\_
- eCommerce
  - financially \_\_\_\_\_ organizationally \_\_\_\_\_
- Private and Hybrid clouds
  - financially \_\_\_\_\_ organizationally \_\_\_\_\_

29. Identify/list the barriers/challenges to the implementation of different cloud computing tools?

30. Identify, if any, and rank the barriers that stopped you from implementing cloud computing tools?

- Setup Cost
  - o yes/no \_\_\_\_\_ rank \_\_\_\_\_
- Security concerns
  - o yes/no \_\_\_\_\_ rank \_\_\_\_\_
- Band width
  - o yes/no \_\_\_\_\_ rank \_\_\_\_\_
- Availability of providers
  - o yes/no \_\_\_\_\_ rank \_\_\_\_\_
- Reliability of providers
  - o yes/no \_\_\_\_\_ rank \_\_\_\_\_
- Lack of awareness of available services
  - o yes/no \_\_\_\_\_ rank \_\_\_\_\_

31. Rank the incentives/opportunities to the implementation of different cloud computing tools?

- On demand self-service (the ability to request and utilize services on need as basis) \_\_\_\_\_
- Minimal upfront investment \_\_\_\_\_
- Rapid elasticity/flexibility (on demand procurement of a dynamic basket of information technology resources) \_\_\_\_\_
- Pay per usage (cost saving; measured service) \_\_\_\_\_
- Option of scalability and expansion \_\_\_\_\_
- Ease of use/simplicity \_\_\_\_\_
- Improved data security/reliability \_\_\_\_\_
- Value-added to business \_\_\_\_\_
- Efficiency, integration and resource optimization \_\_\_\_\_

32. Rank the challenges/deterrents to the implementation of different cloud computing tools?

- Financial resources \_\_\_\_\_
- Lack of knowledge/awareness (human skills/competencies) \_\_\_\_\_
- Availability of ICT infrastructure (including the Internet) \_\_\_\_\_
- Data privacy and confidentiality \_\_\_\_\_
- Culture of centralization/onsite resource allocation \_\_\_\_\_
- Size of the business \_\_\_\_\_
- Usage of manual systems \_\_\_\_\_
- Language barriers (applications mostly in English) \_\_\_\_\_
- Type of business \_\_\_\_\_

Thank you

## Appendix B

No.	Industry/Sector	Role/Expertise of Interviewee	Type of Interview	Date of Interview	Duration of Interview (mins)
1	Healthcare	Entrepreneur	Phone	15-Mar-15	25
2	Business Association	IT	Phone	31-Mar-15	20
3	Real Estate	Entrepreneur/IT	Skype	15-Jan-15	30
4	Food and Beverages	Entrepreneur	Viber	17-Feb-15	45
5	VC/Angel Investment	SME/Investor	Phone	25-Feb-15	45
6	Food and Beverages	Entrepreneur	Skype	06-Mar-15	35
7	Automotive	Entrepreneur	Skype	06-Mar-15	30
8	Training	Entrepreneur	Face3Face	03-Mar-15	35
9	Incubator/Accelerator	SME/Innovation	Skype	27-Feb-15	22
10	Furniture	Entrepreneur	Face3Face	10-Apr-15	30
11	Distribution and Logistics	IT	Skype	08-Mar-15	30
12	Food and Beverages	Entrepreneur	Face3Face	14-Feb-15	35
13	Real Estate	Entrepreneur/IT	Skype	15-Feb-15	20
14	VC/Angel Investment	Entrepreneur/Investor	Skype	07-Mar-15	40
15	Transportation	Entrepreneur	Skype	03-Mar-15	20
16	Publishing	Entrepreneur	Skype	13-Mar-15	35
17	Services	Entrepreneur	Phone	25-Mar-15	30
18	Manufacturing	Entrepreneur	Face3Face	25-Mar-15	25
19	Asset/Property Management	SME/IT	Skype	04-Apr-15	30
20	Manufacturing	Entrepreneur	Face2Face	05-Mar-15	25
21	Government - Post Office	SME/IT	Skype	26-Feb-15	58
22	Distribution and Logistics	Entrepreneur	Viber	24-Feb-15	40
23	Training	Entrepreneur/IT	Skype	02-Mar-15	30
24	Furniture	Entrepreneur	Skype	10-Jan-15	30
25	Information Technology	IT	Skype	27-Feb-15	25
26	Information Technology	IT	Phone	10-Mar-15	40
27	Consulting	Entrepreneur	Skype	29-Jan-15	30
28	Education K-12	Entrepreneur	Skype	15-Jan-15	30
29	Consulting	IT	Phone	24-Mar-15	30
30	Information Technology	IT	Skype	01-Mar-15	50
31	Government - Telecommunications	IT	Skype	25-Jan-15	30
32	Training	SME	Phone	24-Mar-15	30
33	Consulting	Entrepreneur	Skype	01-Mar-15	30
34	Telecommunications	SME/IT	Face3Face	09-Feb-15	30
35	Education K-12	SME	Skype	29-Mar-15	25
36	Distribution and Logistics	Entrepreneur/IT	FaceTime	26-Feb-15	20
37	Food and Beverages	Entrepreneur	Skype	25-Feb-15	25
38	Education K-12	Entrepreneur	Skype	15-Apr-15	30
39	Jewelry	SME	Phone	17-Mar-15	25
40	Higher Education	SME	Phone	23-Mar-15	20
41	Travel and Tourism	Entrepreneur/IT	Skype	27-Feb-15	18
42	Trading	Entrepreneur	Phone	01-Mar-15	20
43	Security	Entrepreneur	Skype	24-Jan-15	30
44	Information Technology	Entrepreneur/IT	Skype	04-Mar-15	25
45	Consulting	Entrepreneur	Skype	20-Feb-15	40
46	Consulting	Entrepreneur	Skype	12-Mar-15	30
47	Travel and Tourism	Entrepreneur	Face3Face	12-Mar-15	40
48	Services	Entrepreneur	Phone	17-Mar-15	25
49	Food and Beverages	Entrepreneur	Phone	14-Mar-15	30
50	Services	SME	Phone	22-Mar-15	20
51	Government	SME/IT	Skype	20-Jan-15	30
52	Trading	Entrepreneur	Skype	06-Mar-15	30
53	Manufacturing	Entrepreneur	Skype	04-Mar-15	20
54	Education K-12	Entrepreneur	Phone	22-Mar-15	20
55	Food and Beverages	Entrepreneur	FaceTime	15-Feb-15	40
56	Information Technology	Entrepreneur/IT	Skype	26-Feb-15	25
57	Accounting and Auditing	Entrepreneur	Skype	02-Mar-15	30
58	VC/Angel Investment	IT	Skype	19-Mar-15	30
59	Retailing	Entrepreneur	Skype	25-Jan-15	40
60	Development Agencies	SK	1	1	0
61	Ready-Made Garments	Entrepreneur	Face2Face	12-Mar-15	30

No.	Industry/Sector	Role/Expertise of Interviewee	Type of Interview	Date of Interview	Duration of Interview (mins)
62	Consulting	Entrepreneur/IT	Face2Face	14-Mar-15	40
63	Telecommunications	IT	Skype	05-Mar-15	30
64	Information Technology	IT	Phone	15-Mar-15	20
65	Social Media	Entrepreneur/IT	Skype	28-Feb-15	20
66	AgriBusiness	Entrepreneur	Skype	07-Mar-15	45
67	Advertising	Entrepreneur	Skype	08-Mar-15	30
68	Internet Startup	Entrepreneur/IT	Face2Face	15-Mar-15	30
69	Information Technology	Entrepreneur	FaceTime	10-Mar-15	30
70	AgriBusiness	Entrepreneur	Face2Face	20-Mar-15	30
71	Media	Entrepreneur/IT	Phone	21-Mar-15	30
72	Energy	SME	Phone	04-Mar-15	35
73	Media	Entrepreneur	Phone	15-Mar-15	25
74	Higher Education	SME	Skype	28-Feb-15	30
75	Higher Education	Entrepreneur/IT	Skype	10-Apr-15	20
76	Development Agencies	SME/IT	Face2Face	09-Feb-15	30
77	Education K-12	Entrepreneur	Skype	10-Mar-15	35
78	Food and Beverages	Entrepreneur	Skype	10-Mar-15	20
79	Retailing - Silverware	Entrepreneur	Phone	14-Mar-15	30
80	Internet Startup	Entrepreneur	Skype	25-Mar-15	30
81	VC/Angel Investment	SME	Phone	14-Mar-15	30
82	Telecommunications	Entrepreneur/IT	Phone	15-Mar-15	20
83	Shipment and Cargo	Entrepreneur	Face2Face	12-Feb-15	30
84	Media	Entrepreneur	Skype	19-Mar-15	25
85	Incubator/Accelerator	Entrepreneur	Skype	28-Feb-15	20
86	Healthcare	Entrepreneur	Phone	26-Mar-15	20
87	Internet Startup	Entrepreneur/IT	Phone	17-Mar-15	25
88	Consulting	SME/IT	Skype	10-Mar-15	30
89	VC/Angel Investment	SME	Phone	14-Mar-15	30
90	Packaging	Entrepreneur	Face2Face	30-Mar-15	25
91	Internet Startup	Entrepreneur/IT	Skype	17-Mar-15	20
92	AgriBusiness	Entrepreneur	FaceTime	02-Feb-15	40
93	Food and Beverages	Entrepreneur	Face2Face	30-Mar-15	25
94	Training	SME	Skype	12-Mar-15	30
95	Printing	Entrepreneur	Skype	11-Mar-15	30
96	Higher Education	SME/IT	Skype	03-Mar-15	18
97	Higher Education	IT	Phone	27-Feb-15	25
98	Internet Startup	Entrepreneur	Skype	10-Mar-15	20
99	Publishing	Entrepreneur	Skype	22-Feb-15	30
100	Trading	SME	Skype	18-Mar-15	25
101	AgriBusiness	Entrepreneur	Face2Face	10-Feb-15	25
102	Distribution and Logistics	SME	Skype	05-Apr-15	35
103	AgriBusiness	Entrepreneur	Phone	23-Mar-15	30
104	Information Technology	IT	Phone	04-Apr-15	20
105	Information Technology	Entrepreneur/IT	Face2Face	18-Mar-15	30