

Use of Cloud Computing in Small and Medium Size Enterprises (“Smes”) in Saudi Arabia: Opportunities and Challenges

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Cloud computing has been described as the next generation model of computing, it is a paradigm that has emerged across the world to impact every aspect of IT and in particular it affects IT users, administrators, operators, purchasers and developers. Moreover, large organizations have benefited from the Cloud on a multitude of levels and have improved the way they work drastically. SMEs, are not different than other organizations using the Cloud, because of their size and outreach, they too want to benefit from the amazing attributes such as cost reduction, rapid customer response capability and balance sheet improvement, in addition to facilitated compliance with laws and regulations. To date the Kingdom’s legislative framework, does not clearly nor comprehensively regulates the cloud or its service providers or customers. Therefore, organizations and in particular SMEs seeking to utilize Cloud services should be prepared to understand all impactful dimensions of the Public Cloud and its relationship with them in the Kingdom, from contractual obligations to development aspects of the relationship, in an attempt to provide better guidance to SMEs to fully benefit from Cloud computing. The motive of this Study is to contribute to the adoption of cloud computing and to raise awareness of the benefits of the use of the cloud amongst authorities, researchers, administrators and business enterprises within the Saudi context. The research will explore the factors encouraging the use of the cloud and the obstacles faced by the enterprises in moving to the cloud. A qualitative approach through a survey distributed among SME's was adopted in this research to identify the main reasons for adopting or not adopting Cloud computing in their business.



Key words: *Cloud Computing, Small Medium Enterprise, Kingdom of Saudi Arabia, privacy, legislation.*

Introduction

The use of information technology has penetrated all sectors of the economy, society, education, government administration and many more facets of daily life. One of the latest new technologies is cloud computing, that is implemented by numbers of institutions in either the public or private sectors. Cloud computing has been defined by the National Institute of Standards and Technology as a model for enabling convenient, on demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction” (NIST, 2011). Cloud computing may provide some benefits to the institutions; it can assist the operation of their business. However, different types of institutions, may have certain reservations in using cloud computing, especially the Small and Medium enterprises (SME’s).

Small and Medium Enterprises (SME"s) in Saudi Arabia are playing a tremendous role in the economy, generating jobs and contributing to economy growth. Under Saudi Vision 2030, Saudi Arabia plans to raise the contribution of SME's from 20% of GDP to 30% by encouraging financial institutions to allocate up to 20% of overall loans, from the current 5%. The General Authority was establishes in 2016, to develop policies, to support and promote the business enterprises, in accordance with the best international practices. Furthermore the General Authority is increasing the capacity of the Saudi economy, so that it is able to generate employment and job opportunities, also contributing to the localization of technology, as well as increasing SMEs productivity.

SME’s have been defined differently from one country to another, depending on the context in which SME’s are operating. Some scholars for instance defined SME as privately owned businesses and more specifically businesses with one (1) to (9) nine employees as small, and 10 to 99 as medium (Van der Wijst, 1989). SMEs have been defined as enterprises employing a workforce of less than 100 with a turnover below 10 million Euros (Jordan J. J Lowe & P. Taylor,1998). However, there is no common definition of SME because different authorities give different definitions to suit the objectives of their institutions. In fact, each country has defined SMEs differently as it depends on the market and its economy in which they are operating (Motwani, J., Levenburg, N. & Schwarz, 2006; Hye & Lau 2018).



In KSA there is no uniform definition of SMEs because it varies from one institution to another. For instance, Rajhi Bank defines SMEs as entities with annual sales turnover up to SR 30 million (<http://www.alrajhibank.com.sa>). Meanwhile the Saudi Arabian General Investment Authority (SAGIA) defines it as small enterprises having less than 60 employees, while Medium size companies having less than 100 employees. (<https://www.sagia.gov.sa>).

The researcher tries, in this article, to demonstrate the benefits of the cloud for SME's and to provide an overview of the challenges facing SMEs when moving to the cloud, suggesting some measures to move to the cloud with less risks. KSA Vision 2030 can be regarded as the turning point for further enhancement of the SMEs position to assist the country's development.

Moving to the cloud, benefits and risks

The use of cloud computing by business organizations has influenced the SMEs in all countries. For instance, in Australia, 44% of the SMEs (that is about 900,000 businesses) has actively used cloud computing during the first 6 months of 2013 (Aimee Chanthadavong, 2015). Other developed countries, like the United States and Japan are also moving towards cloud computing. In all EU Countries it is expected that the use of cloud computing will increase, even though the increase is not that fast compared to the USA (Haseeb et al., 2019).

A) *Benefits of cloud computing*

The recent literature revealed that the challenges faced by business enterprises could be resolved by cloud computing with a variety of advantages. Cloud computing offers lower expenses, better services standardization and greater business adaptability (Atteq Alenizi, 2018). In addition to other advantages; scalability of services, low cost and faster time. Other advantages for SME's include reduced investment in hardware, effective use of computing system in data centers, service and costs savings related to technology infrastructure and faster software upgrades with lower costs (Rath, A 2012; Islam,et .al 2018).

Despite all the benefits mentioned above, the Saudi SME's are still not convinced enough to move to cloud computing in the developing world (Gupta, P., Seetharaman, A., & Raj, J.R. 2013).In developing countries, particularly KSA, cloud computing is still not widely adopted (AlKather, N, Gary Wills & Robert Walters, 2014).

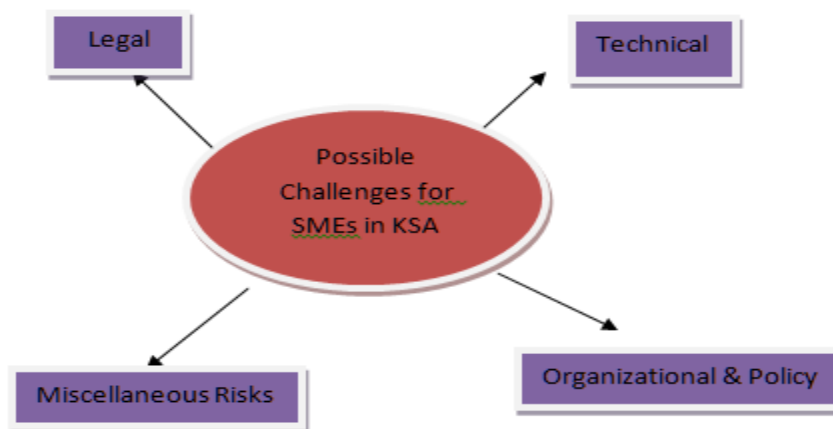
Although, cloud computing presents many advantages and benefits for the enterprises, either small or medium, many possible risks and obstacles may constitute a barrier to the use of cloud computing. The understanding of these possible risks would help the relevant interested

enterprises to be more prepared to take certain measures when they decide to adopt cloud computing. Therefore it is better to have a risk management strategy in handling the risks of the cloud computing use.

B) Risks and obstacles of cloud computing

There are many studies reporting on the challenges of adopting cloud computing, by the SMEs. Further research has to be engaged in finding out what are the actual challenges faced by the SMEs in KSA. In general, the challenges may be divided into four main groups, (i) technical (ii) organizational and policy (iii) legal& policy and (iv) miscellaneous (Khajeh-Hosseini, 2012). These challenges are summarized in the Figure below in which the studies of these challenges may involve two main frameworks namely, regulatory and administrative structures.

Figure Possible Challenges for SMEs in KSA



(a) Legal and Policy Challenges

Although cloud computing provides so many advantages, there are several issues that need to be addressed, such as privacy and security risks, which have been identified, as one of the most important risks for SME's, keeping them away from using the cloud computing in Saudi Arabia.

According to the interviewees, before moving to the cloud, they should ensure that their data is secure and that their privacy is not breached.



Whilst Saudi Arabia, under the Vision 2030, has launched many projects and initiated numerous initiatives to improve the business enterprises, the SME's are still grappling with legal issues to make use of cloud computing, due to the legal vacuum and the absence of legislation concerning privacy and data protection (Torry Harris 2015).

The Basic Law of Governance which is the Constitution of Saudi Arabia in article 40 provides protection of privacy. The protection covers privacy of telegraphic, telephonic, postal and other means of communication. It prohibits interception of private communication except for legal purposes. Similarly the Civil Service regulation in article 12 prohibits the civil servants to disclose secret or confidential information they acquired while at work. The Constitutional provisions could be applied to protect information of enterprises or individuals in the private and public sectors. These two laws could be easily applied to cover any unlawful use, collection and disclosure of information of business enterprises.

The Telecommunications Act and its Bylaws also could be applied in protection of privacy or data privacy. Article 37(7) prohibits the telecommunication service providers from intercepting data or calls carried on public telecommunication networks. Article 37(13) criminalizes intentional disclosure of information or content that has been intercepted. The bylaws in article 56(1) state that a service provider shall not disclose information, other than users' name address and telephone number, without prior consent from the users or as otherwise required by law. It also requires personnel to take all reasonable steps to ensure the confidentiality of users' communication (article 57 (1)). Article 58 (2) and (3) of the bylaws mandates the operators of telecommunication facilities and networks to respect privacy of its users.

The bylaw also states that user information shall not be collected without informing the users of the purpose for which the information is collected. It also prohibits collection, usage, maintenance and disclosure of personal information for undisclosed purposes. Thus if the telecommunication service providers are also providing cloud services for healthcare facilities or educational service facilities, they are expected, by law, to adhere to privacy or data protection rules under the Telecommunications Act and its Bylaws. Any unauthorized use, disclosure and transmission of information will be punishable by under law. This law imposes a fine not exceeding SAR 5,000,000.

The Electronic Transaction Act also mentions the privacy protection of users of the services of certification service providers. The law in article 1(11) defines "electronic data" as data with electronic features in the form of texts, codes, images, graphics, sounds or any other electronic form, either collective or separate. Article 18(5) requires the certification authority



to maintain and ensure that their staff maintains the confidentiality of information obtained in the course of business unless authorized by the certificate holders. This authorization must be either in writing or electronic form. Oral authorization is not considered as authorization under this law. Article 23 (2 -4) states the following as offence:

A certificate holder's use of information concerning the applicant, for purposes other than certification without the applicant's consent in a written or electronic form.

A certificate holder's disclosure of information accessed by virtue of his work without the certificate holder's consent in a written or electronic form, or as provided for by law.

A certification service provider's provision of false or misleading information to the Commission, or misuse of certification services.

The Saudi government has spent billions to upgrade the systems including IT infrastructure. However the absence of specific provisions on data protection leave Saudi Arabia courts with considerable discretion to deal with privacy breach complaints and these claims are dealt with according to the general sharia principles. In addition to that there is no central place where decisions are continuously indexed, collected and made available for the public. Some consider that the lack of a binding precedent system makes the situation more complex (Pearson, S., 2012).

(b) Technical Challenges

Despite all the advantages of using cloud computing for the SME there would be many possible risks that may be associated with it. The understanding on these possible risks would help the relevant interested parties. Therefore, it is better to have a risk management strategy to assess the potential risks in the use of cloud computing.

It has been determined that the risks that are associated with the use of the cloud computing for SME's are outsourcing opportunism risks. The risks are divided into several headings; namely (i) technology development risks (ii) functionality risk (iii) political risk (iv) project risk (v) technical risk and (vi) financial risk. The risks above are mainly related to three forms of deliberate, self service vendor behaviour; that are; shirking and deliberate under performance, poaching and the theft of intellectual property, proprietary software, critical confidential data, opportunistic reprising, client lock-in and vendor hold-up (Azarnik, A., Shayan,B., Alizadeh, M. & Karamizadeh, S.,2012).

Technology development risk may occur due to the adoption of different kinds of technologies to different kinds of projects or programs. Functional risks; a problem may

occur when the vendor is unsure as to the system that shall be used or the needs of the user. There may not be one single cloud for one SME. Moreover the data storage is placed in various geographical locations and it is not obvious whether they are stored inside the country or outside. The political risk is a situation where the members of an organization oppose new technology. Migrating to the cloud can reduce the number of system administrators and software developers. The inactive employees in these fields will become unnecessary; therefore companies or organizations must be careful to keep their best staff until they find new employees to replace them (Ahmad Azarnik, 2012). As for Project risks, mixing of technologies and scope of development makes implementation hard to manage. Meanwhile, the technical risk may happen when hardware or software technology becomes complex (Ahmad Azarnik, 2012). The Cloud Computing implementation may be difficult due to the existence of unsolved technical problems related to security and privacy in the client's or vendor's site. On top of that, if the project could not achieve benefits, there would be financial risk. As for the SMEs, the benefits are acceptable if they reduce the cost of system administrators and maintaining hardware and software (Jabarullah et al., 2019).

Data Analysis

Questionnaires surveying the impact of cloud computing, on SMEs in KSA, were distributed among selected Saudi SME's. The purpose of the survey is to study the challenges faced by the KSA SMEs in relation to cloud computing, to identify the deficiencies in contractual obligation of KSA SMEs in relation to the cloud, and to find out the reasons why some of the SMEs do not use the cloud computing. The questionnaires were sent through emails to several identified SMEs. However since there was no reply received from the respondents, the questionnaires later were distributed by hand to the owners of SME's, in Riyadh.

The questions in the questionnaire were divided into three (3) sections. Section A was on respondents' business demography of respondents, Section B was on the respondents' view on cloud computing in their business and Section C was on any views that respondents would like to give. Section A aiming to find out the type of business operating by the respective respondents, size of business, its capital and years of business has been operating. The structure of the questions was related to these questions:

- Did you adopt cloud computing in your business?
- The reasons for adopting cloud computing.
- Type of cloud solution that are currently used by respondents' business.
- Type of cloud services that are currently used by respondents' business.
- Whether SMEs have multiple providers.

- Functions that have been outsourced to a cloud service provider.
- Challenges faced by SMEs in adopting the cloud computing.
- Whether the SMEs have written contract for cloud computing.
- Whether the respondents are aware of the terms of contract for cloud computing.
- Terms that are available in contract for cloud computing.
- Reasons for not adopting the cloud computing.
- Type of cloud solution that SMEs are interested to use.
- Type of cloud services that respondents are interested to use.

Fifty one SME's have taken part in this survey. From the survey, fifty one SME's companies came from different business backgrounds. 30% of the SME's came from manufacturing, followed by 23.5% from the commercial sector, and 21.6% from other sectors which were made up of pharmaceutical companies, the food industry, the perfume industry and others. The smallest group of businesses are from the agriculture sector with 3.9%. The details of the type of business of respondents are shown in Figure 3 below.

Figure 3. Types of Business of the Respondent

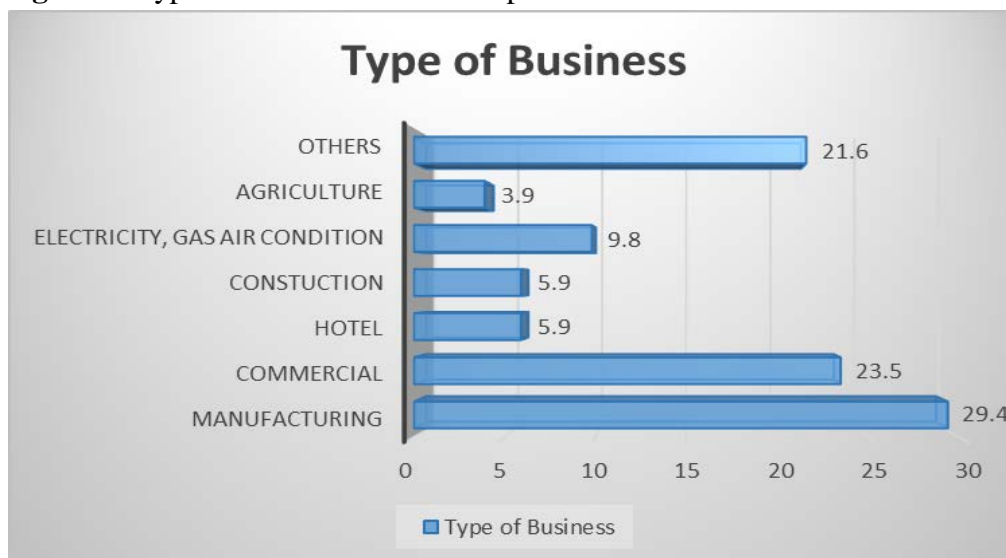


Figure 4. Size of Business of the Respondents

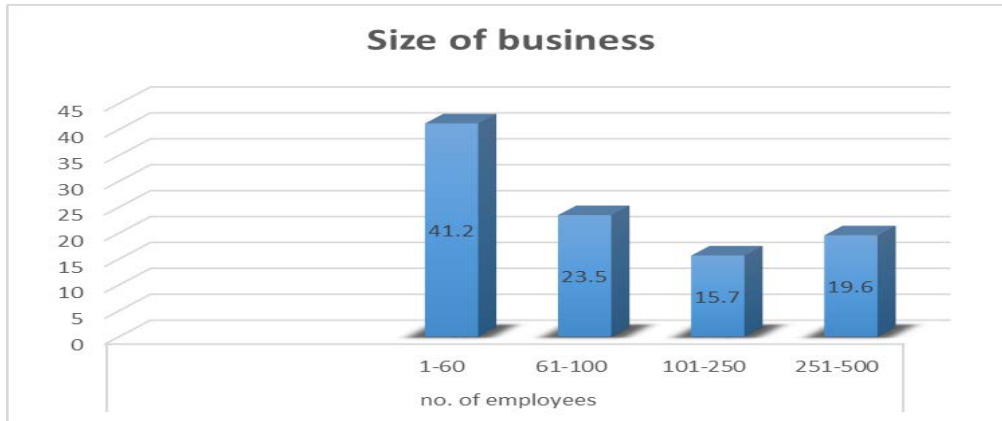


Figure 4 above illustrates the demographic profiles of the SME's companies that participated in this survey. Almost 65% of the SME's companies have a small business size; with less than 100 employees in the company followed by 20% of businesses with a number of employees between 251 to 500 employees and the remaining with 101 to 250 employees in each company.

In term of the age of the SMEs; Figure 5 shows that 61% of the SME's have been in the industry for more than 5 years.

Figure 5. Number of years the respondents has operated its business

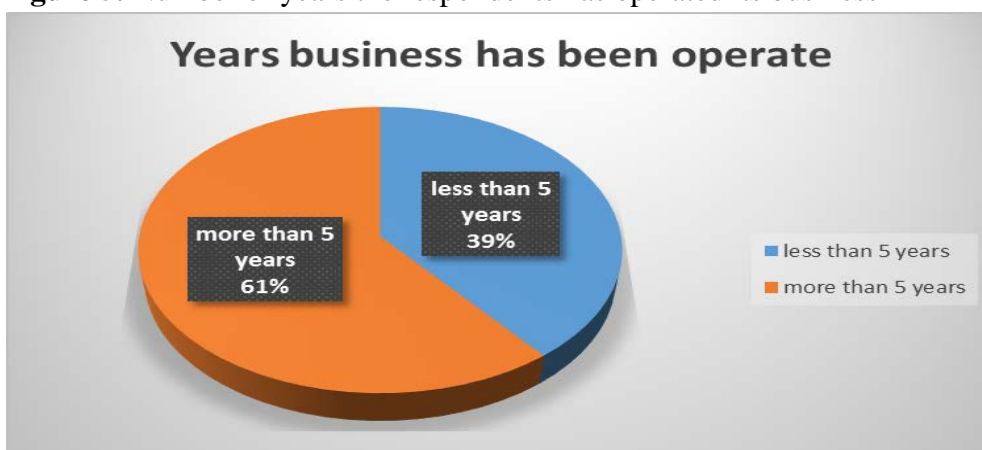


Figure 6. The Capital Amount of Business of the Respondents

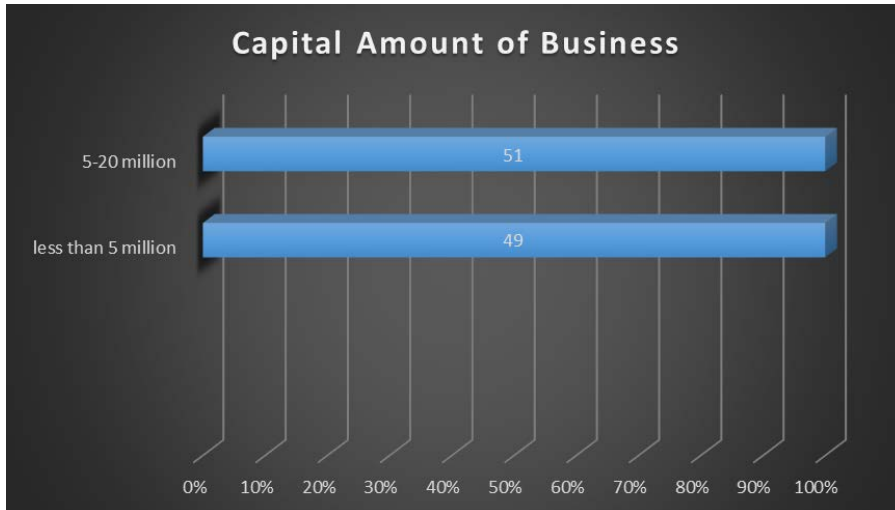
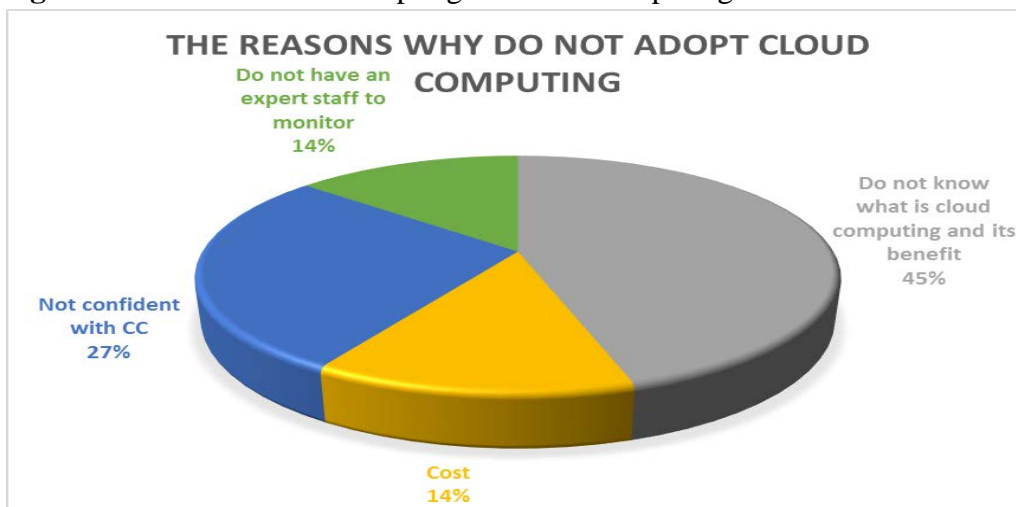


Figure 6 above shows the capital amount of business among the SME's. From here it can be seen that almost equal percentages where 51% of respondents have a capital amount of 5 to 20 million while 49% of the remaining SMEs have a capital amount of less than 5 million.

Surprisingly, not all the respondents that took part in this survey have adopted cloud computing in their businesses. The reason why they do not use cloud computing in their businesses is demonstrated in the Figure 7 below.

Figure 7. Reasons for not Adopting the cloud computing



45% of the respondents do not use cloud computing in their businesses because they do not have the knowledge, do not know exactly what cloud computing is and the benefits of using it in their businesses. Further, the other 27% of respondents said that they are not confident with cloud computing. The other two groups, with 14% of respondents each, voted for the cost and also lack of expertise to handle the system as the reasons why they do not adopt cloud computing in their business. Thus even if the majority of the respondents' businesses have been operating for more than five years, they still do not use cloud computing. The majority of the respondents are having more than 5 million worth of capital in their business, but still the respondents are not using the cloud computing systems.

Figure 8. The type of cloud computing the respondent would like to use

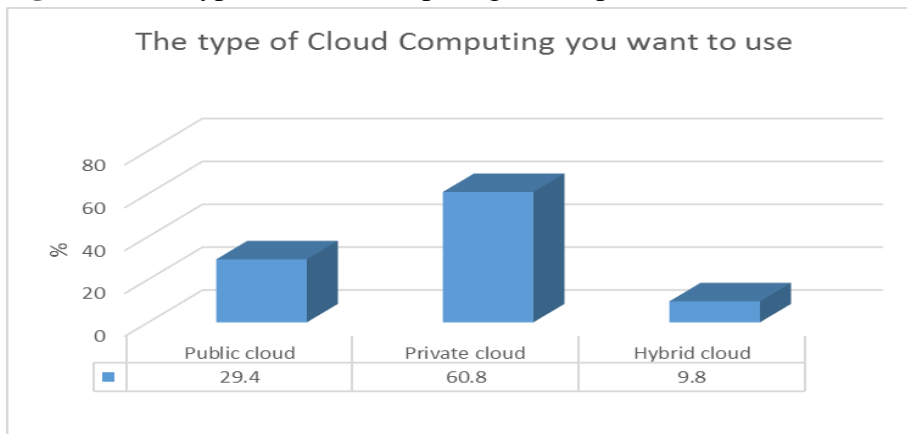


Figure 8 above shows the type of cloud computing the respondents want to use for their company. 60.8% of the respondents choose to use a Private Cloud, followed by 29.4% which choose to implement a public cloud and the remaining respondents choose to adopt hybrid types of the cloud in their businesses.

Table 3: Cloud computing services the respondents would like to use

| | Percent |
|-------------------------------------|---------|
| Individual software package | 2.0 |
| Infrastructure service | 5.9 |
| Software, hardware & infrastructure | 47.1 |

| | | |
|--|---|------|
| | Complete operating system & software package available via Cloud services | 45.1 |
|--|---|------|

Table 3 demonstrates the cloud computing services that respondents want to use in their business. From there, we can see that, 47.1% of them want to use the service of software, hardware and infrastructure, followed by services of complete operating system and software package available via cloud services (45.1%), Infrastructure service (5.9%) and Individual software package (2%).

Table 4 below shows whether the respondents plan to have multiple providers. Based on the survey conducted, almost 70% do not plan to have multiple providers while 30% of them do.

Table 4: Plan to have multiple provider

| | | Percent |
|--|-----|---------|
| | Yes | 31.4 |
| | No | 68.6 |

Figure 9. The function the respondents plan to outsource to cloud service provider

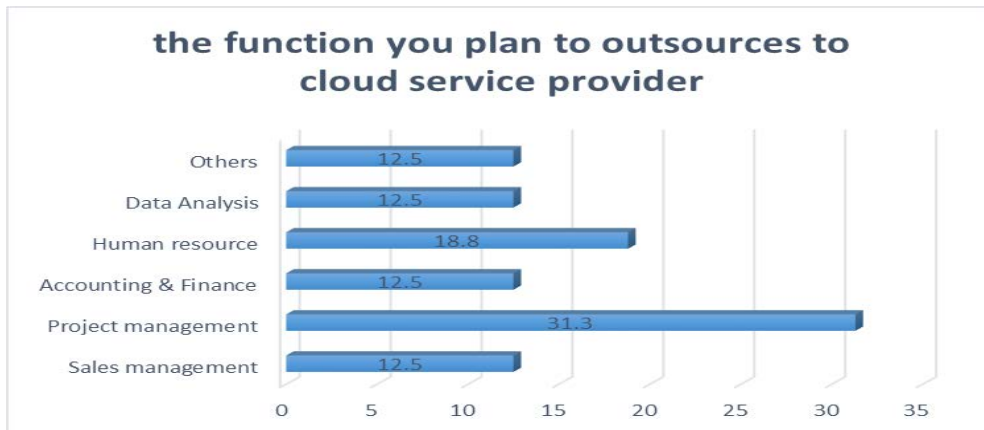
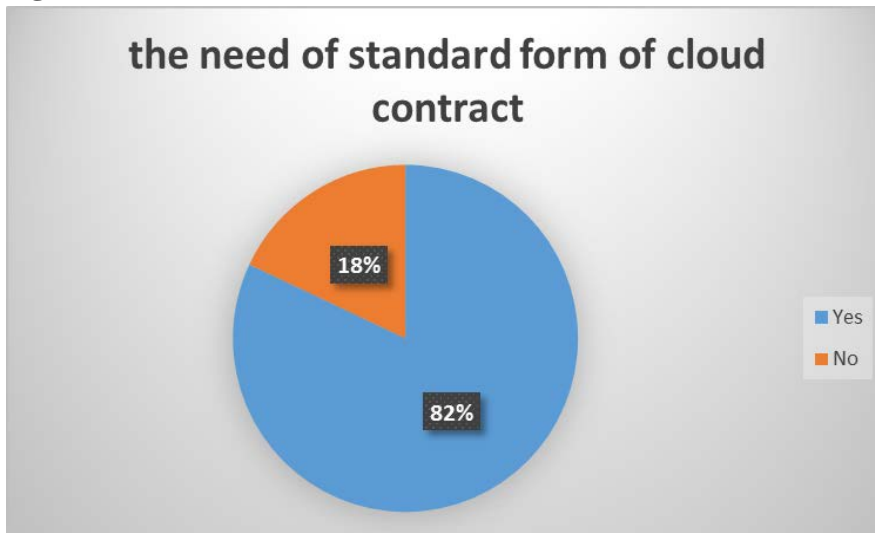


Figure 9 shows the function the respondents plan to outsource to cloud service provider. Among the 30% of respondents that plan to use multiple providers, 31.3% of them plan to use cloud service providers to outsource the project management of the company. This is followed by outsourcing the human resources (18.8%), accounting and finance (12.5%), sales management (12.5%), data analysis (12.5%) and others (12.5%).

Figure 10. The need of standard form of cloud contract



From Figure 10 above, we can see that 82% of the respondents agree that the standard form of cloud contract is essential for business with only 18% of them opposed to this idea. It shows that even if the respondents do not use the cloud computing systems, they plan to use cloud computing in the future and understand that there is a need to have a standard form of contract to protect their interest when using cloud computing for their businesses.

Conclusion and Recommendations

Cloud computing has been growing rapidly. It offers significant advantages, yet carries potential fallacies as well. Cloud computing seems to be worth exploring for small and medium enterprises to large companies. It offers potential opportunities for improving businesses, however many challenges are preventing SMEs from moving to the cloud. Perhaps the strongest resistance to the adoption of cloud computing, in Saudi SME's, concerns security and data privacy risks. One should note that cloud computing has reached a level of maturity to be fully exploited economically, however until now Saudi Arabia has a vacuum in the legislation as to privacy and data protection, which leaves the courts with full discretion as to the application of specific laws in cases of data privacy violations.

The use of cloud computing will enable SMEs to compete with the giant companies in the industry. Even with a lesser number of labour and limited capital, SMEs may use the service of cloud computing to provide equal or even better business opportunities.



Data storage is unlimited when using cloud computing, thus the SMEs do not have to worry about additional costs for this purpose. It can be expanded from time to time depending on the growth of the enterprises.

It is expected that the cloud software is updated, thus this would minimize the operational cost for enhancement of the software. The SMEs may find that the data is accessible at any time and at any place, this would make the business operation more flexible.

There is doubt and less confidence, from the owners of SMEs, on the extent of data protection for security when using the cloud. It is possible that some of the SMEs owner do not realize that they actually use the cloud computing in their enterprise, as they do not understand what the cloud is according to the findings.

The survey conducted in KSA had shown that the majority of SMEs do not understand what is meant by cloud computing even though their capital is quite big. The survey result have shown that the main reasons for not adopting the cloud computing is because SMEs do not understand what cloud computing is. This is followed by not having the expert staff to handle the technology. Thus technology readiness is described as the IT infrastructure available to an enterprise to obtain cloud services, the technology readiness positively influences cloud computing adoption. (A. Rahimli, 2013). The survey also shows that the SMEs want to have the standard form of contract and this is referred to as the service level agreement (also known as a contract service agreement).

The survey results give indications that there is a need to educate SMEs in the KSA on the importance or benefit of cloud computing. As such, there is the potential for cloud service providers to target groups with a series of workshop and campaign in KSA.

On the basis of our research on the use of cloud computing by the Saudi SME's, we observed that Saudi Arabia should move to the cloud as a strategic enabler for delivering timely and effective IT services for Saudi SME's. However, before moving completely to the use of this new technology, the risks should be assessed with regards to the trust of Cloud Service providers for the security of sensitive information of business enterprises, and the consumer should be fully aware in order to avoid any problem as to the violation of data protection. In addition, a comprehensive law on privacy and data protection should be put in place to protect the safety of individual's personal data against any misuse or theft of data. Since Saudi Arabia does not have a comprehensive legislation on data privacy, the researcher is looking into the European style of data protection with a view to adopting its provisions to regulate the collection, possession, processing and use of personal data by the data user



(individual, organization and government). By providing safeguards to the data, the government could promote confidence among the consumers, business enterprises and the users.

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