

# Impacts and Challenges of Cloud Computing for Small and Medium Scale Businesses in Nigeria

#### Scholastica Nwanneka Mallo<sup>1</sup>, Prof. Francisca Nonyelum Ogwueleka<sup>2</sup>

- 1- Phd Student at Department of Computer Science, Nigeria Defence Academy, Kaduna, Nigeria (scholasticaoguejiofor@nda.edu.ng).
- 2- Faculty of Military Science and Interdisciplinary Studies, NDA, Kaduna Nigeria

Received (2019-02-21)

Accepted (2019-06-21)

Abstract: Cloud computing technology is providing businesses, be it micro, small, medium, and large scale enterprises with the same level playing grounds. Small and Medium enterprises (SMEs) that have adopted the cloud are taking their businesses to greater heights with the competitive edge that cloud computing offers. The limitations faced by (SMEs) in procuring and maintaining IT infrastructures has been handled on the cloud platform for the SMEs that adopt it. In this research, the impact and challenges of cloud computing on SME's that have adopted it in Nigeria has been investigated. The impacts identified ranges from provisioning IT infrastructures, reshaping and extending business values and outreach to giving competitive edge to businesses subscribed to it. Though Cloud computing has many benefits; however, it is not without some pitfalls. These pitfalls include data vulnerability, vendor lock-in, limited control over the infrastructure by the subscribers etc. To investigate the level of impacts and challenges being faced by SMEs in Nigeria on the cloud platform, questionnaires were administered to managers and employees of about fifty SMEs that have deployed cloud. The data collected were analyzed using Statistical Package for Social Sciences (SPSS), from which appropriate recommendations were made.

Keywords: Challenges, Cloud Computing, Impacts, SME

#### How to cite this article:

Scholastica Nwanneka Mallo, Prof. Francisca Nonyelum Ogwueleka. Impacts and Challenges of Cloud Computing for Small and Medium Scale Businesses in Nigeria. J. ADV COMP ENG TECHNOL, 5(3) Summer: 169-180

#### I. INTRODUCTION

lobalization has brought a lot of Jintegration and interaction of countries, companies, and people across the globe and according to UNESCO, the process is driven economically by international financial flows and trade, technologically by information technology, and very significantly, also by very human means such as cultural exchanges, migration and international tourism[1]. These have been the driving forces of digital evolution. A lot of digital transformations are taking place and it is affecting the way societies and businesses work. With these digital transformations, come new technological insights that enable organizations to give their users and customers pioneering services that are available at any time and on any device [2]. There is need for organizations to innovate and operate more efficiently, make better use of available resources, spread their outreach, become more flexible and improve profitability. Cloud technology is making this digital transformation possible. The cloud provides continuous access to the key pillars of digitization. It offers flexibility, automation, scalable computing and data resources which are available from anywhere for businesses [3].

Cloud computing, according to NIST, is

a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [4]. It is a specialized form of distributed computing that introduces utilization models for remotely provisioning scalable and measured resources [5]. Using the name "cloud" as an acronym, [6] has defined cloud computing as standing for Common, Locationindependent, Online Utility that is available on Demand. Through cloud computing, services like servers, storage, databases, networking, software, analytics, and more, are delivered over the internet [7].

The first cloud computing services are barely a decade old, but already a variety of organizations ranging from tiny startups to global corporations, agencies to non-profits government embracing the technology for all sorts of reasons ranging from, cost reduction, speed, global scale, higher productivity, to being highly reliable [8]. The typical cloud platform is composed of five essential characteristics, three service models, and four deployment models [4].

Some of the cloud based services are; Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Human Relationship Management, Messaging Application, Project management (PM) etc [9]. There is also cloud manufacturing (CMfg) services, whereby multinational manufacturing factories virtualize and turn their manufacturing resources into a scalable resource pool through which they can provision to other enterprises. The resources that can be provisioned in CMfg include; machinery tools, software like CAMs, management capabilities, product evaluation capabilities etc. and these can be accessed from anywhere in the world [10].

The core foundation of cloud computing is the delivery of services, software and processing capacity using private or public networks while the focus is solely on user experience. That is, to decouple the delivery of computing services from the underlying technology is the very essence of cloud computing [11]. Small and Medium scale Enterprises are cashing into the benefits that abound on the cloud platform by outsourcing

their information technology, accounting, Customer Relationship Management (CRM) and other business related needs etc to the cloud, thereby cutting down hugely, on their capital expenses while focusing on enhancing, reshaping and achieving their business goals and objectives. In a nutshell, the basic idea of cloud computing is that computing will become location and device independent, meaning that it increasingly will not matter where information is housed nor where computational processing is taking place. This enables computing tasks and information to be available anytime, anywhere on any device as long as there is access to the internet [12].

In view of the above, this research seeks to look into the impacts and challenges of cloud computing on SMEs that have deployed cloud technology in Nigeria and how some of the challenges can be handled. It described the mode of operation of the SMEs within the area under study before clouds were deployed in section. The benefits of adopting cloud computing on SMEs were discussed in the section 'Impacts of cloud computing on SMEs'. The Challenges of cloud computing section describes the shortfall and hitches experienced in the cloud. Research methodology section describes the survey carried out on SMEs that have adopted cloud concerning their cloud experience while the data analysis section analyzed and discussed the result and findings of the investigation. In the conclusion, recommendations were made on improving the cloud experience of the users.

#### II. PURPOSE OF THE RESEARCH

Out of 300 SMEs investigated in a research on Cloud Computing Awareness and Adoption Among Small and Medium Scale Businesses (SMB) in Nigeria, 163 (54.3%) of them use Cloud Computing [13]. Therefore the purpose of this research is to investigate the impact and challenges of cloud computing on Small and Medium enterprises that have adopted it in Nigeria. This research will be answering the following questions;

1. What was the business experience of these enterprises before they adopted cloud computing?

- 2. For the businesses that has adopted cloud computing, has it delivered on the expectations?
- 3. What are the challenges the SMEs face while using the cloud platform for their businesses and how can they be mitigated?

Due to the limited period of time assigned to this research, only one hundred (100) SMEs will be investigated in the course of this research.

# III. REVIEW OF RELATED LITERATURE

Cloud computing fundamentally challenges what use to be regarded as a computer. Over the past 50 years, there have been trends in computing. It started with the mainframe era of the 1960s, advanced to the minicomputers in the 1970s, and then to the personal computer in the 1980s, it came to what looked like the climax with the growth of the Internet and the web in the 1990s, and also the explosion of cell phones and other smart, web-connected devices in the past 10 years. However, with the expansion of the cloud, future consumers may need machines with only the ability to drive basic functions such as a screen, keyboard, and Internet browser. In this manner, cloud computing represents a shift from a device-centric system to an information-centric system [14]. From an organizational viewpoint, cloud computing simply represents architecture in which companies consume technology resources as-a-service rather than as an owned system [15]. Adoption of public cloud architectures shows no signs of slowing down as the latest market forecasts suggest the sector is set to grow 23.2% in 2018 from 2017, reaching \$160bn in revenues [16].

The emergence of cloud computing as a computing style has already changed how IT delivers economic value to individuals, businesses, countries and industries [17]. Research has shown that, the major reasons for cloud emergence are rapid growth of computer and communication technologies, technological growths in computing and computing devices and in the data communication [18]. Availability of excess computing capacities with giant corporations such as Amazon, Google, Microsoft etc. and continued innovation in cloud computing has caused radical changes to work practices [17].

This is also the case with the emergence of Cloud Manufacturing (CMfg) which allows the use of distributed manufacturing resources over the internet [10]. Also, cloud computing has broadly moved to treat information technology (IT) services as a commodity with the ability to dramatically increase or decrease capacity to match usage needs [19]. In other words, cloud computing has essentially, moved IT capabilities away from individual computers and servers to centralized providers that manage IT resources for their users via the Internet [14].

The core of cloud computing is that computing services are delivered over the internet, on demand, from a remote location, rather than residing on one's own desktop, laptop, mobile device, or even on an organization's servers [14]. Cloud computing seeks to replace the large databases and servers maintained by many companies and government agencies with Internet-based solutions, and this have potential cost savings and security benefits [20]. Many organizations have turned to cloud computing services for data processing, storage and backup, to facilitate productivity, for accounting services, for communications, or for customer service and support since it offers many potential benefits to enterprises.

For SMEs, due to huge concentration of competition among them, they have to make strong and aggressive moves to differentiate their products and services from their rivals in order to strengthen their position in the market. SMEs have the same complex IT needs as those of large enterprises, but premised IT infrastructure is often a big monetary investment for them. The larger competitors with abundant budget, capacity, and expertise can afford to take such a huge risk. A decision to outsource IT and other needs to the cloud platform can help SMEs reap the benefits thereof without having to spend significant funds as they would have on premised IT infrastructure and also increase their competitiveness with big enterprises. Employing cloud computing as part of their overall strategy will allow SMEs to focus more on their core business value [21].

Implementing information technology solutions and platforms can be complex and costly for SMEs but cloud computing can help ease this burden by enabling SMEs to access services that they might not have the money or resources to

implement or support on their own. This change will also require business and IT professionals to learn and leverage new skill sets. organizations may employ cloud computing solutions as part of their overall business strategy, but before then, it is recommended that SMEs follow a three-phased cloud adoption strategy whereby companies firstly learn about cloud technology and analyze the applications and services they may need, secondly, they document the internal processes that would be affected by cloud computing technology and finally, they map applications and workloads to associated cloud services [22]. Also to assist in decision making before adoption of cloud computing technology, a study has evaluated the CRM services of top ten SaaS providers by analyzing and comparing their strengths and weaknesses [23]. The result of this analysis could be used in decision making by SMEs. Reference [24] has shown that SMEs can easily customize and streamline their needed applications on the SaaS platform with so much ease than would have been on the traditional computing environment.

# IV. Analyzing the Mode of Operation of SMEs before the Adoption of Cloud Computing

Small and medium-sized enterprises or small and medium-sized businesses are businesses whose personnel numbers fall below certain limits. In Nigeria, the classification of business enterprise as Micro, small or medium is as shown in the table below;

Table 1: Classification Adopted by National Policy on Micro, Small and Medium Enterprises (MSMEs)

S/N	SIZE CATEGORY	EMPLOYMENT	ASSET(MILLION N) (Excluding lands and building)
1	Micro Enterprises	Less than 10	Less than 5
2	Small Enterprises	10 - 49	5 – Less than 50
3	Medium Enterprises	50 - 199	50 - Less than 500

Source: SMEDAN (2007)

Small and Medium scale Businesses are a very important part of the Nigerian economy as studies has shown that approximately 96% of Nigerian businesses are SMBs [25]. Businesses within this category range from manufacturing, automobiles, transportation, hotel and recreation, building and construction, information and communication technology etc. SMEs have been acknowledged as the critical breeding and nurturing grounds entrepreneurial domestic capacities, technical skills, innovativeness and managerial competences for private sector development [26]. They are the foundation and the dominant force for the growth of any country's economy [24].

Traditionally, SMEs use IT to solve basic businesses requirements such as sending mails, maintaining information database and managing their project through project management software applications [27]. Apart from IT needs, they also have accounting, customer management requirements to fulfill. To meet the above needs, SMEs have to invest a substantial upfront in both infrastructure and personnel. Physically installed hardware, and locally maintained software is often employed to satisfy their information technology requirements. Also, they make use of off-the-shelf hardware and open source software. The software would normally run on their desktops and other computing devices. As the years go by, depreciation sets in and the need for replacement of these devices as well as upgrading, and installation of security patches to these tools become inevitable and add to their operational costs. Most often, SMEs lack financial resources and have to do a thorough cost benefit analysis before allocation to any IT budget [28]. It goes on like this from year to year and can the limit the performance of SMEs. While it is advisable for SMEs to adopt cloud computing technology, it is also necessary to consider some delicate factors prior to that so as to enable them have a good cloud experience. These factors include Consultation with Management, Business Process Planning and Cost [22].

## **IV. Impacts of Cloud Computing on SMEs**

Most agree that cloud computing could become the key delivery model for computing by 2030. Reference [17] in their research sponsored by Microsoft found that more than half of enterprises worldwide felt cloud computing was a high IT priority. Cloud computing offers the government, organizations and individuals an opportunity to be more efficient, agile, and innovative through more effective use of IT investments, and by applying innovations developed in the private

sector [19]. It democratizes IT implications for SMEs through the various advantages it offers to businesses as it has high potentials to generate significant financial and operational benefits for

small businesses [22]. Cloud computing service provides the fastest way to make a revolution in IT, with low costs, agility, flexibility and scalability [29]. SMEs are not left out in this trend. Presenting

**Table 2: Impact of cloud computing on SMEs** 

Impacts	Descriptions
Cost Reduction and	Increased Cost Efficiency is a major benefit from cloud computing. Businesses can
Control	do away with arbitrary up-front costs and start using applications straight away on
	pay as you go basis [30].
Tangibly enhances business value	IT professionals can devote more energy to enhancing the value of using IT for their enterprises and less on the day-to-day challenges of IT [11]. This frees them up to focus on what matters most which is their business objectives [31].
IT services to be traded as a commodity	Cloud computing services can be traded as a commodity. The evolving cloud buyers, cloud providers and also a rapidly developing resale chain in between is a proof to this [32].
Scalability	Cloud-based services are ideal for businesses with growing or fluctuating bandwidth demands. As needs increase, cloud capacity can easily be scaled up, drawing on the service's remote servers, likewise when the need to scale down arises [33].
Always on Service	Most providers offer a Service Level Agreement which guarantees 24/7/365 and 99.99% availability.
Competitiveness	Moving to the cloud gives access to enterprise-class technology, for everyone – small and large business enterprises alike and this gives a competitive edge to SMEs.
Document control	When cloud computing platform is employed, all files are stored centrally and everyone sees one version of it.
Work from Anywhere	Cloud applications are designed to be accessed securely from anywhere via any connected device helping businesses to offer more flexible working perks to employees so they can enjoy the work-life balance that suits them [33]
Increased Collaboration among team members.	Cloud-based workflow and file sharing apps help teams make updates in real time and this gives them full visibility of their collaborations [34].
Disaster Recovery and	Cloud computing gives greater security when computers and other computing
Data Protection	devices are lost because data are stored in the cloud, and can be accessed no matter what happens to premised machine. Data on the lost device can be remotely wiped off before getting into wrong hands [33]
Competitiveness	Moving to the cloud gives SMEs access to enterprise-class technology, for everyone – small and large business enterprises alike leading to businesses being very competitive.
Efficiency	With a managed service platform, cloud computing is much more reliable and consistent than in-house IT infrastructure.

# **VI.Challenges of Cloud Computing**

SMEs are increasingly aware of the business value that cloud computing brings and most of them are taking steps towards transition to the cloud. A smooth transition entails a thorough understanding of the benefits as well as challenges involved. Like any new technology, the adoption of cloud computing is not free from issues. Some of the peculiar challenges are as follows;

**Table 3: Challenges of Cloud Computing** 

Challenges	Description
Availability of IT Personnel Experienced in Cloud Technology	IT hiring managers' report that the biggest reason they fail to fill open requisitions for cloud-related IT jobs is the candidates' lack of sufficient
Zipotonou in cicuo rominologi	experience, training, or certification [17]. For cloud computing, the availability of skilled IT workers will be a persistent and pervasive challenge.
Security	The information housed on the cloud is often seen as valuable to individuals with malicious intent [12]. The residence of valuable data outside the enterprise firewall is a great risk and matter of serious concerns.
Availability and Reliability of	Cloud providers still lack round-the-clock service and sometimes they
Services	experience outages [35]. High Availability (HA) and Reliability of cloud computing services have been identified as some of the hot challenges in using cloud technology. Moreover, cloud service providers take care of a number of clients each day, and thus can become overwhelmed and may even come up against technical outages [36].
Vendor	Businesses often times do not have the leverage of migrating in and out
Lock-in	of the cloud and switching providers whenever they want.
Limited Control	Cloud infrastructure is entirely owned, managed and monitored by the service provider; it transfers minimal control over to the subscribers [20].
Measuring Return on Investment (ROI)	Reference [22] pointed out measuring of ROI as one of the challenges that face SMEs using cloud computing technology and also recommended a performance metrics that can help establish benchmarks for checkmating impacts of cloud.

these impacts of cloud in a tabular form we have:

There is no doubt that businesses can reap huge benefits from cloud computing. However, with the many benefits, come some drawbacks that need to be addressed, some researchers have proposed some solution to some of these prevalent problems. There has been proposed a Cloud Computing Services Negotiation (CCSN) model that will enable both the providers and subscribers to reach agreement [37]. SaaS providers of CRM can improve the Scalability and Stability (S & S) factors by using enhanced hardware configurations which includes higher bandwidth, powerful data centers and more storage space [23].

## VII. RESEARCH METHODOLOGY

This research is aimed at casting light on current issues and problems through a process of data collection that enables an almost complete description of the situation than would have been possible without employing this method; therefore, descriptive research approach is hereby adopted for this research. This approach is effective in analyzing non-quantified topics and issues,

offers the possibility to observe the phenomenon in a completely natural and unchanged natural environment, the opportunity to integrate the qualitative and quantitative methods of data collection and is less time-consuming than quantitative experiments [38]

## VIII. METHOD OF DATA COLLECTION

Questionnaires have been used as the tool for data collection for this research. The questionnaires were distributed among managers, as well as among carefully selected employees of several SMEs that have deployed cloud computing. Questionnaires were chosen for this research because they are a reliable and quick method to collect information from multiple respondents in an efficient and timely manner. This is especially important for research studies with several objectives, and also where time is one of the major constraints. A general disadvantage of the questionnaires however is their fixed and strict format, which eliminates the possibility for more in-depth or abstract observation [39].

The questionnaire for the managers from the companies consisted of twenty open questions,

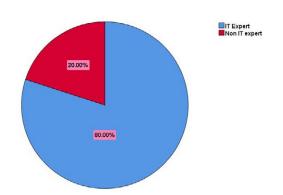
related to their business performance and challenges with cloud platform. The first part of the questionnaire consisted of demographic questions, related to age, gender, and questions related to the professional role of the participants, such as length of their experience with the use of cloud computing. The core questions were divided into groups for clarity, addressing the main objectives of the research. The questionnaires used are both in open and closed ended format, dichotomous type (yes or no) and in a five point Likert scale structure. The scaling is as follows: 5= Strongly Agree (SA), 4 =Agree (A), 3 =Neutral (N), 2 = Disagree (D) and 1 = Strongly Disagree (SD) in that order or in reverse.

# IX. DATA ANALYSIS

The analysis of the questionnaire results was done using Statistical Package for the Social Sciences (SPSS).

#### **Distribution of Respondents**

Questionnaires were distributed to a total of fifty (50) managers and One hundred employees (100). In the managers' category, 80% are IT specialists while 20% were not. This is shown on figure 1 while figure 2 shows the distribution of the employees according to their specialization. 84% were IT Specialists, 6% were Non IT staff while 10% were IT interns



Distribution Figure1: of Managers based **Specialization** 

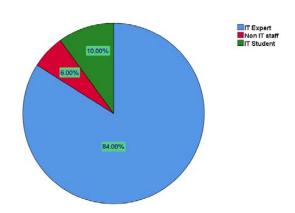


Figure2: Distribution of **Employees** based Specialization.

The respondents were also assessed based on their year of experience in cloud technology and the distribution is as shown in figure 3 for manager and figure 4 for the employees

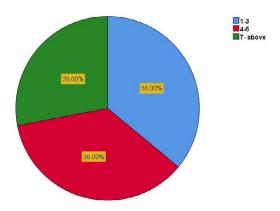


Figure3: Distribution of Managers Based on Years of **Experience in Cloud Technology** 

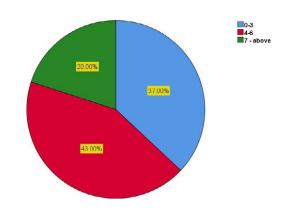


Figure 4: Distribution of Employees based on Years of **Experience in Cloud Technology** 

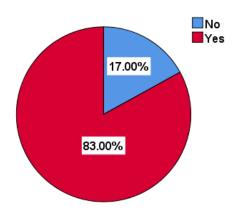


Figure 5: Level of Deployment of Cloud Technology by **SMEs** 

It was also discovered that 83% of the businesses surveyed have fully deployed cloud services for their businesses while 17% have partially deployed cloud services. The distribution is as shown in figure 5

# X. Analyzing the business experience of the SMEs before Cloud was deployed.

Ninety four percent of the respondents in managers' category agreed that they had server within their business premises before deploying cloud computing while six (6%) percent were neutral. This is shown in Table 4

Table 4: Distribution of responses of SMEs with Premised Servers

				Cumulative
		Frequency	Percent	Percent
Valid	Neutral	3	6.0	6.0
	Agree	15	30.0	36.0
	Strongly Agree	32	64.0	100.0
	Total	50	100.0	
Total		56	100.0	

# XI. Analyzing the Impacts of Cloud Computing on SMEs

Among the SMEs investigated, ninety four percent (94%) agreed that cloud computing has given them a competitive edge in their businesses. 84.1% agreed that the targeted Return on Investment (ROI) has been actualized. This was tested using cross tabulation of SMEs whose businesses are fully cloud based against variables on ROI and competitive edge. The distribution is

Table 5: Distribution of Responses Having Competitive Edge with Cloud

			Neutral	Agree	Strongly Agree	
SMEs Fully On	No	Count	0	2	4	6
Cloud		% Fully On Cloud	0.0%	33.3%	66.7%	100.0%
	yes	Count	3	13	28	44
	•	% Fully On Cloud	6.8%	29.5%	63.6%	100.0%
Total		Count	3	15	32	50
		% Fully on Cloud	6.0%	30.0%	64.0%	100.0%

Table 6: Distribution of Responses on meeting Targeted ROI

			Strongly				Strongly	
			Disagree	Disagree	Neutral	Agree	Agree	Total
SMEs	No	Count	0	0	2	3	1	6
On		% For SMEs Partially on	0.0%	0.0%	33.3%	50.0%	16.7%	100.0%
Cloud		Cloud						
	yes	Count	1	1	5	20	17	44
		% For SMEs Fully on	2.3%	2.3%	11.4%	45.5%	38.6%	100.0%
		Cloud						
Total		Count	1	1	7	23	18	50
		% within Fully On Cloud	2.0%	2.0%	14.0%	46.0%	36.0%	100.0%

#### as shown in tables 5 and 6

			Asymptotic Significance
Chi-Square Tests	Value	df	(2-sided)
Pearson Chi-Square	2.825a	4	.588
Likelihood Ratio	2.781	4	.595
Linear-by-Linear	.736	1	.391
Association			
N of Valid Cases	50		

7 cells (70.0%) have expected count less than 5. The minimum expected count is .12.

The responses shown in figure 6 depict that the expected increase in ROI by businesses that have deployed cloud are actualized.

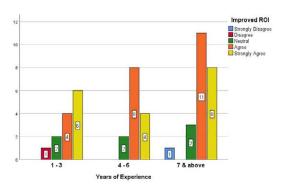


Figure 6: Distribution of the Managers responses on Improved ROI with cloud

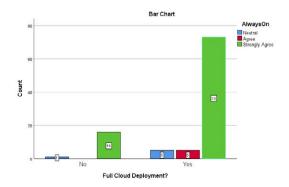


Figure 7: Distribution of the Managers Responses on **Cloud Services Being Always On** 

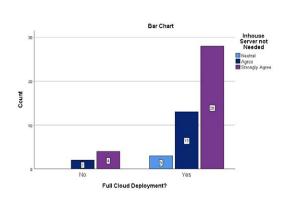
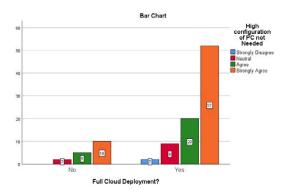


Figure 8: Shows Responses of the Manager on Premised Server being Needless.



**Figure** 9: Distribution of Responses on High Configuration of PC being Needless

# XII.Analyzing the Challenges of the SMEs on the Cloud Platform

To analyze the challenges that SMEs experience in the cloud platform, the security concerns, prompt customer support, and availability of IT personnel variables were cross tabulated against the years of experience of the managers within cloud enabled businesses. Among the manager with 1-3 years experience, 7.7% were neutral on security breach on the cloud platform, while 92.3% agreed that their company's data are at higher risk of malicious attack on the cloud. For those with 4-6 years experience within the cloud environment, 14.3% were neutral while 85.7%

agreed that their data was more vulnerable to malicious attack on the cloud. Among those with seven or more years experience on the cloud, 17.4% were neutral while 82.6% agreed that their data breach is a challenge on the cloud platform. The result of the test is shown on Table 7 and also on Figures 10 and 11.

Table 7:	Distribution of	Responses 1	for Security	Concerns on the cloud.

			Neutral	Agree	Strongly Agree	Total
Years of	1_3	Count	1	Agree 3	Strongly Agree	13
	1-3	Count	'	<u> </u>	9	13
Experience		Expected Count	1.8	2.3	8.8	13.0
		% Years of Experience	7.7%	23.1%	69.2%	100.0%
	4-6	Count	2	2	10	14
		Expected Count	2.0	2.5	9.5	14.0
		% within Years of	14.3%	14.3%	71.4%	100.0%
		Experience				
	7	Count	4	4	15	23
		Expected Count	3.2	4.1	15.6	23.0
		% within Years of	17.4%	17.4%	65.2%	100.0%
		Experience				
Total		Count	7	9	34	50
		Expected Count	7.0	9.0	34.0	50.0
		% within Years of	14.0%	18.0%	68.0%	100.0%
		Experience				

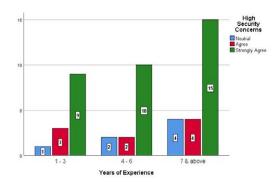


Figure 10: Distribution of Responses on Security Concerns in the Cloud

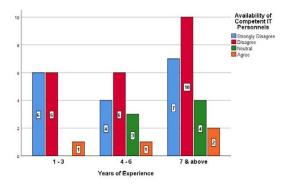


Figure 11: Distribution of Respondents on **Availability of Competent IT Personnel** 

#### XIII. Discussion

From the above analysis, it could be seen that cloud computing platform has a lot to offer SMEs. It is a big shift from the way businesses were traditionally run. It takes the burden of provisioning and maintaining IT infrastructure away from SMEs provides a platform for them to extend their outreach while leaving them to concentrate more on achieving their business objectives. However, it is not without some challenges. Businesses are advised to do some feasibility studies and consultations before the adoption of cloud services. They are to liaise very well with their providers and ensure they are given explicitly defined Service Level Agreement (SLA). Moreover, following some of the proposed models on Cloud Computing Services Negotiation (CCSN) will help both the provider and the subscriber reap mutual benefits. Concerning security issues, SMEs that have adopted cloud and those intending to adopt it are hereby advised to make some security verification with cloud vendors or middlemen before purchasing a cloud commodity. Efforts should be made to verify who sees their information, existence of multiple data centers to safeguard against regional attacks, data encryption measures, handling of cyber attacks, restoration of data in case of attack, security protocol and certifications and the kind of support they are entitled to. On the part of the providers, they should employ enhanced hardware configurations which include higher bandwidth, powerful and secured data centers, more storage space etc, to tackle security and loss of data challenges on the platform. Subscribers 'confidence and satisfaction on the cloud platform should also be ensured by provision of highly available and reliable services; this will also help prevent loss of scarce revenue by the SMEs.

#### XIV. Conclusion

SMEs that have adopted cloud computing are gaining a lot of benefits from it. These benefits will reposition them to contribute meaningfully to economic development of the nation because a more efficient and productive SME sector, means more and better products and services for the

country. It also means better and more skilled workforce for our nation, more contribution to our GDP and an improvement in our economy. It will improve unemployment situation and reduce the frequent migration of the youths to foreign lands as destitute and refugees. Products generation will become more competitive and can easily be exported to other countries. Also, the notorious emphasis on importation will relax and the pressure on the currency will be abated. Inflation will reduce and the sector will once more become the engine of growth. All the above will contribute in actualizing our dream of becoming one of the 20 largest economies by the year 2020.

#### REFERENCES

- 1. http://www.unesco.org/education/tlsf/mods/ theme\_c/mod18.html. last accessed October, 2018
- 2. https://resources.nokia.com/asset/201346,last accessed September, 2018
- 3. https://networks.nokia.com/cloud/nokia-cloud-fora-fully-digitalized-business Last Accessed, October, 2018
- 4. https://www.nist.gov/news-events/news/2011/10/ final-version-nist-cloud-computing-definition-published, last accessed August, 2018
- 5. https://www.cisco.com/c/dam/en\_us/solutions/ industries/docs/c11-687784\_cloud\_omputing\_wp.pdf, last accessed July 2018
- 6. David C. Wyld, (2009) The Utility Of Cloud Computing as a New Pricing - And Consumption - Model for Information Technology. International Journal of Database Management Systems (IJDMS), Vol.1, No.1, pp
- 7. https://www.softvision.com/blog/sql-server-cloud/ last accessed October, 2018
- 8. https://news.microsoft.com/download/presskits/ learning/docs/IDC.pdf, last accessed, July, 2018
- 9. https://www.cleo.com/knowledge-base-cloud-basedservices/ last accessed September, 2018
- 10. EJ Ghomi, AM Rahmani, NN Qader. 2019. Cloud manufacturing: challenges, recent advances, open research issues, and future trends, The International Journal of Advanced Manufacturing Technology, 1-27
- 11. IBM 2009. The Benefits of Cloud Computing: A new era of responsiveness, effectiveness and efficiency in IT service delivery.
- 12. Alexa Huth and James Cebula. 2011. The Basics of Cloud Computing, 2011 Carnegie Mellon University. Produced for US-CERT, a government organization
- 13. Omotunde A. A., Izang A. A, Awoniyi O. C, Omotunde, B. K., and Mensah Yaw A. 2015. Cloud Computing Awareness and Adoption Among Small and

Medium Scale Businesses (SMB) in Nigeria. International Journal Of Multidisciplinary Sciences And Engineering, Vol. 6, No. 6, pp 32-38

- 14. http://www.businessofgovernment.org/sites/default/ files/CloudComputingReport.pdf accessed September, 2018.
- 15. https://www.computerworld.com/article/2551007/ exit-strategy.html last accessed January 2019
- 16. https://www.softvision.com/blog/sql-server-cloud/ computerworld.com/action/article.do?command= viewArti cleBasic&articleid=335144. Last accessed August 2018
- 17. https://data-economy.com/2018-public-cloudcapital-expenditures-set-top-160bn-nearly-doubling-2021/ last accessed September, 2018
- 18. Cushing Anderson and John F. Gantz. 2012. Climate Change: Cloud's Impact on IT Organizations and Staffing, Sponsored by Microsoft WHITE PAPER
- 19. V. Rajaraman. 2014. Cloud Computing. RESONANCE. pp. 242-258
- 20. Vivek Kundra, 2011. Federal Cloud Computing Strategy, white House, Washington DC, USA
- 21. Steven P. Bucci PhD. 2012. Getting Cyber Serious: Mastering the Challenges of Federal Cloud Computing, BACKGROUNDER, No. 2705
- 22. Attaran, M., & Woods, J. 2018. Cloud Computing Technology: Improving Small Business Performance Using the Internet. Journal of Small Business & Entrepreneurship, 1-25.
- 23. Souri, A., Asghari, P., & Rezaei, R. 2017. Software as a Service Based CRM Providers in the Cloud Computing: Challenges and Technical Issues. Journal of Service Science Research, 9(2), 219-237.
- 24. Arjunan, V. R., & Kamath, V. K. 2018. Cloud Computing System for Small and Medium Corporations. International Journal of Engineering and Technology, 7(1.1), 173-176.
- 25. Oyelaran-oyeyinka, B. 2010. FSS 2020: international conference on SME: issues, challenges and prospects. http:// www.cenbank.org/fss/wed/sme. last accessed, October, 2018
- https://www.smedan.gov.ng/images/PDF/MSME-National-Policy.pdf last accessed October, 2018
- 27. Karabek, M. R., Kleinert, J., & Pohl, A. (2011). Cloud Services for SMEs-Evolution or Revolution?. Business+ Innovation, 1.
- 28. https://kuscholarworks.ku.edu/bitstream/ handle/1808/9664/Shetty,%20Kanaka%20EMGT%20 Field%20Project.pdf;sequence=1 last accessed November, 2018
- Aleksandre Asatiani, 2016, Impact of Cloud 29. Computing on Business Process Outsourcing, Systems Science DOI: 10.13140/RG.2.2.29591.16805
- 30. Federal Aviation Authority (FAA). 2012. Cloud Computing Strategy Final Version 1.0, 800 Independence Avenue, SW Washington, D.C. 20591
- 31. https://www.avanade.com/~/media/asset/point-ofview/cloudpovfinalrevised090909874764.pdf last accessed

August 2018

- 32. Economist Intelligence Unit. 2015. The Impact of Cloud: A Curated Report sponsored by FUJITSU
- 33. https://www.salesforce.com/uk/blog/2015/11/whymove-to-the-cloud-10-benefits-of-cloud-computing.html last accessed July, 2018
- 34. https://www.allbusiness.com/3-strategies-improvecollaboration-workplace-22673-1.html last accessed, July,
- 35. https://cloudtweaks.com/2012/08/top-fivechallenges-of-cloud-computing/ last accessed July 2018
- 36. MR Mesbahi, AM Rahmani, M Hosseinzadeh . 2019. Reliability and High Availability in Cloud Computing Environments: A Reference Roadmap, Human-centric Computing and Information Sciences 8 (1), 20.
- 37. B Shojaiemehr, AM Rahmani, NN Qader 2018. Cloud computing service negotiation: A systematic review. Computer Standards & Interfaces 55, 196-206
- 38. https://research-methodology.net/sampling-inprimary-data-collection/convenience-sampling/ accesses October, 2018
- 39. Sarantakos, S. 2013. Social Research. Basingstoke: