Original Article

Pilot Study on the Adoption of Cloud Computing in UAE Large Business Organizations

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Abstract - Recently, Cloud Computing Adoption (CCA) has overtaken Big Data Engineering (BDE) in most business environments. Large companies are embracing CCA through BDE. If CCA is to increase, it must move from weak technology to complex professional results. Based on the technological progressions and variations in the current business environment, it is important to study how BDE can affect CCA, as well as the wider consequences of BDE and CCA. To stay relevant in BDE, it is essential to have innovative results at every level of the business organization. The CCA impact model was developed using the Technology Acceptance Model (TAM), Technology Organization-Environment (TOE) and BDE factors. The CCA was enhanced by including variables related to BDE. Six independent variables were examined: usefulness, ease of use, security effectiveness, cost-effectiveness, intention to use Big Data technology, and need for Big Data technology. A sample size of 30 was used to collect data from large business organizations in the UAE. According to the study, Cloud Computing Adoption (CCA) is predicted and driven by perceived ease of use, perceived usefulness, security effectiveness, intention to use Big Data, and need to utilize Big Data technology and cannot be predicted by cost-effectiveness. Researchers found that the study's results can help managers decide whether to adopt cloud computing.

Keywords - Cloud Computing Adoption (CCA), Big Data Engineering (BDE), Technology Acceptance Models (TAM), Technology Organization Environment (TOE).

1. Introduction

Across two decades, it has been observed that the technology industry has gone through various evolvement of exchange offers of the technology industry which have experienced colossal development and advancement in cloud computing, social media, portable gadgets, IoT gadgets, and huge information, AI, machine learning and profound learning calculations. Srinivas et al. [1] expressed that businesses organization should work on enormous information utilization to make inventive arrangements at a distinctive organizational level. It has been informed that CCA can be driven by BDE used that are needed to be accepted or rejected [2]. Chowdhury [3] and Mirkovic [4] claimed that TAM and TOE are being adopted for a newly generated model integrating further CCA variables and BDE.

Cloud computing adoption and Big Data Engineering have recently shown up innovations. It has been embraced in a few businesses to encourage the sharing of assets such as programs, equipment, and application. Numerous partners take advantage of the cloud, including engineers, arrange modelers, and end-users [5], [6]. The literature review has discovered that ease of use, factors of usefulness, complexity in security, and compatibilities have been used widely to measure cloud computing adoption, which is needed for IT professionals and could be integrated with TAM, DOI, and TOE [7], [8], [28].

Until now, few studies have addressed that Cloud computing adoption derived from Big Data Engineering has resulted in a greater increase in perceived usefulness [6], [10]. Consequently, new variables need to be identified. TAM and TOE model has been widely used in several studies [6], [11], [12], [13]. However, both models are powerless towards cloud computing adoption, and the findings of these studies are still inconclusive and depend on theory, whereas few studies address this problem. In addition to that, cloud computing should be developed.

Therefore a new cloud computing adoption model needs to be established. This explains the need for a new CCA model with BDE variables and other variables from TAM and TOE. The main purpose of this work is to recognize BDE factors and the usefulness of BDE's BDE impact on CCA.

2. Literature Review

Numerous impediments to cloud computing ought to be reviewed. Afterwards, consider [14] analysed 307 advancement specialists in North America who utilized cloud computing or pointed to utilize cloud computing. Chowdhury [3] found that 67% of the individuals in his think approximately were utilizing IaaS, an increase of 19% from a comparable 2015 thought utilizing PaaS in organize.

CCA assignment may be an essential factor of commerce. IT strategies could be troublesome to accept any commerce that reflects a successful IT technique without tallying cloud assignment as a centre method. Menard et al. [29] accumulated cloud computing determination into four specific bunches: exchange organizations, educator instructors, IT specialists, and individual clients.

From a specialized assessment, Liu [16] took note of essential variations in cloud computing allotment when he stated that Gigantic Data could drive cloud computing determination. This recognition has, as of late, been confirmed [5]. As a result, there is an essential opportunity for cloud computing to create.

Memon et al.[17] recommended that high-performance computing and organize computing were doing large-scale information taking care of occupations for a long time [11]. The frameworks were scrambling the workload to different clusters of machines. The framework also interfered with application programming as a message-passing interface when the data volume was ever-increasing.

In later decades, the developing estimate of information required increasing applications to be scaled out to enormous clusters. Agreeing with International Data Corporation (IDC) inquiry, the computerized universe currently contains 4.4 zettabytes (4.4 billion terabytes) of information, which can develop to 44 zettabytes by the year 2020. Unstructured information sets are produced in the scholarly world and industry utilizing advances such as quality sequencers, wearable sensors, social systems, radio recurrence distinguishing proof, and the Web of things. Big data analytics is prevalent in every aspect of people's everyday lives, including healthcare, business, finance, traffic management, manufacturing, and retail. Powerful and efficient computers are required to process huge amounts of data quickly and efficiently. Because of the growing amount and diversity of big data, a standard database system installed on a single server is insufficient to handle it.

As a result, various cluster-based scalable platforms were built to meet the growing demand for parallel processing of big data. Hadoop Passed on Record Framework can be a spread record framework composed of Hadoop MapReduce, Hadoop YARN, Tez, Hive, Pig, Spark, Mesos, Mahout, Storm, and Chart 1.1. These are the names of the primary commonly utilized program components interior the Hadoop environment.

The Participation Board for the Middle Easterner States of the inlet encompasses a great year, with the support of far-reaching broadening and socio-economic advancements. Within the Joined together Middle easterner Emirates, the 10 companies by advertise capitalization have remained the same, with it being one modern company- Abu Dhabi's ADNOC Dissemination.

The best ten UAE companies by showcase cap are recorded in arrange of positioning. The primary company is Abu Dhabi Bank, Segment: Keeping money and Monetary Administrations, with a advertise capitalization of $43.62bn. The moment company is the Emirates Broadcast communications Gather Co with an advertising capitalization of $38.36bn. With the third company is DP World Ltd, with a showcase capitalization of $16.89bn, with the fourth UAE company, Emirates Islamic Bank, with a showcase capitalization of $12.37bn. 14.79 billion dollars and the division: managing an account and venture administrations, positioned fifth within the advertise esteem of Emirates NBD: 13.88 billion dollars with the segment: managing an account and speculation administrations, positioned 6th, Abu Dhabi Commercial Bank, showcase capitalization: 11.11 billion dollars, division: managing an account and venture administrations, positioned Seventh Emaar Properties with showcase capitalization: $9.63 billion Division: Genuine estate, which positions eighth within the capital of Dubai Islamic Bank: $9.37 billion Division: Managing an account and speculation administrations, positioned ninth Abu Dhabi National Oil Company for Dissemination of Vitality Assets Advertises capitalization: $8.34 billion Division: Vitality – Fossil Powers and positioning tenth: the Emaar shopping centre and industry with a genuine showcase domain [18].

Yet the gap is that individuals and organizations hesitate to accept the cloud because of concerns about security and privacy. The purpose of this work is to study what factors that may affect cloud adoption by IT professionals by focusing on the principal research question: To what extent do ease of use, usefulness, attitude, security apprehensions, compatibility, and trust predict IT security professionals' acceptance of cloud computing.

In the age of AI, it is critical to investigate how much cloud computing adoption is driven by Big Data technology when IoT and other emerging technologies are involved [19], directly or indirectly. Cloud computing is being implemented

by numerous industries and becoming a modernization and growth platform; business executives need to adapt to what factors influence others in the industry to accept cloud computing [20].

There is a knowledge gap associated with cloud computing adoption in academic research. Academia researchers work hard to recognize if the industry has changed beyond the initial phase of cloud computing adoption. The primary targets are security and cost, to the next phase, where cloud computing and Big Data technologies are integrated [20].

Consequently, it is clear that when investigating evolving, advanced technologies, depending on research, are very limited [30]. The gap in the works may not be filled. An all-inclusive view of technologies encompassing industry literature, academic literature, and practitioners' research can offer guidance for these evolving and unsettling technologies [22]. In spite of this, a lack of research has explored or analysed the CCA that inspire the execution of cloud computing in large business organization in the UAE.

3. Methodology

Inside the investigation, different members have finished an overview comprising of [16], [23] study instruments. Hewitt and Ross [23] study instrument evaluated measurements of the TAM. The present investigation related to three TAM builds: saw handiness, saw usability, and aim to utilize Big Data innovation. Members reacted to the things utilizing a 5-point Likert scale going from 1 (emphatically dissent) to 5 (unequivocally concur). The specialist-controlled [16] instrument for cloud computing adoption has been evaluated for cost adequacy, security viability, and the requirement for Big Data innovation [24]. A five-point Likert response ranging from "strongly agree" to "strongly disagree" were adopted from the original five-point scale format [31].

The target population included IT experts and supervisors in an association who have received cloud computing or considering cloud computing appropriation. Further, the analyst has focused on IT experts or directors in large companies together with the Middle easterner Emirate, which has a limited populace for the specified test. The sample size utilized G*Power 3.1.7 to decide an essential test measure with an alpha of 0.05, a medium impact estimate (chances proportion = 1.72), a control of 0.80, and a two-tailed test. The reliability of the instrument used in this investigation was determined by calculating Cronbach's alpha value. The dependability was estimated to be greater than 0.60, indicating that the study's reliability is acceptable [26].

Using Lipsey's procedures, the researcher used power analysis to calculate the sample size to create a logistic regression. The desired sample size for this study was 250, and after data, cleaning became 204.

The sample of the investigation considered members who were as per the following (a) anyone working in Big Data innovation, (b) IT experts or administrators who have worked for an association that utilized Big Data innovation or will utilize Big Data innovation, and (c) anyone over 18 years old and experts in big data and cloud computing. The specialist has pursued the inspection strategy, which is the same as the methodology executed by Hood-Clark [27]. Hood-Clark [27] has directed some deliberate, purposive, arbitrary testing to target UAE IT experts for basic leadership chiefs who learned Big Data. These people have worked in associations that utilized or were thinking about the angles for utilizing Big Data.

As indicated by Hood-Clark[27], in methodical irregular examining, the scientist has utilized a discretionary beginning stage with a fixed, occasional inspecting interim determined by isolating the populace by the ideal example size, therefore giving each imminent member an underlying foundation, which is equivalent for the arbitrary possibility of choice. The number of inhabitants in that example gathering is considered qualified to take an interest in this examination which is incorporated with 1,000 people.

The researcher used Google's online drive service to collect data and emailed all potential participants who met certain criteria. Once participants had read and signed the informed consent form, they were given information about how to go about taking the survey. Individuals stayed permitted to contact the investigator and the proposal person in case they had other concerns. The researcher downloaded the data file at the end of this period.

4. Result and Discussion

This result focuses on a pilot survey with 30 responders based on the two selected companies. The aim is to analyze the significance of the selected factors affected by cloud adoption. It is a common process that academics backed using a pilot test before leading to a final poll [7]. All the selected respondents worked in the IT department and were directly involved in Cloud computing events. Table 1 summarizes the related items with descriptive statistical results. Based on the average of 34 items in Table 1, the result shows that the items from 21-34 are below the average. As a result, such questions were dropped from the final survey. Meanwhile, items 1-20 show above average. These items were then grouped together in the final poll questionnaire under system trust. The other trust, namely information trust, is scattered, ranging from 21 to 34.

Table 1. Pilot Study Result

No	Items	Min	Max	Mean	Std.Dev.
	Part 1				
1	I expect a supplementary benefit in my company by applying big data	3.00	5.00	4.1818	.73266
2	CCA improve my performance at my job	3.00	5.00	4.2273	.61193
3	CCA enhanced my effectiveness in my job	3.00	5.00	4.2273	.75162
4	I expect advanced flexibility in the IT department by applying CCA	3.00	5.00	4.2273	.75162
5	Applying CCA would not impose technical complications on my company	3.00	5.00	4.2273	.61193
6	CCA fit in quite easily in the company's IT infrastructure	2.00	5.00	4.2273	.81251
7	I discover that CCA easy to use	3.00	5.00	4.4091	.73414
	Part 2				
8	Applying CCA does/would not require a lot of mental effort for the employee	3.00	5.00	4.4091	.59033
9	Assuming I can make a decision intend to use by BDE	4.00	5.00	4.5909	.50324
10	Given that I have admission to BDE, I expect that I could use it	3.00	5.00	4.4091	.66613
11	I intend to use BDE	3.00	5.00	4.4091	.66613
12	BDE would offer a significant impact on my organization	3.00	5.00	4.4091	.73414
13	I feel that CCA is secure	3.00	5.00	4.3636	.65795
14	I am/would be concerned with the security of the technology used by the CCA	2.00	5.00	4.1818	.85280
15	I notice that CCA has better security than conventional computing method	3.00	5.00	4.5909	.59033
16	CCA was not secure three years ago	3.00	5.00	4.3636	.65795
17	CCA provides cost-effectiveness.	2.00	5.00	4.3182	.83873
	Part 3				
18	The maintenance cost is lower with CCA compared to conventional computing methods	3.00	5.00	4.5909	.59033
19	I should imitate CCA to have substantial cost savings over conventional computing method	3.00	5.00	4.2273	.61193
20	Using CCA in my organization	1.00	2.00	4.5909	.59033
21	CCA offers extra authorization and, according to the users	1.00	2.00	1.3000	.51177
22	CCA offers permission to access data stored control based on the entity's privileges/ rights of use	1.00	2.00	1.5000	.51177
	Part 4				
23	CCA ensure the confidentiality of information accessibility	1.00	3.00	1.5455	.73855
24	CCA offers services which enable a direct, bidirectional communication	1.00	4.00	2.5909	.85407
25	CCA offer services which are benefit the citizen for the proposed tasks and facilitate	1.00	3.00	1.8182	.50108
26	BDE guarantees that the system is up and running, fully operated whenever needed and is protected from denial of service	2.00	4.00	2.8182	.85280
27	BDE guarantees that the system is protected against intrusion threats	2.00	4.00	2.8182	.50108
28	BDE offers protection services which allow for non-repudiation, intrusion detection and anticipation and legal action	1.00	4.00	1.8636	1.03719
29	BDE guarantees that there is protection from unauthorized manipulation of data during transmission	2.00	4.00	2.5455	.59580
	Part 5				
30	BDE upkeeps on the users and is inspired to act based on the user's interest and not opportunistically	2.00	3.00	2.5909	.50324
31	BDE offers upright trust agreements, tells the trust and fulfills possibilities	1.00	3.00	1.8636	.99021
32	CCA offers data in the request of laws, policies and regulations related to online transactions	1.00	3.00	1.4091	.79637
33	CCA offers facilities related to the quality protocols, standards and mechanisms for online transactions	1.00	3.00	1.4545	.59580
34	CCA offers assurances to ensure and verify the projected result of a transaction	1.00	4.00	2.2727	.98473

5. Conclusion

The most important finding of this study is that the CCA can be influenced by the combination of six independent variables (perceived utility, perceived ease of use, security effectiveness, cost-effectiveness, intention to use BDE, and need for BDE). This result may be useful for decision-making managers contemplating their organizations' CCA driven by BDE in the case study in UAE. In fact, cost-effectiveness itself may not be enough for cloud computing service providers to drive the CCA. The current study's other finding was that perceived utility drives the CCA.

As a consequence, if service providers can combine Big Data technologies with the cloud can increase the utility of cloud computing, resulting in increased adoption of the cloud. This study's finding aligns with the hypothesis that the essence of cloud computing is to change from conventional technology to sophisticated business solutions. The ultimate aim is to increase cloud computing adoption. The convergence of BDE with cloud computing is a ground-breaking way for cloud computing to move to high-level business solutions in organizations. Individually, improved perceived ease of use or security performance Cloud computing adoption can be predicted by perceived ease of use, perceived usefulness, security effectiveness, intention to use Big Data, and the need for Big Data technology. According to the study, cost-effectiveness cannot predict cloud computing adoption. Additionally, we found that a combination of six independent variables can drive CCA. The results of this study are useful for the company planning to adopt cloud computing.

Acknowledgments

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