

GOVERNMENT ORGANIZATIONS' READINESS FOR CLOUD-COMPUTING AGE: BASIS FOR AN EXTENSION PROGRAM

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Received: 2023-01-10

Accepted: 2023-01-30

Published online: 2023-02-12

Abstract

The Sustainable Development Goals particularly SDG 11 (Sustainable Cities and Communities) and SDG 17 (Partnership in Attaining the Goal) call for every entity and unit to come across the digitization of their processes and procedures through cloud computing. This study is designed to determine the readiness of government agencies for the implementation of cloud computing in their respective units. Employing a validated questionnaire to 102 ICT In-charge in the government agencies, the following are found: the organizational capability, government policy, and top management support are observed and qualified as much ready; the government agencies are much ready in implementing cloud computing in their processes and procedures. Hence, the government agencies in the parameters of this study need technical assistance from educational institutions to further their readiness in implementing cloud computing. Moreover, institutions of higher and advanced education may offer extension activities along cloud-computing to further the readiness of the government agencies in its implementation.

Keywords: Cloud computing, Digitization, Government agencies, Sustainable Development Goals.

1. Introduction

With the advent of Information and Communication Technology (ICT), a new component of governance has emerged, and the concept of electronic governance has begun (Muhammad, 2013). According to Ng'uni (2019), governments across the world and at all levels have adopted and implemented electronic government in the last decade. ICTs are evolving at a fast pace and they are guiding the development of good governance. The goal of e-government is to link government functions. With today's technological improvements, the world is a better place. Through e-banking, e-business, e-procurement, and other applications, technology has already proven to be highly useful in improving the efficiency of the private sector (Sarker et. al, 2018; Mahdi, Rezaul, & Rahman, 2010). E-government is focused on delivering citizen services, enhancing open sector efficiency, transparency, and accountability in government operations, and lowering open organization costs. It enables the general

public to make the most of remote access to automated organizational operations (Suleiman, Muhammad et. al 2020).

Moreover, with the deployment of cloud computing as one of the new technologies, a number of reforms have already been implemented (Anderson & Rainie, 2021). Today, big data provides the opportunity to bring every aspect of government to speed up by properly utilizing a significant amount of data. It is useful not only to government, but also to other sectors. The trend of utilizing data and information is transforming traditional concepts, leading to the development of a new model. Cloud computing is a new paradigm that enables internet-based applications and services with the ability to effectively communicate, manage, and store data that is physically stored on remote servers rather than on in-house resources or personal computers (Odeh et. Al., 2017).

In the Philippines, the establishment of the DICT represents a policy milestone in the evolution of e-government (dict.gov.ph). It provides an institutional anchor for mainstreaming e-government innovations. Given the responsibility to ensure the provision of ICT infrastructures and systems as instruments of good governance and global competitiveness, the new agency can benefit from benchmarking with international measures of e-government (Magno, 2018). Further, cloud computing has resulted in new advancements and developments in Information Technology, particularly in education (Olaloye, 2019). The education sector has critical concerns in a country's economic growth and development, particularly in developing economies. It is also connected with Information Technology to mention the demand for IT infrastructure, as well as its ongoing upkeep for a variety of educational purposes.

On the other hand, developing countries continue to face challenges in implementing e-government efforts, resulting in a high rate of failure. Technological constraints, scarcity of resources, cost, the digital gap, inadequate management and infrastructure, and a lack of IT infrastructure are some of the most commonly encountered challenges and obstructions found in relevant studies (Almarabeh et. al 2016). Additionally, when third parties manage and process sensitive data, especially in the government sector, it is expected that issues about trust arise in the minds of e-government stakeholders. Some of the challenges associated with implementing cloud computing in terms of e-government are lack of data control, security and privacy, system failure, access authorization, data leakage, among others (Ali et. al 2018).

It is in this perspective that this study was conceptualized with the purpose of determining the government organizations' readiness for cloud-computing in a province in the northern part of the Philippines.

1.1 Objectives of the Study

This study is designed to determine the readiness of government agencies on the implementation of cloud computing in their respective units.

It specifically aimed to:

(1) determine the readiness of government agencies in implementing cloud computing along cloud-computing adoption, organizational capability, government policy, top management support; and

(2) design program of extension activities in addressing the current state of readiness of government agencies on cloud-computing.

2. Methodology

The descriptive-quantitative research design was employed in this study. This design is intended to gather and describe data on the readiness of government agencies on implementing cloud computing as perceived by the respondents during the time of the study. According to Check & Schutt (2012), surveys are necessary when the intention is to collect information from sample of individuals through their responses to questions framed in a questionnaire with regards to a certain issue or concern. It was conducted in a province in the northeastern countryside of the Philippines. A total of 102 government employees responsible to the IT units served as the respondents of this study.

The questionnaire used in this study is a validated instrument that underwent expert pooling, field test, and revision. The field test results yielded the following using Cronbach's alpha: .987, .921, .915, and .901, respectively, for Parts I, II, III, and IV of the instrument. According to Taber (2018), an alpha of at least .70 suggests reliability. Hence, a valid and reliable instrument.

The frequency count and mean are employed in this study. Results formed part in the identification of potential input on the proposed Extension program of activities to be extended among the government agencies concerned.

3. Results and Discussion

The results and discussion of the study are presented in the following tables:

3.1 Readiness of government agencies in Implementing Cloud Computing

Table 1. Readiness of Government Agencies in Adopting Cloud Computing

Cloud-computing adoption		NR	R	MR	VMR	Mean
1	Cloud-computing adoption is practiced in forecast-based decision making	2	46	30	22	2.72
2	I think our organization is ready to adopt Cloud-computing	5	45	28	22	2.67
3	We assume to implement Cloud-computing in the next 2 years	3	45	31	21	2.70
4	CC provides a more consistent structure to guide the application of safety protocols on the access, storage, processing, and transmission of data	-	40	36	24	2.84
5	Cloud computing entails security challenges along data privacy, data breach, data loss, among others.	-	41	31	28	2.87
6	Cloud computing contributes to work efficiency as data are available anytime and anywhere.	-	30	28	42	3.12
Grand Mean						2.82

Range: 1.00-1.74, Not Ready (NR); 1.74-2.49, Ready (R); 2.50-3.24, Much Ready (MR); 3.25-4:00, Very Much Ready (VMR)

The readiness of government agencies in adopting cloud computing is presented in Table 1. It revealed that participants evaluated the government agencies as much ready in all the statements pertaining to cloud-computing adoption which is further supported by the grand mean of 2.82.

The idea of government agencies' readiness come to an agreement with Osmanaj and Ali (2020) in which the technology of cloud computing will facilitate the improvement of productivity, improvement of efficiency and will lower the costs in government transactions. Further, new algorithms, machine learning and artificial intelligence are driving new insights and automation that can help governments deliver more engaging and personalized citizen services (www.ibm.com).

Table 2. Readiness of Government Agencies in terms of Organizational Capability in Implementing Cloud Computing

Organizational capability		NR	R	MR	VMR	Mean
1	Our staff are using IT resources and infrastructure in their work	1	31	40	28	2.95
2	Our organization has the necessary capability to implement cloud-computing	7	39	34	20	2.67
3	Our staff have their own Internet access (should they need to bring their work at home)	7	41	27	25	2.70
4	Our organization knows how IT can be used to support operations	2	36	32	30	2.90
5	There is adequate network capacity and bandwidth in the organization	15	45	28	12	2.37
6	The organization is able to integrate updates on IT infrastructure and system or software	8	40	32	20	2.64
Grand Mean						2.71

Range: 1.00-1.74, Not Ready (NR); 1.74-2.49, Ready (R); 2.50-3.24, Much Ready (MR); 3.25-4:00, Very Much Ready (VMR)

Table 2 showed the readiness of government agencies in terms of organizational capability in implementing cloud computing. It disclosed that the participants evaluated the government agencies as much ready in most of the statements in organizational capability however, statement 5, "There is adequate network capacity and bandwidth in the organization" is evaluated as ready. Nevertheless, the grand mean (2.71) supports that the government agencies were much ready in the organizational capabilities in implementing cloud computing. Hence, this result affirms one of the benefits from using cloud computing as mentioned by the Southeast Asia Development Solutions (2021) in which, it ensures that public sector human resources will keep up with the technology development. Also, governments across Asia and the Pacific are responding to change by updating their e-government services, augmenting their data analytics capabilities, and putting in place digital economy development plans (www.adb.org).

Table 3. Readiness of Government Agencies in terms of Government Policy in Implementing Cloud Computing

Government Policy		NR	R	MR	VMR	Mean
1	Cloud-computing is one of the government major policies	8	52	21	19	2.51
2	Government policy encourages the use of cloud-computing	6	50	23	21	2.59
3	Government intends to issue supporting regulations for cloud-computing	2	50	27	21	2.67
4	Policy on ICT capacity and development of essential skills are adopted to meet international and local standards	-	48	24	28	2.80
5	Our organization is aware of the government policy on cloud computing	8	50	23	19	2.53
6	The government promotes cloud computing as the preferred technology for government administration and the delivery of government services.	7	47	28	18	2.57
Grand Mean						2.61

Range: 1.00-1.74, Not Ready (NR); 1.74-2.49, Ready (R); 2.50-3.24, Much Ready (MR); 3.25-4:00, Very Much Ready (VMR)

Table 3 reveals the readiness of government agencies in terms of government policy in implementing cloud computing. It exhibited that participants evaluated the government agencies as much ready in all the statements in government policies identified in implementing cloud computing which is further supported by the grand mean of 2.61

This is supported by Gasser & O'Brien, (2014) that governments are replacing their legacy IT systems with cloud computing technologies and implementing new cloud-based tools for collaboration and information sharing across agencies and units.

Table 4. Readiness of Government Agencies in terms of the Top Management Support in Implementing Cloud Computing

Top management support		NR	R	MR	VMR	Mean
1	The management is enthusiastic to adopt cloud-computing	4	45	35	16	2.63
2	The management provides resources for adopting cloud-computing	6	45	26	23	2.66
3	The management understands the benefits of cloud-computing	2	47	29	22	2.71
4	The management encourages the development of cloud-computing	4	44	36	16	2.64
5	The management has the ability to leverage IT as a strategic core competence	1	47	27	25	2.76
6	The management is willing to subscribe to the cloud computing platform	3	47	25	25	2.72
Grand Mean						2.69

Range: 1.00-1.74, Not Ready; 1.74-2.49, Ready; 2.50-3.24, Much Ready; 3.25-4:00, Very Much Ready

The readiness of government agencies in terms of the top management support in implementing cloud computing is summarized in Table 4. It presents that the participants evaluated the government agencies' top management support as much ready in implementing cloud computing which confirms by the grand mean of 2.69.

As such, the study of Sallehudin, et. al. (2018) agrees that there is significant effect on cloud computing implementation as to technological, organizational and human characteristics. Accordingly, Hsu (2019) reported that commitment from top management is critical to ensure that an organization's objective is realized to the point of increasing company performance. Top management support is a critical factor in overcoming barriers and boosting an organization's technological capacity to efficiently utilize new technological services or products.

3.1 Proposed Extension Program

Project COGENT (**C**ommunity **O**utreach for **G**olden and **E**xuberant **N**eologism of digitization through IT-based **T**ransformation)

The Information Technology and Graduate School (IT-GS) Programs are committed to fulfilling the needs of the stakeholders not just for a short period of time, but for as long as the stakeholders need help in enhancing their services for the betterment of the community.

The employees of the Provincial and Local Government Unit (PLGU), Department of Education (DepEd), and national and local private agencies of the province of Quirino would like to improve their relationships with the organization, especially in terms of enhancing or expanding their Information and Communication Technology (ICT) related skills.

In this connection, the IT-GS programs will carry out a series of trainings and activities to help the employees of the PLGU, DepEd, national, local and private organizations of the province of Quirino in achieving their community goals and aspirations.

This training program's overarching objective is to meet the ICT demands of the beneficiaries by providing advanced knowledge and skills in the field of information and communication technology.

This project will continue for one year, or as long as the stakeholders need the services of the team. It consists of a series of computer-related trainings and other activities, such as providing the organizations with timely and cost-effective disaster recovery options that help them with faster and speedy data recovery, assisting them in creating a flexible and scalable testing environment that significantly reduces manpower and time requirements, and aiding them in learning cloud-based backup techniques to enable them to be ready for any unforeseen circumstances.

Objectives of the Extension Program

This training program's overall goal is to meet the ICT demands of the Quirino province's PLGU, DepEd, national and local private agencies by providing advanced knowledge and skills in the field of information and communication technology.

It specifically intends to create the following skills set as a result of the Training Needs Analysis:

- Green Cloud Computing
- Edge Computing
- Cloud Cryptography
- Load Balancing
- Cloud Analytics
- Scalability
- Cloud Computing Platforms
- Cloud Service Model
- Mobile Cloud Computing
- Big Data
- Cloud Deployment Model
- Cloud Security

Description of the Project, Strategies and Methods

Activities and comprehensive computer trainings are scheduled from January through December, 2023. This course is designed for the Quirino province's PLGU, DepEd, national and local private agencies who wish to boost their computer proficiency and knowledge in relation to cloud computing.

The activity was created specifically to provide tools, boost confidence, and increase the effectiveness of the knowledge needed to elevate their services through the application of advance technologies.

Functional Relationships with the Collaborating Agencies

The IT-GS Unit shall:

1. Start working together with the employees of the PLGU, DepEd, national and local private agencies in the province of Quirino to undertake training needs assessments in order to define the support services to be extended;
2. Provides technical assistance and services linked to cloud computing and other ICT enhancement activities;
3. Share with the human and material resources available in the program; and
4. Conduct monitoring and evaluation to determine the degree to which the participants' lives and workplaces have been benefited by the knowledge and skills they have acquired through trainings and programs.

1. Conclusion and Future Works

Based on the foregoing results and findings, the following are concluded:

1. The government agencies in the parameters of this study are *much ready* in implementing cloud computing;

2. The government agencies in the parameters of this study need technical assistance from educational institutions to further their readiness in implementing cloud computing;

3. Institutions of higher and advanced education may offer extension activities along cloud computing to further the readiness of the government agencies in its implementation.

Impinging the results and conclusions of this study, the authors put forward on the implementation of the proposed Extension Program, the Project *COGENT*. This, with the initiative of the Master in Management Major in Public Management (MM-PM) program of Quirino State University, will pole-vault the readiness of the government agencies in the locale of the study in fully implementing cloud computing in their processes, procedures, and daily operation as part of trailblazing innovation in the academe and government agencies as governed by Sustainable Development Goals, SDG 11 (Sustainable Cities and Communities) and SDG 17 (Partnership in Attaining the Goal).

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