

Proposing a New Model for Quality of Service Acceptance



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Abstract: *Quality of service (QoS) has been proofed to be a great significance effect in the utilization of cloud service in higher education institutions (HEI's), due to having many aspects determine the acceptance level of QoS while providing cloud service, QoS acceptance not given sufficient attention from HEIs and decision-makers. In this research, previous QoS studies are review in this field to identify QoS acceptance variables by review studies for the last 5 years. Thus, with the aim to discover QoS aspects this research intends to develop an integrated model to understand these variables and relationship between QoS acceptance variables, which must be efficiently studied. Hence, the integrated model between TOE (Technological, Organizational, and environmental) and HOT (Human, Organizational, and Technological) theory is presented in this research to be the core contribution. The integrated model helps HEIs to evaluate and explore QoS aspects to increase utilizing of cloud service, improving HEIs efficiency, and help decision-makers to facilitate the acceptance of QoS in HEIs.*

Keywords: Quality of Service; Acceptance; HEI; TOE framework; HOT framework; cloud service

I. INTRODUCTION

Higher Education Institutions (HEIs) are considered to be one of the primary pillars of community change as it associates among governments, industry, and colleges [1]. HEIs have advanced from the use of the traditional education process to achieve knowledge towards continuous modernization of the Information Technology (IT) infrastructure in order to improve research and learning events by using cloud services [2]; [3]; [4]. The quality and number of services are improved in new technology; therefore, there is an increase in the number of HEIs that switch from the traditional form to the online service form. [5, 6]. Cloud Service is a developing innovation. Advance in processing power, connectivity, virtualization, and storage are consolidated to make a new environment [7, 8].

Revised Manuscript Received on 30 July 2019.

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The computing scene is quickly changing towards creating developing software utilized by millions to expand as a service [9]. Cloud service helps to reduce costs significantly while developing the speed of use application, computing assets get to be distinctly less expensive and effective and more pervasively accessible than any time [8, 10].

The proficiency and adequacy of Cloud Service are essential in higher education. The capacities of this innovation can be utilized to support group collaborative learning in education industry [11-13].

Cloud computing services ensure the access of a broad number of clients while it still guarantees the quality, availability, and security of its service [14]. Also, HEIs have the capacity to improve their services, and accommodate the maximum number of students and/or staff [15]. Moreover, cloud service innovation is employed as a response to a need to create a service offered by many organizations, especially HEIs, to decrease the cost of utilizing servers on the premises [3, 16].

Quality of Service (QoS) is the combination of many properties, such as availability, which is the time during which a service is at work, security properties, which incorporate the presence and types of confirmation mechanisms the services offer, and reaction time [17-20]. Moreover, QoS is an expansive term utilized to depict the general experience of clients or applications provided over a network [21]. In fact, the level of fulfillment experienced by the client (teachers or student) must be higher than that achieved by the normal service [22, 23].

II. QUALITY OF SERVICE ROLE IN CLOUD SERVICE

The degree of QoS acceptance in utilizing cloud service by HEIs can be measured by the increase of service use, which is expected to help support and improve the learning process in HEIs. In recent years, organizations, particularly HEIs, have shown the enormous migration of IT applications and services to the cloud. The main concern of decision-makers in HEIs when migrating to the cloud is the QoS aspects, whereas these aspects include for instance availability, reliability, performance [6, 20], IT infrastructure [24], cost [25], human capital [26], and service provider [11].

HEIs needs to identify QoS variables from different aspects for instance regulation, cost reduction, and trustworthy [27, 28], while another researcher has been identifying other factors such as performance and environments [29, 30], ICT infrastructure, user satisfaction, clients' needs security, and reliability [24].

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Many researchers start investigate QoS in different aspects such as [31] study QoS from perspective of SLA contract management, [32] also explore QoS from allocating optimal resources, and [33] study QoS from cloud provider aspect to how can provider collaborate consistently to procure more assets in peak time to satisfy their QoS targets.

III. JUSTIFICATION OF INTEGRATION TOE FRAMEWORK AND HOT-FIT FRAMEWORK

Tornatzky [34] present the TOE framework, which affords supportive theory to understand the QoS variables and their relations and provide robust analytical theory to contemplating organizational level acceptance in various categories of technology s [35, 36]. TOE utilize in organization level to predicts adoption and acceptance process of technology [37]. A study of the literature indicates that the TOE framework [34] provides a supportive framework for understanding QoS acceptance of cloud service utilization, As well, TOE framework, [35] trusted that the principle estimations of TOE are solid hypothetical bases and reliable exploratory support, and its Empirical discoveries from these examinations asserted that the TOE is an important framework in which to appreciate its technology acceptance [34, 38, 39]. The TOE framework includes three main factors related to an organization's context that could affect the acceptance of technological tools: (1) the technological dimension, (2) the organizational dimension, and (3) the environmental dimension. As shown in (Fig.1).

A study about IT utilizing HOT structure conducted that it builds up a superior and clarifying intra-firm development acceptance [40]. However, the clarification control for institution technology acceptance reception must become acquainted with different factors that can be considered as various layers of the case that impact the outline and the utilization of data innovation for example the individual, the assignment [41, 42], human variables [43], variables to consolidate with the environmental, technological and organizational settings.

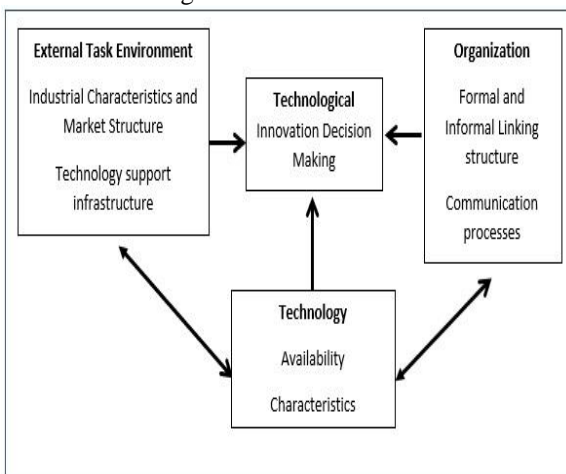


Figure 1: TOE framework [34]

The Hot-fit framework has technological and organization, this framework, unlike TOE use human factor which includes users experience and expectations which helps to identify human capital in organizations, this dimension plays a critical rule in QoS acceptance [36, 44]. Additionally, HOT-fit

framework [43] highlighted extra qualities, for example, fit between technological, human and organizational parameters, human dimension helps to detect human experiences in the organization [27], and fit between technology and human aspect [43].

As shown in (Fig.2). Moreover, these extra highlights empower more understanding and a holistic approach to evaluate the assessment. In this research, the researcher intends to use a portion of HOT-fit framework which is Human context to find the influence of human on QoS acceptance of utilization cloud service.

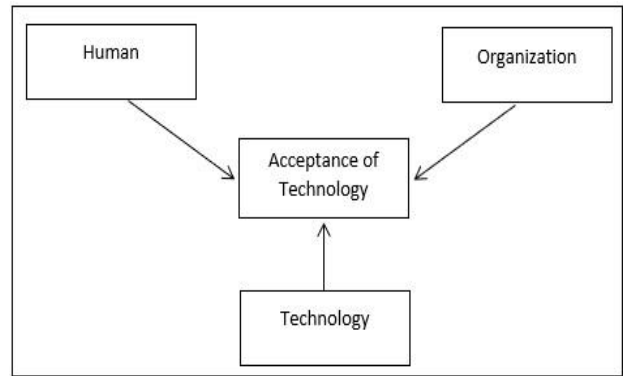


Figure 2: HOT-fit framework [43]

IV. RESEARCH METHODOLOGY

The methodology used to achieve this research by exploring the most significant factors influencing QoS acceptance. The research achieves this objective by review prior factors which are conducted by many studies, and research material has been studied to conduct the factors influencing QoS acceptance. The primary studies include more than 20 papers in the conferences and journals from 2013 to 2018. 14 factors which came from reviewed studies were perceived as the most significant factors in the previous investigations. At that point, QoS acceptance factors which were recognized were build up in the research model.

V. CONCEPTUAL RESEARCH MODEL

The conceptual model presented in this research gotten from integrated TOE (Fig.1) and HOT framework. The main aim of the conceptual model to understand, evaluate QoS acceptance variables in the education context. Moreover, provides details behind the integrating process of two theories (TOE and HOT). QoS acceptance of cloud service utilization uses TOE as the main framework, and at the same time, the HOT framework is used to include the human dimension. In QoS acceptance of cloud service utilization in HEIs, the decision-maker needs to consider four factors or dimensions (technological, organizational, environmental, and human) to support the decisions regarding QoS acceptance of cloud services; therefore, to help support decision-makers in HEIs, the researchers have built a theoretical model called TOEH to help determine the factors with the most influence on QoS acceptance.

The researcher intends to utilize TOE to exploring QoS variables from different aspects, moreover, recognize different core QoS variables in cloud service and the relationship between core variables and other variables for instance abilities, inspirations. Therefore, TOE provides an appropriate analytic instrument of organizational acceptance of such technology for different aspects. A study of the literature recommends that technology, organization, and environment (TOE) framework by [34] may give a supportive beginning stage to considering acceptance of technology [38, 39, 45].

The TOE framework perceives three highlights of an organizational context that could affect acceptance of technological tools: (1) the technological context depicts the present technology being accepted and utilized to the organization [34, 38]; (2) the Organizational context suggests characteristics of the organization [36], for instance, IS/IT Knowledge, and size [46]; (3) the Environmental context is the field in which an organization coordinates its business, insinuating its industry, competitors, and dealings with the business[28], [17]. The TOE framework clears up acceptance of the technology.

From related works of previous studies done in the field of QoS and utilization of cloud service in different industries, it found that human dimension plays a significant aspect of accepting and improving QoS. Szewczk and Snodgrass [47] stressed the critical and crucial role of the human during the process of QoS acceptance of innovation. the absence of a human in QoS acceptance has been a deterrent to the achievement of QoS acceptance.

Subsequently, human comprehension has been an essential item of top management and staff information about QoS. The institutions and human measurements are considered as critical issues in the execution and development of QoS acceptance. In research, led by Mayer & Mayer [48], founded major boundaries of QoS acceptance of innovation is the absence of human expertise and ability prerequisites in the developing process of accepting new technology.

Meanwhile research model includes the human factor in accepting QoS since this aspect involves decision-making by top management of HEI's which consider a noticeable and indispensable factor in accepting QoS of technologies [36, 44]. Whereas TOE theory excludes the human factor but the HOT used to include it to evaluate the fit between human factor and other factors such as technology with QoS acceptance [43]. Moreover, the integration process will help the researcher to understand QoS acceptance variables of utilizing cloud service in HEIs, and study critical aspects affecting QoS acceptance process and help decision-makers to utilize cloud service in HEI's.

The decision-maker need to consider four factors or dimensions (technological, organizational, environmental, and human) to support the decisions regarding QoS acceptance of cloud services; therefore, to help support decision-makers in HEIs, the researchers have built a theoretical model called TOEH (Human-Technology-Organization-Environment) to help determine the factors with the most influence QoS acceptance.

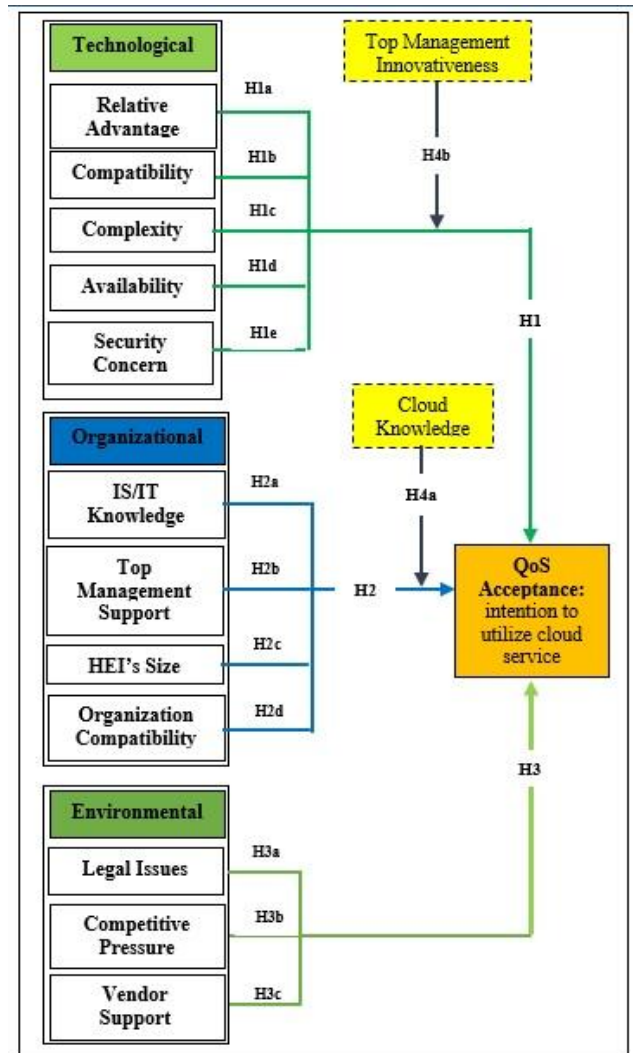


Fig. 3. Initial Integrated Model

VI. CONCLUSION

Exploring QoS variables play an important role in confirming acceptance of QoS is maintained and confirmed proposed model to support QoS acceptance by evaluating aspects of QoS to increase the level of cloud service utilization. Moreover, from studies review in QoS found human aspect is significant impact to ensure QoS acceptance, whereas human factor include decision making, top management innovativeness related to QoS acceptance, and additional significant factors (technology, organization, and external factors (environment)) factors, each of aspects has own influence level in acceptance of QoS which need to determine and categorize based on prior studies that have been reviewed.

The developed model provides a clear picture for decision makers in HEI's on the important factors affect QoS and understand by exploring and evaluation, and build HEI's strategies plans regarding utilization cloud service.

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