

## A Conceptual Modeling for Achieving a Performance and Sustainability on SMEs Using Cloud Computing Technology



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### ABSTRACT

Enhances the business growth and improves its performance in the industry is critical things for achieve sustainability of every business. SMEs are likely tending to outsource their IT requirements in order to be able to focus more on their core businesses. This makes cloud computing an attractive option for SMEs in order to reducing the costs, and improving the quality and the efficiency of business processes. This research aim to knowing the impact of cloud technology on firm's performance towards firm sustainability in terms of economic, environment and social aspects. The result will be Conceptual model that investigates the factors influencing utilizing cloud computing to enhance the firm's performance which will then influence the firm's sustainability.

**Key words:** SMEs, Cloud computing, sustainability, Performance, TCT, RBV

### 1. INTRODUCTION

Small and medium-sized enterprise (SME) is defined as the entity engaged in economic activity with a certain number of employees and turnover. SMEs play a very active role in every national economy. Reports have also outlined and signified towards the role and contribution of SMEs towards the national GDP, economic growth, social development and employment [10] -[32]. Accordingly, the performance of this sector is associated with the economic performance of the country [3]. However, as SME environment is highly competitive, firms need to be more innovative in securing tools to enhance the performance, managing changes, and promoting services to customers. To enhance their innovation abilities, SMEs should adopt innovative technologies [61]. SME innovativeness enhances the business growth and improves its performance in the industry [43]. IT can be used as a tool to improve company's efficiency and reduce the cost of production and operation [48]. Therefore, SMEs compete to adopt IT to increase their competitiveness in order to survive [7]. SMEs are likely tending to outsource their IT requirements in order to be able to focus more on their core

businesses [18]. Moreover, in a competitive environment, the survival of any organization is attributed to its ability to adopt innovative technology that secure a competitive edge by reducing the costs and improving the quality and the efficiency of business processes [59]. This makes cloud computing an attractive option for SMEs. Cloud computing is widely recognized as the innovative technology which has attracted many organizations [4]. Cloud computing is a model that allows wide-ranging, on-demand network access to shared configurable computing resources such as servers, storage, and applications, which businesses or corporations can rent for a fee. It provides potential for significant cost saving in capital resources, IT infrastructures, maintenance, business operations, and staff, and creates new business opportunities for service-oriented models [5]-[25] -[20]. Cloud computing's pay-per-use model can assist firms to minimize start-up costs and eliminate purchasing expensive software [9]. Further, as migration to the cloud leads to less hardware to maintain and less demand for full-time network, server, storage and experts, which maximizes resource utilization [25]. Cloud's special characteristics are particularly advantageous for SMEs [6]. Cloud adoption not only leads reducing the establishment cost, lowering risks and promoting innovation, but also offers a protected IT set up with high business continuity which is most crucial for SMEs today[33]. Many argue that SMEs are the biggest winners in utilizing cloud computing to enhancing their performance. A survey by CDW showed that 88% of cloud users pointed to cost savings advantage of cloud computing and 56% stated that cloud adoption raised their business's profits[42]. In addition, 60% of adopters indicated that cloud services eliminate the need for their IT staff to maintain infrastructure, enabling them to focus more on strategy and innovation. Additionally, 62% of the firms reinvest saved money into the business to boost turnover, increase wages and drive product innovation [42]. Microsoft conducted a study on 3,000 SME's across 16 countries to understand whether SME's has an attention to adopt cloud computing. It was concluded that "43% of workloads will become paid cloud services" [44]. Moreover, with low budget and lack of human resources, SMEs are not able to implement and upgrade advance technologies in order to increase their business performance[44]. Cloud computing is the most evolving

concept which has optimized IT performance of SMEs sector. It enables SMEs to have a maximum return on their investment and assists them to work in ever demanding corporate environment effectively. The organizational performance refers to how organizational operations perform. It is considered as the most important measure of success in commercial sector [37]. Previous studies have shown significant impact of organizational innovation capabilities on the performance [11]. A firm's survival is based on its performance [64]. Therefore, to pursue sustainable growth, SMEs should strengthen their technological innovation capability through long-term growth strategies. Technological innovation is one of the major factors contributing to organization sustainability. According to the resource-based view, technological innovation capability can secure the firm with a competitive advantage [17]. Firms must continue to innovate to ensure their sustainability in the environment of global competitive pressure, and due to shortened product life cycles [11]. SMEs need to become more competitive and sustainable by boosting their technological innovation capabilities to survive and grow in an era of uncertainty [64]. SMEs are adopting the cloud computing in order to survive in the competition [33]. Organisational sustainability is "a collection of methodologies, business models and best practices which enable organisations establishing long-term business operations and funding" [20]. SME sustainability refers to "the year of business operation, availability of future plans and diversity of product/service range" [45]. Sustainability is a critical success factor for organisations in order to maintain their business operations [22]. Cloud computing focusing on cost savings and green technology is the focus of SMEs attention [20]. Cost saving competitive advantage of cloud computing potentially can contribute to long-term sustainability [21].

## 2. PROBLEM STATEMENT

In the last two decades corporate strategy and management experienced prominent changes towards sustainable thinking [53]. This implies a dramatic changes in SMEs in terms of economic, social and environmental performance. Managing sustainability is challenging, so an integrated framework is required which considers environmental, social and economic business performance [29]-[51]. Firms are increasingly seeking methods and tools to improve sustainability, and identifying, managing and measuring the drivers of improved sustainability [28]. Sustainability measurement should include several factors based on the economic, environmental, and societal issues [28]-[51]-[60]. Sustainability gained more attention in practice and research in recent years [24]. Organizations are seeking meeting customers' demands by introducing sustainable technologies and optimizing business operations in a sustainable way [40]. More specific, SMEs should focus on three interdependent dimensions of sustainability; economic, social and environmental in order to succeed in

the long run [27]. Thus, for firms, to achieve outstanding results, performance measurement is crucial [24]. Accordingly, firms are seeking to operate smarter by incorporating technologies such as cloud computing to find ways to cut costs and increase efficiencies. Cloud computing is a recent phenomenon which is predominantly driven by industry recognition of making sustainability their focus. It is argued that cloud-based technology enables firms creating a competitive advantage [56]. However, despite cloud computing attractiveness and many perceived benefits, many SMEs are still hesitant [30]- [31]- [36]. A review of cloud computing studies shows that the adoption rate of cloud computing by SMEs is slower than anticipated [47]. Further, SMEs face barriers when applying new technology due to the lack of technological awareness in creating online channels in SMEs [2]. Notably, one of the main challenges of SMEs is the need to be able to assess which technological innovations can be applied to give competitive advantage [3]. Different aspects of cloud computing have been studied by a number of researchers, [13]. However, SME's are still hesitant to adopt cloud computing technologies [13]. Furthermore, reviewing the literature shows limited scholarly research on the applications of cloud technology in SMEs towards enhancing their sustainability.

## 3. RESEARCH AIM

In this research the impact of cloud technology on firm's performance towards firm sustainability in terms of economic, environment and social aspects is examined. Accordingly, the aim is to propose a model that investigates the factors influencing utilizing cloud computing to enhance the firm's performance which will then influence the firm's sustainability. Thus, the main question is whether the cloud computing has the potential to improve SMEs performance which leads eventually to sustainability.

## 4. RESEARCH OBJECTIVE

The main objective of this study is to investigate the factors influencing the sustainability of SMEs through enhancing their performance using cloud technology. Accordingly the following research objectives are identified:

- 1- Explore the drivers of cloud technology adoption by SMEs.
- 2- Identify the factors influencing cloud technology utilization to enhance the of SMEs' performance.
- 3- Identify the role of cloud computing technology in enhancing SMEs' sustainability.
- 4- Develop and validate a model for SMEs sustainability using cloud computing.

## 5. LITERATURE REVIEW

Cloud computing provides the first chance for SMEs to apply new software approaches in a cost-effective manner [19]. Flexible cost structures and scalability make cloud computing the more attractive option for most SMEs [57]-[14]. The cloud services are more suitable to SMEs due to the relative advantage, flexibility and scalability features [50]. For example, implementing in-house Enterprise Resource Planning (ERP) incurs high costs for SMEs, while using the cloud the firm can buy only the components based on its business requirements instead of buying a whole ERP suite. Examined the important factors influencing SMEs decision to adopt cloud technology [55]-[54]. Based on the Technology, Organization and Environment (TOE) framework and Diffusion of Innovation (DOI) Theory, a model of cloud computing adoption by SMEs in Australian was developed and tested. Results showed that SMEs decision was influenced by factors related to organizational capability (relative advantage, quality of service and awareness), but not influenced by risk-related factors (security, privacy and flexibility). [31], presented a model to support the decision-making process in SMEs to adopt cloud computing using a multi-criteria decision method. A systematic approach to evaluating cloud computing services and deployment models was presented. The model helps ranking and selecting cloud services and deployment models using the Potentially All Pair-wise Rankings of all possible Alternatives (PAPRIKA) method. The model was validated by designing a survey, which was distributed to several SMEs decision makers in Australian. Findings showed a hierarchical ranking of the important factors influencing SMEs decision to adopt cloud computing. Relative advantage of cloud computing was ranked at the top, followed by the economic values, then the reliability and availability. Cloud services features, control ability and the compatibility of cloud services with the legacy systems were ranked forth, fifth and sixth, respectively. Security and privacy issues were ranked at the least as determinants for SMEs decision to adopt cloud services. Also, cloud services models and deployment models were ranked sequentially as follows: Private IaaS, Private PaaS, Private SaaS, Hybrid IaaS, Hybrid PaaS, Hybrid SaaS, Public IaaS-System, Public PaaS, Public SaaS, and Public IaaS-Storage. Examined the factors affecting cloud computing adoption by the SMEs [30]. A quantitative survey-based study was conducted to examine the effect of perceived benefits, top management support, IT resources, and external pressure on cloud computing adoption. Findings showed that IT resources and external pressure significantly affect cloud computing adoption, while there is no significant relationships between both of perceived benefits and top management, and cloud computing adoption. Further, based on reviewing the related literature, he recommended investigating in internal readiness and selecting the right cloud provider in the context of SMEs [26]. The compatibility between cloud provider solutions with enterprises' legacy systems and business

needs, as well as the impact of using cloud solutions on organizational culture, staff skills, and work practices should be explored. Furthermore, investigated the relationship between the use of the cloud technology and performance of organization from the customer, operational and financial perspectives [37]. A case study on the impact of cloud computing on the performance of Zarin porcelain Industries Company in Iran was examined. Findings showed that cloud computing has a positive and significant impact on the organizational performance based on the three different dimensions; financial, customer and operational. Mostly, previous researches identified cost savings as the key motivation for SMEs to pursue sustainability [23]. However, SMEs might be motivated to make progress on sustainability by a variety of factors, including social responsibility, government policy, social pressure [34]-[62] and the values of the owner/manager. Identified community reputation as the most frequently cited motivator of progress on sustainability, while increased profits comes in a close second [16]- [23]. The practice of technological innovation is significantly impact the business performance, but its effect towards SME sustainability is underexplored [10].

## 6. PROPOSED CONCEPTUAL MODEL

Measuring the impact of IT innovation on the organization performance and accordingly its sustainability is a complex problem which only can be informed by the insights of multiple theoretical paradigms. This study will rely on theoretical models to determine the impact of cloud computing on SMEs performance. The study will therefore rely on dominant theories of performance including Fit Viability Model (FVM), Resource Based View (RBV) and Transaction Cost Theory (TCT). Accordingly, this study proposes an integrated model, which considers the technology characteristics of cloud computing as well as the context of the SMEs sustainability through examining the factors influencing the performance. The proposed model integrates three of the most dominant models measuring the impact of a technology innovation on the organizational performance including FVM, RBV and TCT as well as considering the related literature. Figure 1 represent the study initial proposed model. Firstly, when new technology is used to implement a system in an organization, a degree of risk is usually involved. Thus, a model that able to predict the applicability of this technology to the context of the organization will be an advantage. The context's readiness and the characteristics of the technology affects the applicability of a new technological innovation [38]. FVM model is useful in establishing whether or not cloud computing can enhance the performance of SMEs. In this context, Fit is used to describe how far cloud computing is appropriate for the SMEs businesses tasks. Viability in the context of SMEs describes how much added-value might cloud computing bring to the SMEs performance as well as to what extent SMEs are ready for the adoption of this technology. Secondly, reviewing the literature shows that RBV is widely accepted and verified in the context of

SMEs [48]-[49] and organizational performance [1]-[8]-[39]-[58]. The RBV emphasizes that to have competitive advantage, businesses should possess and have control of valuable, rare and non-substitutable resources [12]. In regard to SME, resources may include technological, business and human resources which can be purposefully combined to develop firm's capabilities. These capabilities can enhance the performance [46]. Based on RBV, performance can be enhanced by integrating technological resources with other resources .Thirdly, as the main advantage of cloud computing for SMEs is cost saving, TCT has also informed understanding of the role of cloud technology in reducing transaction costs of SMEs. TCT was applied to study cloud computing adoption by organizations ,more specific in the context of SMEs [15]- [63]. Moreover, drawing on TCT, examined how cloud computing can help firms balance both economic and environmental performance, [52]. Furthermore, the environmental characteristics also exert their influence on utilizing cloud computing to enhance performance of SMEs towards sustainability. Social responsibility [34], government policy and social pressure [62], as well as community reputation [23], were identified as the most frequently cited motivator of progress on SMEs sustainability. The architecture of the proposed Conceptual is shown in Figure 1.

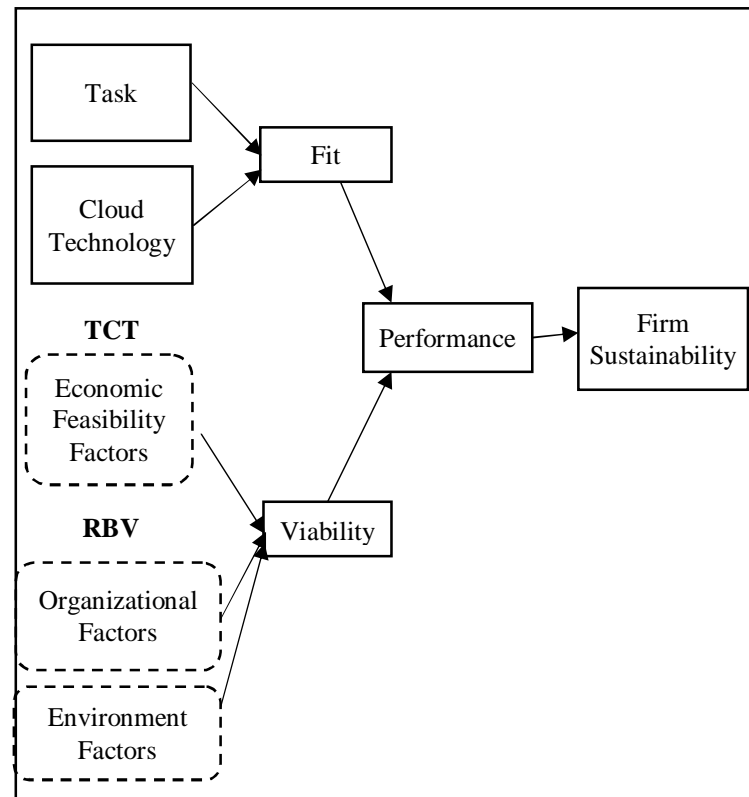


Figure 1: Proposed Conceptual Model

## 7. RESEARCH METHODOLOGY

Migrating e-services to the cloud is a complex decision making process. The main aim of this research is to develop a model as a matrix that can help decision makers to select the appropriate cloud model for their organizations requirements. To reach this aim, a solid research method is followed. The research method of this study comprises different stages, which includes formation of the problem background, reviewing the literature, validating and ranking the influencing factors by collecting and analysing data from the experts, developing the decision model, and discussing the results. Many factors may influence public organizations leaders' decision to adopt cloud computing to provide services that are more efficient. To identify these factors, comprehensive review of the related literature is conducted. This process should be guided by analysing some real cases from different countries.

## 8. CONCLUSION

Cloud computing is a recent phenomenon, which is predominantly driven by industry recognition of making sustainability their focus. It became one of the key techniques for controlling and organizing the firms in term of economic and environmental performance. In this paper, we present theoretical studied to investigate the factors influencing the sustainability of SMEs through enhancing their performance using cloud technology. Many issues consider in this study first, explore the drivers of cloud technology adoption by SMEs. Second, identify the factors influencing cloud technology utilization to enhance the of SMEs' performance. Third, identify the role of cloud computing technology in enhancing SMEs' sustainability. The result was develop a conceptual model for SMEs sustainability using cloud computing. The model integrates three of the most dominant models measuring the impact of a technology innovation on the organizational performance including FVM, RBV and TCT as well as considering the related literature. The research needs further work to test and improve the proposed conceptual model before going to practice.

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