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Current State of Cloud Computing Adoption – An Empirical Study in Major Public Sector Organizations of Saudi Arabia (KSA)

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Abstract

Cloud computing technology has been adopted by many developed countries' public sectors. This has led to improvements in government function, the services it provides to its citizens and institutions, and its cooperation with other government organizations. Whilst cloud computing is no longer an emerging technology in developed countries, it is still a relatively new paradigm in other countries, particularly in developing countries. The Kingdom of Saudi Arabia (KSA), for instance, is still at the phase of considering the technology, with very few cases of adoption, and certainly not at governmental levels. This paper analyzes the state of current cloud computing adoption in the KSA, supported by an empirical study through a comprehensive outreach survey, yet to be reported in the literature. The survey was distributed throughout a number of government ministries, rather than a specific one, which has been the main focus of published literature.

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Keywords: Cloud Computing; Saudi Arabia; An Emprical Study; Cloud Computing Adoption

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1. Introduction

Governments around the world are adopting web-based technologies and the internet in their daily tasks for cost reduction and better resource utilization puposes[1]. Thus, the concept of electronic government (e-government) has emerged over recent years[2]. E-government utilizes Information and Communication Technology (ICT) to deliver government services[3]. The government of the KSA attaches high significance to the e-government concept and the transformation process that leads to its realization, in order to reduce costs, improve services, save time and increase effectiveness and efficiency across the public sector[4]. As a result, the government of the KSA has already started the process of implementing an e-government strategy. 'YESSER' has been the umbrella organization and the overall controller of all procedures, activities, and all other issues and acts related to e-government implementation in the Kingdom[3]. Cloud computing has emerged during the last decade, and promises to significantly improve government functions, the services it provides to its citizens and institutions, and its cooperation with other government organizations[5]. Both developed and developing countries have started to adopt cloud computing services in all sectors[6]. The National Institute of Standards and Technology (NIST) defined cloud computing as "a model for enabling ubiquitous, 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"[7]. The cloud computing model is composed of five essential characteristics, four deployment models and three service models[8]. The essential characteristics of cloud computing include on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service[9]. The cloud deployment models are private, public, hybrid, and community model[10]. In addition, cloud computing includes three service delivery models: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS)[7].

Cloud computing offers potential benefits to public organizations by making information technology (IT) services available as a commodity[11]. The general claimed benefits of cloud computing include: cost efficiency, almost unlimited storage, backup and recovery, automatic software integration, ease of access to information, quick deployment, easier scale of services and delivery of new services. However, cloud computing's wider adoption has so far been restricted due to several factors[12], which are mostly concerned with the moving of business data to be handled by a third party, including loss of data control, security and privacy of data, data quality and assurance, and data stewardship etc. Data lock-in is a potential risk involving cloud customers facing difficulties in extracting their data from the cloud. Cloud consumers can also suffer from operational and regulatory challenges, as organizations transfer their data to third parties for storage and processing[13]. It may be difficult for consumers to check the data handling practices of the cloud provider.

The KSA, despite recent considerable investments to develop its ICT infrastructure, is still behind when it comes to the adoption of cloud computing. In this paper, we aim to investigate the current state of cloud computing adoption in the public sector in the KSA. The results of this study are expected to be valuable for both public sectors in the country as potential customers, and cloud providers as potential technology providers. This study analyzes results from the most recent empirical study, in what we consider is the most comprehensive outreach survey yet to be reported in the literature. The structure of the rest of the paper is as follows: Section 2 provides a review of related work about cloud computing in the KSA. Section 3 presents the research's contribution. Sections 4 and 5 deal with results and discussions, respectively, with Section 6 providing concluding remarks and recommendations for future work.

2. Related Work

Information and Communication Technology (ICT) investments have been increasing in recent years, based on the KSA government's strategic aims[3]. Among Saudi organizations, the key strategic aims for ICT investments involve improving operational efficiency, improving the alignment of ICT with business needs, skills development, ramping up innovation, and customer relationship enhancement. As a result, many government organizations in the KSA have implemented their ICT infrastructures, including e-government solutions[14]. The government of the KSA began implementing a national e-government program in 1998[3]. Since then, it has significantly transformed its public