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When traditional information technology project managers encounter the cloud: Opportunities and dilemmas in the transition to cloud services

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Abstract

Cloud computing has rapidly changed the conventional way information technology (IT) products and services are delivered. This study aims to identify the opportunities and dilemmas IT project managers are encountering in managing cloud projects, and to develop a system dynamics model to capture the complexity of cloud adoption. A questionnaire survey was conducted among IT project managers and data were analyzed via T-Tests, ANOVA, and principal component analysis. The identified opportunities and dilemmas in adopting cloud services formed the elements in the system dynamics model. Findings revealed incorporating cloud services in IT projects could shorten project timeline, optimize project scope, and reduce project cost. However, project managers also expressed concern about data privacy, security, IT governance, and local regulation when moving services to the cloud. Incorporation of proper change management plan and detailed risk management plan are required to identify the privacy and regulatory concerns.

Keywords: Cloud project; IT Project Manager; Opportunities and dilemmas; System dynamics

1. Introduction

Information Technology (IT) project management is a type of project management where IT projects are planned, executed, monitored, and controlled by a project team (Hsu et al., 2014). Compared to other types of projects (e.g., construction and manufacturing projects), IT projects are normally short-term and with greater uncertainty. IT projects also have a higher failure rate due to the unique technological challenges relating to hardware and software misconfiguration, network failure, security risks, or interoperability issues (Weingartner et al., 2015). General project management challenges including deadlines, budget constraints and resource constraint also contribute to the potential failure causes in IT projects. Recently, cloud computing influences how IT is implemented; thus, cloud services are becoming the dominant IT service delivery model in this decade (Zhang et al., 2010) and this has significant impact on how IT projects are managed.

Cloud computing was defined by the National Institute of Standards and Technology (NIST) as a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources including networks, servers, storage, applications, and services that could be rapidly provisioned and released with minimal management effort or service provider interaction. Cloud services have altered the definition of

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products in traditional IT projects, where hardware and software packages are delivered to customers. Instead, the products in cloud services consist only of various services instead of physical hardware and software and this forces a role change for the IT project managers involved. Cloud projects are challenging because of their dynamic nature (Walterbusch et al., 2013). IT project management is complicated as it involves the transitioning of business needs and demanding stakeholders to workable solution. However, while these challenges present dilemmas to the IT project managers, the change to provision of cloud services also affords many new opportunities to organizations and managers (Gupta et al., 2013).

This research is important because the change in technology to cloud projects forces re-consideration of strategy, information systems policy, and organizational requirements (Marston et al., 2011), all of which need to be carefully evaluated by the IT project managers. While the social and cultural determinants of traditional IT project success are well understood, cloud projects have changed the project management method in software development and infrastructure implementation projects. Despite this, many IT project managers have only been equipped with general skills to manage IT projects (Muhic and Johansson, 2014) and may be missing skills vital to manage the transition to cloud projects. Risks in cloud computing projects that the managers may need to work with include tool immaturity, unavailability of skills, increased engineering costs, and compliance issues. In addition, the growing volume of cloud services has led Gartner to predict that by 2016, most new IT spending will be on cloud computing (Gartner, 2013). This strong growth and dominance in spend provides further motivation to understand the impact of cloud computing on IT project managers. Therefore, the aim of this research is to identify the opportunities and dilemmas that exist in managing cloud projects, establish how different IT project managers perceive these differently, and to develop a system dynamics model to simulate the complexity of cloud adoption.

The rest of the paper is structured as follows. First, we provide an overview of the project management challenges inherent during the shift towards cloud-based services. We then outline our research questions and aims to determine how these opportunities and dilemmas are perceived and then discuss the survey and modeling methodology that we used to address these. We present the results of the analysis and the developed causal loop diagram (CLD) and model based on the survey data, presenting social and cultural management skills as the key challenges facing IT project managers. We discuss our findings and show agreement with past literature but also highlight key opportunities and factors that experienced IT project managers can leverage as they shift towards the cloud and highlight now emerging IT project managers should augment their skills.

2. Related literature and hypothesis

2.1. IT project management evolving to cloud

The rapid changes towards cloud computing has changed the roles and responsibilities of IT project managers. Traditionally, the three important elements in IT projects were people, process, and technology; these needed to be defined, balanced and integrated to optimize the project performance (Liu et al., 2011). However, the trend of moving to cloud services changed the role of IT project managers from technical support to new skills such as proper contracts management, strategic IT investments, ensuring efficient alignment between the legacy application and cloud services, acquiring expertise for IT resource planning, governing new development in data privacy and security, and managing compliance issues (Smith et al., 2011). Project managers play an important role in monitoring and controlling the deployment phases in an IT project life cycle. They must manage and address issues relating to project performance – especially meeting time-based criteria (Agarwal and Rathod, 2006) – and also reduce the social and cultural elements that lead to instability in projects (Liu et al., 2011). Such measures of success may also depend on whether the IT project manager is working with an external client, in which case client satisfaction is crucial (Savolainen et al., 2012). Key measures of success (e.g., cost overruns and adherence to time-based criteria) can be adversely impacted by requirements changes, which are therefore a key risk that must be managed (Fu et al., 2012).

In the IT industry, project managers are classified into two types who manage projects differently: technical project managers and functional project managers. Technical project managers are responsible for technical elements such as assessing technical risks, solving technical problems, and communicating to non-technical audiences. Technical project managers are normally consider as IT professionals. In contrast, a functional project manager is responsible for non-technical elements of the project; e.g., time and cost planning, requirements gathering, and usability testing. The IT project lifecycle includes multiple phases; e.g., initiation, planning, executing, monitoring, controlling, and closure (Pitsis et al., 2014). IT projects are short and have high levels of uncertainty so that managing risk is always a central problem regardless whether the project is outsourced or in-house (Liu and Wang, 2014).

2.2. Traditional services vs. cloud services in IT projects

Traditional IT services always refer to outright ownership and locally provisioned hardware and software. When the capacity of the server is exceeded, additional hardware must be added to the physical equipment. The traditional server model has been used for decades because it was simple to implement, deploy, and was owned by the customer. However, the traditional approach has limitations in scalability and agility to accommodate the increasing server workloads. Proper knowledge and experience were required for the IT personnel to maintain and operate the servers at certain locations (Weingartner et al., 2015) and new skills and empowerment of staff is related to their ability to deploy the agile methods (Sheffield and Lemétayer, 2013) that are becoming increasingly important to accommodate many and rapid changes. Cloud computing can accommodate a range of payment types including metered service, pay-per-use, remotely provisioned, and tenant-based subscription. Servers run in a virtualized environment with shared resources in a data center