

Institutional Pressures and Cloud Computing Adoption: The Moderating Effect of Organizational Mindfulness

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Abstract: The literature on cloud computing adoption has grown substantially. Most of the focus on the antecedents of cloud computing adoption. While some of these studies have investigated the relationship between institutional pressures and cloud computing adoption, there is a dearth of empirical literature on how organizations can moderate the bandwagon effect of institutional pressures. The current study aims at investigating the moderating role of organizational mindfulness on the relationship between institutional pressures and cloud computing adoption. A priori model was developed and tested through SEM. A firm level cross sectional survey was conducted on a sample of 60 financial institutions. The results indicate that organizational mindfulness has a small moderating effect on the relationship between institutional pressures and cloud computing adoption. An implication of this study is that financial institutions, should adopt cloud services that suite their own individual needs discerned through mindfulness rather than following institutional bandwagons.

Keywords: Cloud computing, cloud computing adoption, institutional pressures, organizational mindfulness, financial institutions.

1. Introduction

Cloud computing, which involves the provision of information technology (IT) solutions as a service rather than as a product over the internet is not only transforming the computing industry but also how individuals and organizations consume IT services. Through sharing of IT resources, cloud computing has led to substantial transformations involving the centralization and translocation of software, platforms and infrastructures into the cloud. As a result, cloud computing has become a popular topic for blogging, white papers, workshops, conferences and even magazines [1] leading to a heightened interest by firms in cloud computing adoption [2]. According to Gartner [3], more than \$1 trillion in IT expenditure will be directly or indirectly toward transition to cloud computing systems by 2020. But despite the interest of organizations in cloud computing, ready access and widespread deployment still averages at a low of 7 percent [4].

A literature review on cloud computing research published from 2009 and till 2015 indicates that a bigger proportion of academic literature on cloud computing has mainly focussed on technical issues (47.4%) with only 31.9% focussing on business issues [5]. A major business issue regarding cloud computing is adoption. Cloud computing adoption has therefore attracted a number of studies [6]–[11] specifically addressing organizational factors that influence or hinder adoption of cloud computing by organizations. Most of these studies have proceeded along two schools of thought; the economic-rationalist perspective and the institutional perspective. The economic-rationalistic school posits that decision makers adopt an innovation because of the expected efficiency or returns [12]. On

the other hand, the institutional perspective posits that organizations face pressures to conform to some shared notions of appropriate norms and behaviours [13]. According to Strang and Tuman [14], when institutional forces are strongly present, the IT adoption decisions made by an organization will be contingent not just on a firm's own independent assessment of the innovation's merits but will also depend on just who prior adopter are. This results into what has been characterized as the bandwagon phenomenon [15], [16].

According to Lin and Chen [17], the particularities of emerging complex IT innovations like cloud computing and complexities of modern organizational environments pose technical and organizational challenges to firms intending to adopt such innovations. To address these challenges, the theory of organizational mindfulness has been used to understand how organizations can temper the effects of institutional pressures. Swanson and Ramiller [18] argue that attention to organizational specifics in the form of organizational mindfulness is crucial in supporting sound judgments about whether adopting a particular IT innovation is a good thing to do, when committing to the innovation is likely best to take place, and how implementation and assimilation can best be pursued. Organizational mindfulness plays a dual role in innovation, enhancing the recognition of organizational circumstances demanding an innovative response, while also fostering effectiveness in executing the response itself [18]. Organizational mindfulness is not simplistically promotive of innovation but may also entail wariness in some circumstances, and where needed it may foster a resistance to jumping on innovation bandwagons [12, p. 66]. Organizational mindfulness, apart from enabling organizations to make IT innovation adoption decisions based on their organizational specifics will also enable the same organizations to make better decisions throughout the implementation process.. Informed by this discussion, we were motivated to answer the question "How does organizational mindfulness moderate the relationship between institutional pressures and cloud computing adoption?". To answer the question, a priori model was developed and tested by using responses of a survey data collected from financial firms in Kenya.

2. Study Objectives

- i) To examine the relationship between institutional pressures and cloud computing adoption by financial institutions in Kenya.
- ii) To examine the relationship between organizational mindfulness and cloud computing adoption by financial institutions in Kenya.
- iii) To examine the moderating role of organizational mindfulness on relationship between institutional pressures and cloud computing adoption by financial institutions in Kenya.

3. Business Case

3.1 Cloud Computing

A classic definition of cloud computing is that it is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [19]. Cloud computing allows for the delivery of IT infrastructure and applications as a service on demand to individuals and organizations through the use of the internet [20]. It enables users to utilize computing resources over a network or internet as services without necessarily acquiring and owning them. Cloud computing can be classified in terms of both service models and deployment models. The types of service models that have emerged under cloud computing are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) [21]. The deployment models are public cloud, private cloud, hybrid cloud and community clouds [22].

Organizations adopt cloud computing due to several reasons. Adoption of cloud

computing requires very minimal upfront investment. Public cloud computing needs no capital expenditure because no hardware, software or network devices are purchased by the client [23]. Cloud computing resources can be rapidly allocated and de-allocated on demand [24] thus lowering operating costs. Scalability of cloud computing allows organizations to demand computing resources and services on need basis. Services hosted in the cloud are generally web-based and easily accessible through a variety of devices with internet connections [24]. Finally, cloud computing reduces business risks and maintenance expenses as these tasks are passed on to the cloud service provider [24].

The main challenges or limitations of cloud computing are of technical, managerial and regulatory nature. Technical challenges include: 1) problems availability/reliability of cloud services (Buyya et al., 2011) , lack of sufficient tools for integration/Componentization (Stanoevska-Slabeva & Wozniak, 2010), 3) limited scope for customization [26], [27]. Managerial challenges include how to effectively and efficiently manage security and privacy of data (Kim, 2009; Buyya, Goscinski, & Broberg, 2011), fear of vendor lock-in (W. Kim, 2009), vendor management [29], and change management for successful adoption [27]. Lastly, the challenge of compliance/regulatory ambiguity[27]–[29] .

3.2 *Cloud Computing Adoption in the Kenya's Financial Sector*

The Kenya's financial sector comprises of the banking, capital markets, insurance, pensions, and savings credit cooperatives [30]. These financial subsectors are regulated by five regulatory authorities that include; The central bank of Kenya (CBK), Capital Markets Authority (CMA), Insurance Regulatory Authority (IRA), Retirement Benefits Authority (RBA) and the Societies Regulatory Authority (SASRA). The financial service providers are diverse and include 42 commercial banks, 13 deposit taking microfinance banks [31], 181 registered savings and credit cooperatives [32] and 55 insurance companies [33].

The financial, ICT and manufacturing have been identified as the early adopters of cloud computing globally with an average of 7.24 cloud apps adopted per business unit compared to an of average of 5.4 for all industries [34]. A study done in South Africa also indicates that the ICT sector was leading in cloud computing adoption at 54% followed by manufacturing sector at 47% and the financial sector at 33% [35]. A study by Economist [4] shows that 74 percent of the respondents indicated that cloud computing will be a major factor in banking in five years. A cloud computing in Kenya report indicates that adoption of cloud computing is fairly recent with first adopters appearing in 2010 [36]. Since Kenya has been the finest in ICT innovation in Africa and home to multiple regional hubs including IBM's first African research lab and Google's first sub-Saharan African office [37], it is well positioned for cloud computing adoption. The emergence and rapid growth of mobile financial services in Kenya has been a driving force for the adoption of cloud computing by the financial sector. Through cloud computing, firms in the financial sector are able to rapidly engineer new financial products quickly while at the same time enhancing agility and efficiency in service delivery.

4. Theoretical Perspectives and Hypothesis Development

4.1 Institutional Pressures

Institutional theory posits that organizations face pressures to conform to organizational practices and policies accepted as legitimate and rational means to attain organizational goal [38]. Under mimetic pressures (MP), coercive pressures (CP) and normative pressures (NP), organizations implement strategies to gain, maintain or repair their legitimacy [39]. Interactive innovations like cloud computing diffuse when other organizations observe and imitate the early adopters to replicate their success or avoid being perceived as laggards; or when they communicate with these early adopters and are persuaded, induced or coerced to adopt (Contractor and Eisenberg, 1990 cited in Teo et al., 2003).

A number of studies have used institutional theory to explain and predict adoption of IT innovations. Teo et al (2003) used institutional theory to study intention to adopt Federal Electronic Document Interchange (FEDI) and concluded that institutional forces have a significant influence on organizational intention to adopt FEDI. A study by Benders, Batenberg and Blonk [40] on ERP deployment concluded that competitive and institutional pressures play a role in ERP adoption. Another study conducted on assimilation of enterprise systems concluded that institutional pressures contribute to post implementation of ERP [41]. Further, a study on cloud computing adoption by South African firms showed that the mimetic pressure is more important compared to coercive and normative pressures in the adoption of cloud computing [35]. These studies show that IT innovations are embedded in complex interdependent social, political and economic networks that are shaped by broader institutional forces. We therefore propose the hypothesis that:

H1: Institutional pressures have a relationship with cloud computing adoption by financial institutions in Kenya.

4.2 Organizational Mindfulness and Cloud Computing Adoption

Adoption of IT innovations based on institutional forces are bandwagon behaviours. Bandwagons are diffusion processes whereby individuals or organizations adopt an idea, technique, technology or a product because of pressures caused by the number of organizations that have already adopted it [12]. In bandwagon behavior, adopting organizations entertain scant reasoning for their moves, notwithstanding the high cost and apparent risk involved [18]. In order to address the challenge of bandwagon behavior, the role of organizational mindfulness in determining organizational innovation adoption particularly in the context of technologies subject to bandwagon dynamics is explored. An organization is considered mindful if it manifests these characteristics; preoccupation with failure (PF), reluctance to simplify interpretations(RI), sensitivity to operations (SO), commitment to resilience (CR) and under-specification of structures (US) [42].

Following the call by Fichman [43]; and Swanson & Ramiller (2004) for incorporation of mindfulness in IS research, several studies have since used it as a theoretical lens. A study of agile software development concluded that collective mindfulness is one of the emergent capabilities of an agile team [44]. Studies of high reliability organizations have used mindfulness as a means of mitigating the potentially negative consequences of bandwagon behavior (Wolf, Beck, & Pahlke, 2012). A related study used mindfulness to examine information systems agility and established that mindfulness focuses on similar goals as agility [47]. Finally, a study on the role of mindfulness in mobile business intelligence (mobile BI) adoption established that the enthusiasm of the executive and users affect the decisions of a company to adopt mobile BI [48]. These studies examined the direct role of mindfulness on IT innovation adoption. To extend the application of organizational mindfulness as a lens for understanding IT innovation especially cloud computing, the current study puts forward the below hypotheses:

H2: Organizational Mindfulness have a relationship with cloud computing adoption by financial institutions in Kenya.

According to Fichman [43], integrating mindfulness into IT innovation research, the “black box” for decision making can be opened. Mindfulness explains how expanded scanning and information processing of managers contributes to discriminating decisions made in order to successfully resist bandwagons [49]. In particular, mindfulness eventually leads to increases in business process performance regarding grid assimilation in the face of institutional pressures [50]. Following the preceding findings, we hypothesize that:

H3: Organizational Mindfulness have a moderating effect on the relationship between institutional pressures and cloud computing adoption by financial institutions in Kenya.

5. Methodology

Data used to test the three hypotheses was collected using a questionnaire. The

questionnaire items included indicators for measuring institutional pressures, organizational mindfulness and cloud computing adoption. A random sample of 60 financial institutions was picked from a sample frame of 138 licensed firms. The financial institutions sampled included firms in both the banking and insurance industries. The banks were identified from the Central Bank of Kenya website (www.centralbank.go.ke) and the insurance firms were identified through the Insurance Regulatory Authority website (www.ira.go.ke). as there is no single database listing all the firms in the financial sector. There were a total of 138 licensed firms in the financial sector with 53 of them being in the banking sector and 71 firms in the insurance sector.

A single questionnaire was used to capture data from each of the 60 sampled financial institutions. Out of the 60 financial institutions sampled, 33 completed the question resulting into a 55 percent response rate. The questionnaire instrument was administered online to the managers having ICT related responsibilities in each of the firms. The questionnaire items for the various scales were adapted from literature sources that have studied similar constructs and variables.

Data was analyzed using the Structural Equation Modelling (SEM) technique. SEM tests were conducted using SmartPLS[52]. SmartPLS was used to estimate the relationships among institutional pressures, cloud computing adoption and the moderating effect of organizational mindfulness. Data screening was done before importing the data to a SEM software package for both measurement and structural estimation. After data screening, only 22 observations were found to be usable for data analysis.

6. Results

Since each latent variable was measured using a number of indicators, internal consistency of the indicators was evaluated using composite reliability (CA) with a threshold value of 0.700 and above [53], [54]. The convergent validity which assesses the extent to which indicators measuring a particular latent variable load highly on that variable compared to other latent variables was evaluated using the average variance extracted (AVE) with a threshold of 0.500 and above[53], [54]. Values for CA & AVE are summarized in Table 1.

Table 1:Table 1: Reliability and validity of Latent Variables

Latent Variable	CA	AVE
Institutional Pressures	0.863	0.679
Cloud Computing Adoption	0.830	0.464
Organizational Mindfulness	0.951	0.796
Moderating Effect	1.000	1.000

The structural model was evaluated through the coefficient of determination (R2) criterion. The value for R2 was 0.341 indicating a weak explanatory power[51]. The findings are summarized in Figure 1.

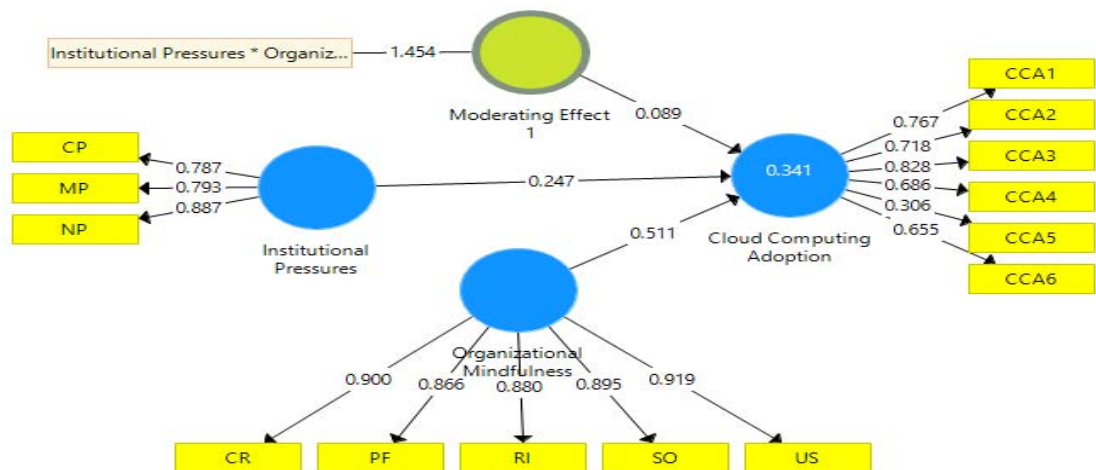


Figure 1: The Measurement and Structural Model of the Variables

7. Discussion of Results

The results of this study are preliminary since the data used relates only to financial institutions while the complete study collected data from the ICT and Manufacturing sectors. The sample of 22 financial institutions may have not comprised adequate sample size for the types of the analyses conducted on the data. The results show that institutional pressures have a relationship with cloud computing adoption with a path coefficient of 0.247. This confirms the findings of previous studies on IT innovation adoption, for example Teo et al. [38], Cochrane and Herhalt [55], Low et al. [56] and Oredo et al.[11]. Another study conducted on cloud computing adoption by South African firms also concluded that greater mimetic pressures will lead to greater adoption of cloud computing [35, p. 92]. The implication is that bandwagon effect is a significant predictor of cloud computing adoption by financial firms in Kenya.

The results also indicated that there is a positive relationship between organizational mindfulness and cloud computing adoption with a path coefficient of 0.511. This is an indication that financial firms engaged in the early evaluation of cloud computing benefits against their specific needs. Most of the studies touching on the relationship between organizational mindfulness and IT innovation adoption are mainly conceptual [18], [43], [57]. If mindfulness is viewed as a theoretical concept for understanding how organizations can achieve flexibility and reliability in their enactment of organizational routines [42], [57], then this study confirms the findings of McAvoy et al. [47], who found that mindfulness influenced information systems development (ISD) agility.

The main objective of the study was to investigate the moderating effect of organizational mindfulness on the relationship between institutional pressures and cloud computing adoption. The path coefficient of the moderating effect is 0.089. This result implies that the interaction effect is positive. The more positive organizational mindfulness is, the more positive is the more positive the relationship between institutional pressures and cloud computing adoption becomes. From a theoretical perspective, it has been demonstrated that mindfulness can moderate the relationship between theoretical constructs of social influence media use [49], [58]. The small interaction effect of organizational mindfulness could be due to the fact that adoption of IT innovations by financial institutions is influenced more by institutional pressures and not necessarily by the specific needs of an institution. In fact, financial institutions operate within very strong institutional contexts.

8. Conclusions

The results of this study showed that organizational mindfulness has a moderating effect on

the relationship between institutional pressures and cloud computing adoption. The results indicate a small moderating effect. An important implication is that organizations should evaluate their own needs and make discriminatory adoption decisions. From management science, organizational mindfulness has been found to promote decision makers' evaluation of preparedness as the first step before deciding on the implementation of an IS [59]. The role of organizational mindfulness in IT innovation adoption has been hypothesized from three fronts; either as a prerequisite, an accelerator or as an implication [49]. In this study, we explored the role of organizational mindfulness as an accelerator/decelerator of IT innovation adoption in terms of its interaction effect. Future research should not only explore the prerequisite and implication roles of mindfulness but also to attempt to expand the sample size in order to test if such moderating effect is statistically significant.

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