AN INSTITUTIONAL LENS ON CLOUD COMPUTING ADOPTION – A STUDY OF INSTITUTIONAL FACTORS AND ADOPTION STRATEGIES

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Research paper

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Abstract

This paper reports from an empirical study that focuses on cloud computing (CC) adoption in various contexts. The findings build upon 25 interviews conducted in both Norwegian and Egyptian organizations. We utilized a neo-institutional lens as a guide to understand the internal and external factors, and their various influences on shaping CC adoption strategies. We identified five external institutional factors; governments and regulatory bodies, cloud service providers, media, socio-political changes, and culture. Furthermore, three internal institutional factors have been identified; internal stakeholders, organization characteristics, and IT infrastructure. We identified three different adoption strategies in this respect; efficiency-motivated adoption, legitimacy-motivated adoption and non-adoption. This research gives an insight into which institutional factors that influence the adoption and non-adoption of CC services.

Keywords: Cloud computing, Adoption, Strategy, Institutional, factors, Egypt, Norway

1 Introduction

There is a growing interest in cloud computing (CC), in the era of service innovation that “entails firms selling computing rather than computers to clients. Servitization strategies allow an organization to shift from selling a product to selling an integrated product and service offering” (Barrett et al. 2015, p.137). However, there is an increasing concern from clients about this new business model; thus, there is need to gain more knowledge about its dynamics. Despite the capabilities that the CC model can bring to organizations in terms of scalability, flexibility, agility, simplicity, and efficiency (Venters & Whitley 2012), there are nonetheless several critical factors to its adoption. These factors are related to technology, business environment, the potential adopting organization, and the relationship between the potential adopting organization and its business environment (Armbrust et al. 2010; Garrison et al. 2012; Marston et al. 2011). The existing information systems (IS) literature has indicated the lack of research in the area of CC adoption and the need for practice-related IS research outcomes (Yang & Tate 2012). Furthermore, there is a need to transfer lessons learned from cross-country investigations, which may reveal more influential factors for adopting CC services (Schneider & Sunyaev 2014; El-Gazzar 2014). Recent literature has advocated the need for studying the “adoption” and “non-adoption” of CC services, because it would be interesting to compare non-adopting with adopting contexts (Schneider & Sunyaev 2014). In this sense, the literature has encouraged to focus on “factors other than technology characteristics, such as organizational, individual, and environmental characteristics.... [and] further investigation of institutional influences in the context of
cloud-sourcing decisions” (Schneider & Sunyaev 2014, p.15). Based on the research gaps identified in previous literature, this research seeks to increase our understanding of CC adoption in organizations. By utilizing an institutional lens, we want to explore the institutional factors that have influence on shaping CC adoption strategies by looking into various contexts. In particular, the following research questions have guided this research: What are the institutional factors that influence on CC adoption in organizations? How do institutional factors shape CC adoption strategies?

The remainder of the paper is organized as follows. First, we present some key concepts of CC and neo-institutional theory. Second, we introduce the research context and methods, followed by the presentation of the results. Third, we provide a discussion of the results and implications for research and practice. Finally, we make some concluding remarks.

2 Background and key concepts

2.1 Cloud computing concepts and adoption

CC has been defined by many industry institutes, Cloud Service Providers (CSPs), industry experts, and academics (Yang & Tate 2012; Cearley 2010; IBM 2009; Creeger 2009). However, CC is commonly defined 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” (Mell & Grance 2011, p.2). CC services are offered as software applications (i.e., Software as a Service [SaaS]), integrated development environments (i.e., Platform as a Service [PaaS]), or storage and connectivity infrastructure (i.e., Infrastructure as a Service [IaaS]). CC services are deployed either on a public shared environment, private dedicated on- or off-premise environment, or combination of public and private deployments integrated with in-house IT systems (i.e., hybrid) (Mell & Grance 2011). These variety of CC offerings provide key strategic capabilities (e.g., scalability, ubiquity, and mobility) to organizations that would not be available otherwise (Iyer & Henderson 2010; Venters & Whitley 2012). These capabilities bring benefits to organizations, such as innovation through increased business focus, increased efficiency in work processes, and rapid response to dynamic market demands (Iyer & Henderson 2012; Schneider & Sunyaev 2014). However, these benefits cannot be realized without making changes in the business processes and related routines (Brynjolfsson et al. 2010).

The literature on CC adoption reported a wide set of factors that affect organizations’ decision to adopt CC services. Schneider and Sunyaev (2014) found strong evidence in previous research that cost savings, accessibility to IT resources, flexibility, quality improvements, reduced time to market, market maturity, top management support, and vendor’s service capability (i.e., expertise and knowledge about technology and processes, technical and managerial IT skills, and reputation as perceived by the client) had a positive effect on CC sourcing decisions. The authors also emphasized that strategic importance, availability risks, perceived complexity, and security risks had a significantly negative effect on CC sourcing decisions (Schneider & Sunyaev 2014). Another study corroborated both the positive effect of perceived benefits, top management support and the CSPs expertise and reputation, and the negative effect of complexity and perceived risks, on CC adoption (El-Gazzar 2014). In the latter study, the negative effect of absent or outdated regulations across countries were highlighted (El-Gazzar 2014). In sum, the literature concluded that the effect of institutional influences is, yet, inconclusive and need further exploration (Schneider & Sunyaev 2014), and the complex and multi-faceted nature of CC adoption is not yet well-addressed (Morgan & Conboy 2013). Furthermore, research that compares CC adoption across countries has been suggested (Schneider & Sunyaev 2014). In this paper, we acknowledge that the systemic view on CC adoption strategies is quite important, which looks at the strategy as a social action that needs to be understood within its social context. This obliges to take the culture and power mechanisms of the social system surrounding the organization into account.
(Bakir & Todorovic 2010; Whittington 2001). Next, we introduce the institutional lens of neo-institutional theory which has informed this research.

2.2 Neo-institutional theory

It is argued that IS studies have not exploited neo-institutional theory in a level of analysis that goes beyond a single organization; for instance, to include environmental (e.g., societal, sector, or field) and individual (e.g., agency) issues (Currie 2009). The organizational field level is a central concept in neo-institutional theory, and can be defined as “a community of organizations that partakes of a common meaning system and whose participants interact more frequently and fatefuly with one another than with actors outside the field” (Scott 2001, p.84). This may include regulatory bodies, business partners (e.g., customers and suppliers), peer organizations, competitors, and professional and trade associations. Institutions are socially constructed by social, political, economic, and legal contexts in the organizational field, which enact the rules and norms of accepted social behaviour for either individuals or organizations (Weerakkody et al. 2009). At the national level, “organizations in different socio-economic and political contexts may often react differently to similar internal and external challenges due to constraints imposed by the environment they exist in” (Weerakkody et al. 2009, p.354).

Institutional influences are imposed on organizations from the social system they operate in, either at the organizational field level or the national level (Oliver 1991; Currie 2009), to influence their decision-making. These institutional influences are triggered from the values, norms, beliefs, and assumptions that are made by individuals who populate organizations and their institutional environment (Barley & Tolbert 1997). We used neo-institutional theory to explain CC adoption in its social setting, because “explanation is closely linked to human understanding, as an explanation can be provided with the intent of inducing a subjective state of understanding in an individual.” (Gregor 2006, p.617).

Furthermore, neo-institutional theory demonstrates the notion of irrationality in decision-making, which drives organizations to seek legitimacy more than efficiency (Avgerou 2000; Orlowski & Barley 2001; Mignerat & Rivard 2009). Legitimacy is defined as the “congruence between the social values associated with or implied by [organizational] activities and the norms of acceptable behavior in the larger social system” (Dowling & Pfeffer 1975, p.122).

CC is argued to be embedded into political reforms and organizational changes to enact, support, and drive transformation in the way organizations run their business (Cordella & Willcocks 2012). In the CC literature, governmental influence was reported to be negative on the adoption of CC services; however, this only applies for highly regulated industries such as healthcare (Schneider & Sunyaev 2014). At the national level, laws and regulations can be tough, with penalties constraining the adoption of CC services in some contexts (Seddon & Currie 2013), or encouraging, with policies motivating the adoption of CC services in other contexts (Lian et al. 2014). At the international level, laws and regulations give rise to complexity and fuzziness issues (Marston et al. 2011); for instance, in the EU region there is serious concern about data security and privacy issues with regard to public records. Indeed, the unsolved conflicts in legislation between the EU and US. This raises a big question mark regarding responsibilities and accountabilities between client organizations and CSPs (Seddon & Currie 2013), especially with widespread leaks about the NSA PRISM surveillance program, which has led to increased uncertainty (Schneider & Sunyaev 2014; NTT Communications 2014).

In the context of CC, the organizational field that is most characterized by high competition, uncertainty, and conflicts consists of various actors such as “national governments, supra-national organizations, industry bodies, trade and professional associations as well as cloud vendors, cloud clients and the organizations of these clients ” (Kshetri 2013, p.375). These actors enact the rules and norms of the CC game through an exchange of dialogues, rhetorics, and content; however; these rules and norms are not moving at the same speed as the technological development (Kshetri 2013). This has been attributed to the fact that each of these actors has a different logic and perception of the main CC issues, namely, concerns, interests, and capabilities (Kshetri 2013). Some actors are focused on costs benefits, some are focused on security and privacy risks, whilst some are focused on security and pri-
vacancy risks, and others are focused on controlling the data in the cloud, either by securing or spying on data (Kshetri 2013). A limited empirical studies applied concepts from neo-institutional theory in order to examine the effect of institutional influences on the adoption of CC services. Three studies are in progress, which have chosen to use a neo-institutional perspective. One of these studies is aimed at understanding the behaviour of cloud vendors in how they formulate their strategies to respond to the emerging market of CC (Su 2011). The second study has focused on the clients by arguing that institutional influences are likely to affect a client organization’s perception of CC characteristics (e.g., accessibility, scalability, cost-effectiveness, and lack of security); in turn, this has an influence on its ultimate intention to adopt CC services (Saya et al. 2010). The third study hypothesized that the successful adoption of SaaS by peer organizations serves as a mimetic pressure to influence the likelihood of a client’s decision to adopt SaaS (Xin & Levina 2008). The way in which client organizations interpret various institutional influences in their adoption strategies and their reasons for so doing remain relatively unexplored. Additionally, the literature advocated the need to “provide evidence for the underlying mechanisms driving differences, for instance, between adopter and non-adopter firms” (Schneider & Sunyaev 2014, p.16). We, then, applied these concepts to the findings from two interpretative qualitative case studies: one from Egypt and one from Norway.

3 Research Context and Method

Given the limited empirical research on CC adoption in the Egyptian and Norwegian contexts (Hustad & Olsen 2012; El-gazzar 2015), we conducted two interpretive case studies (Walsham 1995; Marshall & Rossman 1989). Case study method is useful for exploring areas where existing knowledge is limited (Cavaye 1996). Thus, case study strategy aims to provide a description of the phenomenon by understanding the dynamics of its context (Darke et al. 1998; Eisenhardt 1989; Yin 2009). Furthermore, case study strategy in IS research helps to understand and interpret the adoption of IT innovations in the natural social setting (Orlikowski & Baroudi 1991). The findings from the two case studies were analysed using neo-institutional theory and compared. Table 1 provides a summary of the study’s contexts and informants’ profile. We conducted 25 interviews comprising 13 informants from different Norwegian organizations and 12 informants from Egyptian companies representing both the client and provider side. Some interviews were conducted synchronously (i.e., face-to-face, phone, and online), tape-recorded, fully transcribed and translated to English. Some other interviews were asynchronous (i.e., email-based) for the convenience of the informants, as they were too busy to be interviewed synchronously. The interviewees found it easier to answer the interview questions in writing when they had time to think and then write down their answers (James & Busher 2006; James 2007; Meho 2006). The e-mail-based interviews involved sending e-mails in order to clarify any points mentioned in the informants’ answers. The Data analysis was guided by neo-institutional theory. recorded interviews were transcribed and the textual content of the interviews, together with the content of e-mail-based interviews, has undergone content analysis through manual coding of the recurring themes, visual mapping, and drawing conclusions (i.e., explaining the findings) using concepts from neo-institutional theory (DiMaggio & Powell 1983; Oliver 1991).

During the data collection, the informants from both contexts frequently talked about two key events; one in Norway (experiences of Narvik and Moss municipalities) and one in Egypt (the Egyptian revolution in 2011 and consequent government decree to shut down the Internet). We relied on secondary data sources to describe the two events; however, the influence of those events on CC adoption emerged from the interviews. The case of Narvik municipality represents an early adopter of CC services in the Norwegian public sector. This municipality, which had an outdated IT solution and lacked the required skills to maintain it, had a desire to move to CC services in order to benefit from more cost-effective mobile solutions and maintain efficiency (Jørgenrud 2011). Although they sent requests to IBM, Microsoft, and Google, they only received one reply, and that was from Google. In this case, the municipality faced a situation of limited alternatives, as not many CSPs were willing to reply to Narvik’s request. Furthermore, they made a choice that was not conscious with regard to regulations;
they entered into an agreement with Google for Google Apps without a clear statement about the location of the data. This caused the Norwegian Data Protection Authority (DPA) to ban the use of Google Apps in the municipality until they were able to obtain such information. Consequently, Narvik municipality changed the agreement with Google and received information on the location of their data. The DPA allowed Narvik to continue using Google Apps, but conditionally upon following certain guidelines (Datatilsynet 2012). Moss requested guidelines from DPA before they started to use Microsoft Office 365 (Datatilsynet, 2012). Moss aimed to have a federated cloud-based e-mail platform to improve the quality of employees’ work and to gain flexibility in administration of the users. In addition, the aim was to eliminate maintenance overhead of IT resources (Moss Kommune, 2013). Given the lesson learnt from the case of Narvik, Moss used Microsoft Office 365 for efficiency purposes; however, at the same time, they sought legitimacy by requesting guidelines from the DPA to evaluate the agreement with Microsoft for using Office 365 (Veen & Nymoen, 2012). This event is triangulated with quotes emerged from the interviews; a quote by P7 supports the importance of that event is provided in the findings section.

Egypt has undergone socio-political transitions, since the revolution in 2011 that had impact on all sectors in the country including the ICT sector. The 28th of January, 2011 was named “Friday of Anger”, when all Internet connections and mobile phone communications were completely shut down because of the government’s order (Osman et al. 2011; Arthur 2011; Williams 2011). This threatened the safety of public and private properties, and the availability of Internet-based communication means. The Internet shutdown by the government had an impact on both CSPs and clients, as this threatened their business and affected their future trust in the government. One might think that this event (i.e., Internet shut down) that happened in 2011 was temporary and that life would come back to normal afterwards; however, this event had led to a long-term negative impression about the government. This event is triangulated with quotes emerged from the interviews, such as: “Internet cut in 2011 will always be a local fear in Egypt as it could happen again leaving business completely paralyzed.” (P12). Furthermore, a quote by P8 supports the importance of that event is provided in the findings section. There are limitations regarding the interviewees: (1) in Egypt case, we had two interviewees from private organizations, and CSPs and consultancies dominated the sample; however, they were able to offer insights about the client organizations they dealt with. (2) in Norway case, we had five interviewees from public client organizations, and seven CSPs and consultancies. All the interviewees are from different organizations except C4 and C5, the two are from the same organization.
Twenty agreement with the cloud service provider with specific needs according to the Norwegian law. So you ha
tems are new things. (After being finished with these two cases, we discovered important things): (1)
pare with for future cases because every detail of the law is not regulated because cloud services sys-
ning agreement, P7 asserted:
throughout the adoption process, from assessing the potential data risks, and selecting the right
public organizations have to follow the guidelines and regulations that are enacted by the DPA
icipalities (C6 and C7), which hav
lesson learnt for the municipality itself and for other adopting municipalities a
adoption strategy into a legitimacy
conscious with regard to regulations. This choice created a strong coercive influenc
Narvik demonstrates an example of an efficiency
This was the case for Narvik
location restrictions are violated, which can lead to banning, or inhibiting the adoption of CC services.
Government can have a rather strong coercive influence if the regulations regarding data
Egyptian organizations. The influ
enacted regulations and guidelines have been interpreted as coercive pressures influencing the Norwe-
gian context
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<tr>
<th>Code (position): interview setting</th>
<th>Egyptian context</th>
<th>Norwegian context</th>
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<tbody>
<tr>
<td>Provider Code C = Provider Code P</td>
<td>P8 (Senior solution manager): e-mail</td>
<td>P2 (Regional offer director for cloud transformation): face-to-face</td>
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<td></td>
<td>P9 (Co-founder and manager): e-mail</td>
<td>P3 (CEO): Skype</td>
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<td>P10 (Software development engineer): e-mail</td>
<td>P4 (Product and R&amp;D manager): face-to-face</td>
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<td>P11 (Senior IT consultant): e-mail</td>
<td>P5 and P7 (Senior consultant): (P5: face-to-face) (P7: Skype)</td>
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<td></td>
<td>P12 (Managing IT consultant): e-mail</td>
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<td></td>
<td>P13 (Account manager): phone</td>
<td>P6 (Product manager): face-to-face</td>
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<td>P14 (Consulting system engineer): e-mail</td>
<td>C4 (Vice president): face-to-face</td>
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<td>P15 (IT consultant): phone followed by e-mails</td>
<td>C5 (Technical project manager): face-to-face</td>
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<td>C2 and C3 (System engineer): face-to-face</td>
<td>C9 (Enterprise architect): Microsoft Lync</td>
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<td>P16 (Technical consultant): Skype</td>
<td>C6 and C7 (CIO): phone</td>
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<td></td>
<td></td>
<td>C8 (IT advisor): face-to-face</td>
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Table 1. Contextual characteristics and overview of informants participating in the study.

4 Findings

CC adoption phenomenon can be understood as being shaped by a set of institutional influences, which have an important impact on the choice of CC adoption strategies. Based on the findings, CC adoption is enabled, constrained, inhibited, or confused by a set of external and internal institutional factors. The external factors are related to the external social environment, both locally and globally. The internal factors are related to the internal social and technical environment. The evidence from the data indicates that these factors have an influence on the choice of adoption strategies, which are discussed in the next section. The findings of this study were classified into eight institutional influences comprising five external factors (government and regulatory bodies, cloud service providers, media and socio-political changes) and three internal factors (internal stakeholders, organization characteristics, and IT infrastructure). In the following, we present findings related to each of these factors.

4.1 External Institutional Factors

Governments and regulatory bodies. The findings revealed three governmental influences; enacting regulations and guidelines, banning, and spreading knowledge and experience. Both the banning and enacted regulations and guidelines have been interpreted as coercive pressures influencing the Norwegian organizations. The influence of spreading knowledge has been interpreted as a normative pressure influencing on the Egyptian companies. The laws in Egypt were not in place; this served as an inhibiting factor, because clients felt that their rights would not be protected if something went wrong with their data. Government can have a rather strong coercive influence if the regulations regarding data location restrictions are violated, which can lead to banning, or inhibiting the adoption of CC services. This was the case for Narvik municipality in Norway as described in the previous Section. The case of Narvik demonstrates an example of an efficiency-motivated adoption strategy; their choice was not conscious with regard to regulations. This choice created a strong coercive influence, which turned the adoption strategy into a legitimacy-motivated adoption after a ban was placed. Narvik’s case was a lesson learnt for the municipality itself and for other adopting municipalities afterwards, such as municipalities (C6 and C7), which have used the agreement enacted by DPA unquestioningly. Norwegian public organizations have to follow the guidelines and regulations that are enacted by the DPA throughout the adoption process, from assessing the potential data risks, and selecting the right CSPs, to choosing the right CC service model and location of the data, and using a special type of data processing agreement, P7 asserted: “Two big cases in Norway and have been processed in through the Norwegian system [Narvik and Moss]. These two cases are what we need to look at to see and compare with for future cases because every detail of the law is not regulated because cloud services sys-
tems are new things. After being finished with these two cases, we discovered important things]: (1) that you have to do, and it is required by the Norwegian law, risk analyses; (2) you have to have an agreement with the cloud service provider with specific needs according to the Norwegian law. So you
cannot use the agreement directly from [the cloud service provider]; (3) then you actually are required by the law to implement regular security audits.” The influence of Narvik and Moss was also asserted by P5.

Contrarily, government in the Egyptian context had a more normative influence enabling the adoption of CC services. The Egyptian government distributed knowledge and expertise in collaboration with CSPs and consultants by means of talks and workshops at the “Cairo ICT” conference which was organized in Cairo in 2011. In the opening session of the CC forum event at this conference, the new minister for Communications and Information Technology (CIT) stated that the is, first, to attract foreign investment in order to create job opportunities for young people and, second, to stimulate the market and support companies that work in the Information and Communication Technology (ICT) sector. We can compare the impact of the Egyptian government on CC adoption when it shut down the Internet during this period of political reform with the impact of the Norwegian government when it banned Narvik from using Google Apps. Both incidents differ in terms of severity and consequences. The impact of the Egyptian government was indirect; the Internet was shut down for political purposes to stop the gathering of revolutionary crowds. The consequences have indirectly influenced the client organizations’ trust in adopting CC. The Norwegian government, however, had a direct influence on Narvik municipality, and had a close involvement in CC adoption process. The consequences of the Norwegian government’s actions were to force the client organizations towards having a legally compliant data processing agreement and conducting risk analyses.

Media. Here, “media” denotes the spreading of news about previous cases and leaks either online or in print. This influence has been interpreted as a normative influence guiding organizations to seek legitimacy when adopting CC services. Narvik’s case was discussed in the news. As a result, other organizations went on to the legitimacy-motivated adoption of CC services. They did so by carefully adhering to the DPA’s guidelines in order to avoid publicity in the newspapers in the same way as Narvik municipality, which was banned from using Google Apps. The “Snowden effect” is another manifestation of the influence of media that could cause an organization to stop dealing with a certain CSP, this was asserted by P6: “We struggled with that [...] we had the Snowden case for us stopped a big project to move all the business mailboxes in Norway 30000 mailboxes were supposed to be moved into Office 365 cloud, the project was stopped after all the news headlines with Edward Snowden said that the US is reading your mailboxes, if you move them to [...] American companies, we have to stop it. So now we are moving the mailboxes to another data server in Norway instead; it is not more secure but the perception because of media made that necessary.”

Cloud service providers (CSPs). The influence of CSPs was important for CC adoption. CSPs’ experience in the CC industry and their compliance with regulations are related to the media, and global versus local CSPs. Global CSPs, which are mainly US-based, are very concerned about increasing their maturity in the cloud market, and have the sufficient experience to compete on securing their CC services. The influence of media has led to lack of trust towards global CSPs since they might represent a risk for the clients. Hence, local CSPs have come onto the scene, demonstrating their adherence to government regulations and this finding has been interpreted as a mimetic pressure from the case study of Norway. These local CSPs aim to persuade client organizations to adopt their CC services by offering the local storage of data and adherence to Norwegian laws. Some clients believe that local CSPs offer a greater guarantee to store data within the same country (e.g., client C8). Such thinking can be flawed, because some CSPs may use third party CSPs to store the data, P2 asserted: “This is a big misunderstanding because it’s by default a guarantee that smaller local providers store information at the same place where they are located; they may use third party providers that store data wherever they want.” This was asserted by P5, P6 and client C1. The different views held by clients and providers with regard to global CSPs versus local CSPs debate raise some interesting points. The clients’ perspective prioritizes the legal compliance of local CSPs over the security expertise of global CSPs. This resulted from the interplay between the media and global CSPs’ expertise. The providers’ perspective prioritizes the competitive security expertise of global CSPs; they argue that local CSPs do not have an equivalent level of expertise, P5 asserted: “If in general you say I would trust a local CSP
more than the global one, I would disagree to that! The global CSPs are the ones attracting the best security talent, the best developers, they have the best and more secure data centers, and they operate on multiple continents. So if the US [data centers] were to disappear, they still have a data center in Europe.”

A further interesting finding is the political game played between CSPs and traditional IT providers, which is particularly confusing for client organizations. The influence of this political game has been interpreted as a normative inhibiting CC adoption due to the negative marketing by traditional IT providers. Traditional IT providers claim to offer their IT solutions as if they are cloud-like, even though they are not. Thus, traditional IT providers will talk negatively about pure CSPs and vice versa. Consequently, clients will be more confused and also pure CSPs will find it difficult to sell their CC services, P2 asserted: “The traditional vendors will talk negatively about cloud services because they want to sell their traditional solutions and the cloud vendors do it the other way and as a customer in the middle, you will be confused because the messages are quite different from different types of vendors. That is a quite messy situation! It is not easy to be a customer with all that!

Socio-political changes. Political reforms and revolutions can cause uncertainty to the extent that they inhibit the adoption of CC services. This is what happened in the Egyptian context, when an arbitrary decree from Mubarak’s government issued on 28th of January, 2011, resulted in the shutting down of the Internet. Such a decree was intended to stop people communicating and planning gatherings. However, it had an unlikely impact on businesses, especially the CC market in Egypt. In particular, it had a coercive inhibiting influence on client organizations, because they could not risk making their entire business dependent on the Internet by using CC services. At the same time, CSPs had their businesses downgraded as a result of this decree, thus, CSPs need to protect their business, P8 asserted: “recently Egypt faced an Internet outage due to the decree from the government which is not accepted and we must have a law that prevents governments from forcing Internet providers to cut Internet services, as this becomes a very weak spot for cloud services trend in Egypt, all companies are now afraid from facing similar situation that their dependence on CC will lead to outage and will impact their business.” After this political event, the Egyptian government sought to encourage the adoption of CC services through such initiatives as discussed at the Cairo ICT conference.

Culture. This factor was found to be a coercive inhibiting factor that led to non-adoption among organizations in Egypt. It is related to the reluctance to keep the data off-premise, even though data security is technically guaranteed in terms of data encryption, as noted by P13: “the problem in Egypt is mainly cultural. People share same concerns about ‘my data should be with me’, although we encrypt the data at rest and on transfer and put firewalls. Additionally, we sign an agreement, through which we guarantee security of the data.” This cultural factor, which needs to be addressed, was even noted by the Egyptian government as being one of the expected challenges to CC adoption in Egypt for the coming years (MCIT 2014).

4.2 Internal Institutional Factors

Internal stakeholders. When internal stakeholders have conflicting interests regarding the adoption of CC services within an organization, these conflicts usually emerge from different backgrounds of the stakeholders and their various needs. Thus, organizations face the challenge of having an unclear vision and being unable to accommodate the needs of all stakeholders. Thus, it becomes an inhibiting factor that can lead to slow or non-adoption decisions of CC services. In this regard, C1 asserted that having unclear vision regarding how the organization should adapt to the environment can be a nightmare for a CTO. From the Norwegian context, conflict was a dominant reason for non-adoption. In C8’s municipality, the idea of adopting CC services was ignored, even though the idea was raised and discussed at a small conference held there. As C8 has stated, the reasons for not choosing the correct strategy for using CC services in this municipality were threefold: (1) loss of control (concerns regarding data sensitivity and data location); (2) conflicts (small municipalities have different interests and knowledge about the use of IT compared with larger municipalities); and (3) bureaucracy (the multi-
leveled structure of each municipality makes it slow to reach an agreement on any proposed strategy, especially as the gains are not yet clear to them). Although C8 saw security as the primary reason for not reaching a clear CC adoption strategy, he gave other reasons for non-adoption; among these reasons was the challenge to accommodate the conflicting interests of internal stakeholders, C8 asserted: “We haven’t a proper process around that yet. In our municipality, the main issue is to have a wider cooperation with all [small] municipalities to gather the main components in one place. When a decision matter or the IT department works on a proposal for a strategy, then it must be delivered to the administrative and then the executive, and then it is sent upward to the politicians to be agreed or to be decided whether to do that or not. Those small municipalities have also the same structure and they have different interests, goals, and knowledge about IT and use of IT systems. So our job here is quite a challenge [...] Two years ago, I put up a small conference for all municipalities to discuss about CC and the vendors were invited two or three of them. We had a full day of discussion and presentations and none of the municipalities decided anything.”

Another influence is the perceptions of stakeholders regarding data security risks (e.g., confidentiality). These risks resulted from an external factor “the media”, which was elaborated earlier in the external factors. This implies that clients require more security guarantees than those offered by CSPs. Clients perceive security in the cloud as a risk that can result from dealing with global US-based CSPs, despite the fact that these CSPs are experienced in securing their solutions. On the other hand, P5 asserted that security in the cloud is better than in-house security and that they, as global CSPs, consider it a competence on which competition between CSPs is based. P4 asserted that clients often feel they have full control over their IT department and security issues. However, in her view, this is not true; rather, clients’ local IT departments do not have the necessary skills to cope with security issues. Interpretations by P5, P2, P3 indicate that the risks posed by CC solutions are “not absolute” and need to be evaluated against the risks of other IT solutions. Even if risks exist, there are ways to mitigate them, such as certifications. Both the conflict of interests and perceptions of security risks had a coercive inhibiting influence on CC adoption.

Organizational characteristics. The multi-leveled organizational structure has an inhibiting influence on the adoption of CC services, as was manifested in the case of Norway where one of the reasons that C8’s municipality did not achieve a CC adoption strategy was the multi-leveled bureaucratic structure. Such a structure makes it complicated to adopt CC services and slows down the process. C1 from Egypt case highlighted this notion of complex organizational structures from his experience in a private worldwide client organization, he asserted: “Transforming a traditional organization and restructuring it is essential for a clearer decision making process [...] A shift in responsibilities may occur to adapt to the new model [...] Sticking to an old organizational chart will lead to gaps in understanding new requirements/demands from all involved teams [and] elongating the decision making process.”

This finding was not interpreted as an isomorphic pressure; however, it was worthy to include for its inhibiting influence, and informants from both Egypt and Norway cases asserted it.

IT infrastructure. Complex unstandardized processes inhibit the adoption of CC services. The higher the interdependency between the enterprise applications, the more complex the IT infrastructure gets, the more difficult to rapidly move to or integrate with CC services. C9’s organization started an initiative for modernizing their infrastructure; they decided to proof concept of a PaaS product for building mobile solutions and regional electronic public record solutions to avert facing implementation complexity since they have so many interdependent systems, C9 asserted: “We are looking at how can we utilize the cloud in the context of establishing a regional electronic health record solution which is centralized, consolidated, and standardized that can be used by all of the hospitals from their locations and that is too complicated because the electronic health record is integrated with many systems and that is why integration can pose a concern.”

P2 discouraged the idea of rushing to the cloud with the most complex IT infrastructure: “I think the most important [issue] is to understand the architecture and [...] if you have a good modular architecture, you can easily see if there are functionalities that [can be put in the cloud] and also if it has a
very strong dependency on other systems, then you should not pick that one at the first phase.” This finding was not interpreted as an isomorphic pressure; however, it was worthy to include for its inhibiting influence, and several informants from Norway case asserted it.

### 4.3 CC Adoption Strategies

**Efficiency-motivated adoption.** This was evident in Narvik municipality; they were early adopters of Google Apps and did not consider getting information about the location of the data in accordance with Norwegian law. This is an external factor. However, after the ban, they changed the agreement and got information on data location.

**Legitimacy-motivated adoption.** This was found applicable for late adopters, such as C9, C4, and C5. In the case study of Norway, C9’s organization, the adoption strategy was in place, but the transition had not yet begun. They were at the stage of accommodating various institutional factors for the sake of legitimacy in the legal environment. They were aiming at IaaS and PaaS services, but their concern was the selection of the right CSPs to meet the legal requirements regarding data location. Furthermore, they were considering a criterion of high availability in their To-Be architecture to guarantee a smooth transition without disturbing the current processes, which will determine the right CSPs for them as well. Additionally, a concept of mobile solutions was being trialled, with storage in the cloud, and they were evaluating how they could use CC services to establish a regional electronic public record that was both centralized and standardized. They are currently in the evaluation stage, because they recognize the challenge raised by the many interdependent systems they have. In the organization that C4 and C5 work for, various internal and external institutional factors have shaped their adoption strategy. After evaluating solutions that are available in the market such as Cloud Foundry; they did not find enough references for this solution in Norway. Furthermore, they were developing apps of a special type. Thus, having them deployed by available PaaS solutions would require them to do potentially cumbersome manual modifications. Thus, they decided to implement their own PaaS.

**Non-adoption.** Unclear vision and lack of trust were found to be reasons for non-adoption. It should be noted that the factors that shape non-adoption are not CC technology-related factors, such as data encryption in the cloud; mostly, the factors are related to the external and internal environments. In C8’s organization; the factors that contributed to non-adoption were internal. These factors took the form of conflicting interests among stakeholders and the bureaucratic organizational structure, which contributed to the lack of clear vision towards adopting CC services. In the Egyptian context, the non-adoption was influenced by several reasons related to external factors, such as a lack of legal framework, cultural concerns about security, and socio-political changes and their consequences, all of which contributed to a lack of trust that led to non-adoption.

### 5 Discussion in Light of Theory and Conclusion

The contributions from this study can be counted as empirical contributions that offer theoretical and practical implications. An empirical contribution is defined as “a novel account of an empirical phenomenon that challenges existing assumptions about the world or reveals something previously undocumented” (Ägerfalk 2014, p.594). Next, we discuss the key empirical findings and contributions (see Figure 1). The neo-institutional perspective holds that an organization’s response to institutional influences is bound by organizational conflict, resources and awareness, and depends on these pressures per se (Oliver 1991). Common patterns emerged among actors at the organizational field level who had influences on the organization’s CC adoption strategy; thus, we grouped them into the category of “external institutional factors”. Likewise, the actors and characteristics in the internal environment of the organization that had influences on it are grouped into the category of “internal institutional factors”. In the literature on neo-institutional theory, government regulations have been always reported to have a coercive influence, which constrains organizations in adopting certain practices or organizational models (DiMaggio & Powell 1983). This corroborates the findings from the Norwegian
context. However, the findings from the Egyptian context indicated that the government had a rather normative influence on organizations towards adopting CC by spreading knowledge and experience through public sessions and panels. This finding in addition to the intermingled influence of media, global CSPs, local CSPs, and traditional IT providers support the claim that institutional influences “intermingle in empirical setting” and “tend to derive from different condition and may lead to different outcomes” (DiMaggio & Powell 1983, p.150). The literature on neo-institutional theory and IS/IT outsourcing reported that the media had a mimetic influence that accelerated the diffusion of IS/IT outsourcing practices (Hu et al. 1997). When looking back to the 1980s and the rise of minicomputers, many organizations outsourced their IS functions that they used to outsource to external suppliers (Hirschheim et al. 2007). However, the announcement of Eastman Kodak’s major outsourcing decision in 1989, once again brought about an increased tendency towards IS/IT outsourcing, known as the “Kodak effect” (Loh & Venkatraman 1992). In the IS/IT outsourcing literature, it was reported as a source of mimetic influence on IS/IT outsourcing decisions (Lacity et al. 2010). However, the findings indicate a rather normative influence of media that decelerated the diffusion of CC services by distributing information about the Snowden leaks in 2013, which we can connote as “Snowden effect”.

The literature on neo-institutional theory (DiMaggio & Powell 1983), and on CC and neo-institutional theory (Xin & Levina 2008) claimed that peer organizations have the tendency to be copied by organizations in situations of uncertainty. However, the findings indicated a further mimetic influence of local CSPs, who take opportunity to demonstrate their regulatory compliance over global CSPs, on organizations to move to their CC services and dismiss global CSPs. The literature on IS/IT and neo-institutional theory suggested that the future research needs to focus on the political view of the institutional influences “that includes key components such as power, politics and various actors” (Mignerat & Rivard 2009, p.389). Our findings support that view, which manifests in the influence of the political game between traditional IT providers and CSPs, which is likely to confuse the clients.

The socio-political changes factor did not have a direct influence related to CC in particular. Rather, it contributed to an increase in the lack of trust, which led to cases of non-adoption of CC in the Egyptian context. The literature on neo-institutional theory (DiMaggio & Powell 1983), and on CC and neo-institutional theory (Saya et al. 2010) claimed that the institutional influences are exerted by organizational actors who have a common meaning system and frequent interactions with the influenced organization. Those actors have a direct stake with the influenced organization, such as customers, suppliers, partners, government, industry and professional organizations, and competitors. However, the findings indicate that even changes in a broad and complex social system can inhibit the organization from adopting CC services, such as revolutions and their consequences, where actors (e.g., political parties, protesters, etc.) may not have a direct stake or a frequent interaction with the influenced organizations.

Culture of the society around the common sense of not accepting the data to be off- premise despite data security is technically guaranteed. The findings regarding this factor corroborate the literature on the neo-institutional theory claiming that institutional influences can be exerted “by cultural expectations in the society within which organizations function” (DiMaggio & Powell 1983, p.150). However, the literature on CC and neo-institutional theory is, yet, missing the focus on cultural matters (Saya et al. 2010; Xin & Levina 2008), which can have an important influence on CC adoption. Furthermore, the conflicting expectations of internal stakeholders lead to misaligned and conflicting strategies (Lacity & Hirschheim 1995). From the institutional perspective, rationality is linked to the search for efficiency, while irrationality is linked to the search for legitimacy (Mignerat & Rivard 2009). Efficiency encompasses technical and economic efficiency, where organizations can achieve better outputs with lower costs, less effort, and better hardware and software (DiMaggio & Powell 1983; Kshetri 2013). Irrationality is linked to legitimacy (Deephouse & Suchman 2008), which is “socially constructed in that it reflects a congruence between the behaviors of the legitimated entity and the shared (or assumedly shared) beliefs of some social group” (Suchman 1995, p.574). Hence, we categorized CC adoption strategies into efficiency-motivated adoption, legitimacy-motivated adoption, and non-adoption.
Efficiency-motivated Adoption

- Governments and regulatory bodies
- Enacting regulations and guidelines
- Banning
- Spreading knowledge and experience
- Media
- Publishing stories of early adopters
- Spreading Snowden leaks
- Cloud service providers (CSPs)
- Global CSPs vs. local CSPs
- CSPs vs. traditional IT providers
- Socio-political changes
- Political reforms
- Culture
- Reluctance to keep the data off-premise

Influence | Evidence NO | EG
--- | --- | ---
coercive (+) | yes | no
coercive (-) | yes | no
normative (+) | yes | no
normative (-) | yes | no
menetic (-) | yes | no
normative (-) | yes | no
coercive (-) | no | yes
coercive (-) | yes | no

Internal

- Internal stakeholders
- Conflicts of interests
- Perceptions of security risks
- Organization characteristics
- Multi-level bureaucratic structure
- IT infrastructure
- Complex and unstandardized processes

Influence | Evidence NO | EG
--- | --- | ---
coercive (-) | yes | no
coercive (-) | yes | no
coercive (-) | yes | no
coercive (-) | yes | yes
inhibiting (-) | yes | yes
inhibiting (-) | yes | no

Adoption Strategies

Efficiency-motivated Adoption

Evidence NO EG

Legitimacy-motivated Adoption

Evidence NO EG

Non-Adoption

Evidence NO EG

A summary of findings on understanding CC adoption from an institutional perspective. Legend: influence (inhibiting (-) or enabling (+)), Evidence (NO: Norway case, EG: Egypt case). Efficiency-motivated adoption strategy was enacted by Narvik municipality, when they first started using Google Apps without questioning about the location of the data achieve efficiency. Narvik municipality was aware of the CC services offered by the CSPs that are expected to serve its own interest of seeking efficiency. However, Narvik municipality was not aware of the institutional influence of the regulatory body (i.e., DPA) and did not have information about where Google is storing the data, thus, the municipality failed to maintain its legitimacy within its legal legitimation system. This led DPA to ban the use of Google Apps until the municipality conducts risk assessments and gets information about the location of the data. The story of Narvik implies that efficiency was attained, but legitimacy was not. This finding has two implications that deserve further validation in the future. First, legitimacy is subjective at times and it manifests in subjects, or levels, of legitimation; a subject of legitimation can be a system of power (i.e., power of coercion) (Deephouse & Suchman 2008). Perhaps using Google Apps unconsciously has legitimated the municipality within the CC market, which is a low-level subject of legitimation, but has not legitimated it within the high-level legitimation subject that is the Norwegian legal system. These multiple levels of legitimation subjects demonstrate the complexity of the real world and have been argued to be a challenge for researchers to investigate (Deephouse & Suchman 2008). Second, it has been claimed organizations enact various strategies to respond to the institutional influences (Oliver 1991). However, it would be insightful to develop further institutional concepts, in the future, to explain the implication of a strategy to create a new institutional influence (i.e., the banning that resulted from the Narvik’s efficiency-motivated adoption). Future research questions would be fruitful to ask about what are the levels of legitimation subjects that organizations should be seeking legitimacy from? As this is likely to have a significant influence on CC adoption.

The legitimacy-motivated adoption strategy enacted by C9’s organization manifested in negotiating sourcing strategies and choose the right sourcing partners to accommodate the legal requirements that dictate dealing with CSPs who provide data storage within the EU region. C9’s organization was not allowed to deal with CSPs from India; hence, its legitimacy gain would have been low otherwise. Furthermore, the proof-of-concept initiative by C9 organization accords with the institutional perspective that an organization tends to resist the institutional influences exerted “to improve its efficiency if it...
has doubts about the impact of [these institutional influences] on the quality of its services” (Oliver 1991, p.161), which, in turn, has some ramifications on its anticipated legitimacy in case of conformity. Organizations may tend to “shape and redefine institutionalized norms” of acceptable practices or performance (Oliver 1991, p.159), because “a one-size-fits-all approach may not work for all user organizations’ cloud adoption.” (Kshetri 2013, p.383). Private clouds are better when it comes to security and compliance with regulatory requirements (Schneider & Sunyaev 2014). For the organization where clients C4 and C5 work, implementing own private cloud model was an appropriate option for a number of reasons; first, they have not found any reference a wide use of PaaS model in Europe. Second, they preferred to be independent of external support that may delay them in case critical bugs in the cloud system arise, which can demolish their image within their institutional environment. Thus, they aimed at preserving their image by implementing a private cloud model and maintain legitimacy. Non-adoption strategy that was enacted by C8’ organization and described by several Egyptian providers, was motivated by unclear vision and lack of trust resulted from the external (i.e., socio-political changes and culture) and internal factors (i.e., conflicts among stakeholders). Organizations may tend to dismiss the institutional influences toward certain practices (e.g., CC adoption) in either one of the two situations; the potential for external institutional influences “is perceived to be low or when internal objectives diverge or conflict very dramatically with” the institutional influences (Oliver 1991, p.156).

To conclude, we utilized a neo-institutional lens to understand the internal and external factors that influence CC adoption. We identified three different adoption strategies in this respect; efficiency-motivated adoption, legitimacy-motivated adoption and non-adoption. This research gives an insight into institutional factors that influence the adoption and non-adoption of CC services that are claimed to be inconclusive in the literature (Schneider & Sunyaev 2014), and gives “cognitive and cultural explanations for organizational responses” (Orlikowski & Barley 2001, pp.152–153). Institutional theorists were criticized for their tendency “to overlook the role of active agency and resistance in organization-environment relations” (Oliver 1991, p.151). Thus, the findings support the neo-institutional perspective to explain CC adoption phenomenon; the findings serve as a guide for practitioners in shaping CC adoption strategies in their organizations to consider several kinds of dynamics in their external environment and the consequences of not considering the high-level legitimation subject in their adoption strategies. Further research may delve into each factor at various levels of analysis (i.e., other countries, sectors) to further examine the discussed findings and implications using institutional logics lens to historically document the logics behind CC adoption strategies and provide richer explanations.
References


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