An Exploratory Study on Cloud Strategies

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ABSTRACT

Due to popular benefit beliefs the spread of cloud computing applications and solutions is increasing. However, it is largely unknown how organizations can target cloud adoption on a strategic level. In this study, we delve deeper into this phenomenon based on semi-structured interviews with business and IT representatives as well as consultants. More specifically, we examine the form and operationalization of a cloud strategy as well as influencing factors and benefit beliefs. Analyzing the data of six interviews using a grounded theory approach we found organizational context factors that determine the form of a cloud strategy. Furthermore, necessary themes, useful tools and governance aspects have been identified as operationalizing content.

Keywords

Cloud Strategy, IT Sourcing, IT Outsourcing Strategy, Cloud Computing

INTRODUCTION

Due to the increasing importance of information technology (IT) to organizations, companies try to achieve competitive advantages through IT usage. In this context they pursue different strategies and concepts for implementation of IT (Chen, Mocker, & Preston, 2010). Nonetheless, the concept of information systems (IS) strategy remains nebulous and is inconsistently defined (Chen et al., 2010). Cloud computing can be viewed as an on-demand and scalable deployment model for IT services (Böhm, Leimeister, Riedl, & Krcmar, 2011) and has been notably a high-profile subject of studies conducted by consultancies (e.g. Capgemini, 2012). They commonly agree that it is a fundamental shift in obtaining IT services with high relevance for adopting organizations.

The strategic relevance of cloud computing for an organization has to be assessed individually. Despite a possibly strategic usage of cloud computing, every organization is recommended to implement an overall sourcing strategy (Smith & McKeen, 2004). In this context, a cloud strategy can be seen as a subset or a part of the IS strategy. To date, various aspects of a cloud strategy, such as formalization, benefits or operationalization for organizations have not been fully addressed in the academic world. Only recently the US government published a cloud strategy defining a framework for their governmental agencies regarding adoption and usage of cloud computing (Kundra, 2011). This paper focuses on taking the perspective of a single adopting organization in contrast to, e.g. the European Union Cloud Strategy focusing on settlement of cloud vendors.

In this paper we address this gap of research on cloud strategy. More specifically, our research objective is to explicate and integrate insights and approaches that have been implemented or discussed in industrial practice guided by the following research questions:

- What organizational factors influence the appearance and form of a cloud strategy?
- How can a cloud strategy be operationalized and what benefits are expected?

Since we have not found any explicit knowledge in this field, we used the Grounded Theory approach. We also use this qualitative approach due to its suitability for exploring complex phenomena. The contribution we make is two-fold: We propose a conceptual framework on cloud strategy and derive implications for practice and research.

This paper is structured as follows. We continue by giving an overview of essential concepts from cloud computing and outsourcing strategy. Accordingly, this section is followed by a description of our research method. Subsequently, we present

our research findings in terms of an interview-based conceptual framework and the emergent considerations for research and practice. Finally, we conclude the paper with a summary and an outlook on future research.

BACKGROUND

Recent studies examined the relationship between cloud computing and outsourcing and jointly concluded that cloud computing is a form of outsourcing (e.g. Clemons, 2011). Although there exist various differences in e.g. the mode of service provisioning and flexibility in terms of contract duration and payment, cloud computing vendors compete with traditional outsourcing vendors (Böhm et al., 2011). Dhar evaluated similarities and differences, concluding that the impact of cloud computing on IT outsourcing represents a fundamental shift in the evolution of IT service delivery (Dhar, 2011). Summarizing, the organizational side of cloud computing for adopting companies is at least as important as the technological side but to date has been undervalued in research. Issues such as cultural impact, third party relationships, (optimal) rules for decision making and application adoption or risk profile analysis have only recently found their way into research (e.g. Clemons, 2011; Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011).

Due to the lack of research in the field of cloud strategies we included the review of IT outsourcing strategy into our related work. We found a suitable definition describing IT outsourcing strategy as the prevalent logic of a company´s outsourcing decisions portfolio. This can be interpreted in two ways: 1) Explicit formulation of a strategy to guide decisions and 2) Implicit cumulative pattern that can be detected within individual outsourcing decisions (Lee, Miranda, & Kim, 2004). Predominantly, research on IT outsourcing strategy focuses on strategic intent and strategic effects of those sourcing decisions (Lacity, Khan, & Willcocks, 2009). In this vein, Lee connected his earlier work outsourcing strategy conceptualization suggesting that a fit between outsourcing and business strategy offers the greatest advantage in terms of firm performance (Lee et al., 2004; Lee, 2006). In contrast, we found only one article explicitly dealing with a cloud strategy and proposing a definition that considers it as a set of decisions, which is necessary to develop and implement a network-centric information strategy that enables organizational agility and cost savings (Iyer & Henderson, 2010). In their work they derive seven basic cloud capabilities for adopting organizations considering the cloud vendor ecosystem including respective interconnections. They further deduce their implications for a cloud strategy from these seven capabilities and give a step-by-step recommendation. We would like to extend this stream of research by taking the view of adopting companies and thereby contributing to this body of knowledge. From taking the opposite perspective, we expect to find aspects and issues that are contrary to the promises of vendors in the cloud ecosystem. In this vein, the stream of cloud computing adoption examines factors that advance and prevent cloud computing adoption (incl. benefits and risks). In a recent study on benefits and risks of SaaS it was found that security threats are the dominant overall risk perception whereas cost advantages have been detected as the strongest benefit perception (Benlian & Hess, 2011). A Return on Investment (ROI) model has been developed that incorporates a company´s business and IT characteristics as well as intangible impacts of Cloud Computing (Misra & Mondal, 2011). Another study found that the 5 factors (relative advantage, top management support, firm size, competitive pressure, trading partner pressure) have a significant effect on the adoption of Cloud Computing (Low, Chen, & Wu, 2011).

METHODOLOGY

In this chapter we explain our methodological approach for collecting and analyzing the data, conducted from several interviews. In order to gain a comprehensive understanding of cloud strategy, we apply the systematic methodology Grounded Theory. This approach is chosen due to the lack of theoretical understanding of a complex phenomenon, requires no pre-selection of appropriate prior to the data analysis and is well accepted and established among the IS community (e.g. Orlikowski, 1993; Seidel & Recker, 2009). The Grounded Theory method was developed in 1967 by Glaser and Strauss and is for building theory rather than for evaluating existing theories (Glaser & Strauss, 1967; Strauss & Corbin, 1998). By means of this approach we developed a theoretical framework based on a systematic data collection and coding of the material related to cloud strategy, following the guidelines provided by Strauss and Corbin (1998).

Data Collection

Between October and November 2012 interviews with employees from six different organizations have been carried out, using a structured interview guideline. Firms were selected from different industries and company size in Germany (IT service providers, business consultants, real estate, engineering, hardware and software) and contacted through the personal networks of the authors. Interviewees were required to possess a profound level of knowledge considering cloud computing adoption in organizations. The questions of the interview guideline were structured around five categories: company background as well as experience, service implementation, objectives, and strategies with respect to cloud computing. The structure and questions were developed from literature research and based on a pre-study regarding fields of action in cloud computing. They were further validated in an informal workshop on cloud strategy at a practitioner conference to ensure that no important issues are neglected. The interviews followed a semi-structured guideline, including the four major

paradigmatic categories recommended by Grounded Theory (Strauss & Corbin, 1998). Interview partners were CEOs, IS managers and managing consultants. All interviews (each lasting about 60 minutes) were recorded and transcribed. The transcription was sent back to the interview partner for final confirmation.

Data Analysis

The data analysis is an iterative process and started right after the first data collection (interview) in order to complement the questionnaire as required. Following this approach the data collection and analysis was conducted without any preconceptions. Further, we performed a gradually approach with open coding, axial coding and selective coding to extract information of the conducted interviews. First, codes were identified, named and categorized (open coding). Therefore, the interviews were transcribed and each sentence is analyzed in order to define abstract categories which summarize the content and context. Next, we conducted an axial coding, where the codes are related to each other, via a combination of inductive and deductive thinking (Strauss & Corbin, 1998). To identify and group the relationships we adapted the basic framework from Strauss and Corbin (1998) which consists of mainly four elements: the phenomenon, casual conditions, content and strategies as well as consequences (see Figure 1). We chose this coding paradigm since we were looking for causal relationships, content as well as its effects of our phenomenon. According to this frame the findings are structured (see Research Findings). Finally with regard to selective coding, the categories are related around one core phenomenon.

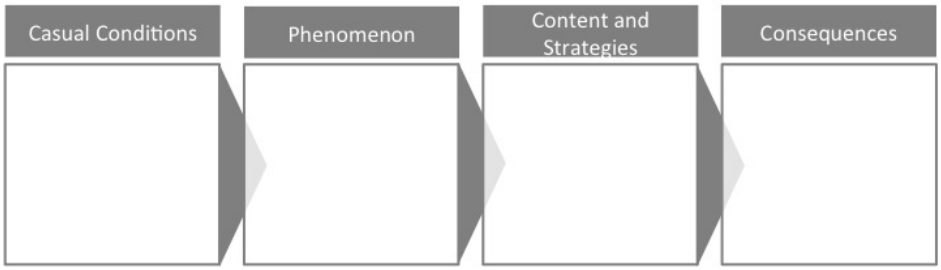

Figure 1: Adapted coding paradigm from (Strauss & Corbin, 1998).

RESEARCH FINDINGS

The derived model saturates the theoretical categories from the coding paradigm of Strauss and Corbin with variables that describe the necessity and appearance of a cloud computing strategy. Figure 2 depicts the model with sub-categories and variables. In the next section, we will explain these variables for each category and will state relevant quotations. Theoretical and practical references will be given as well.

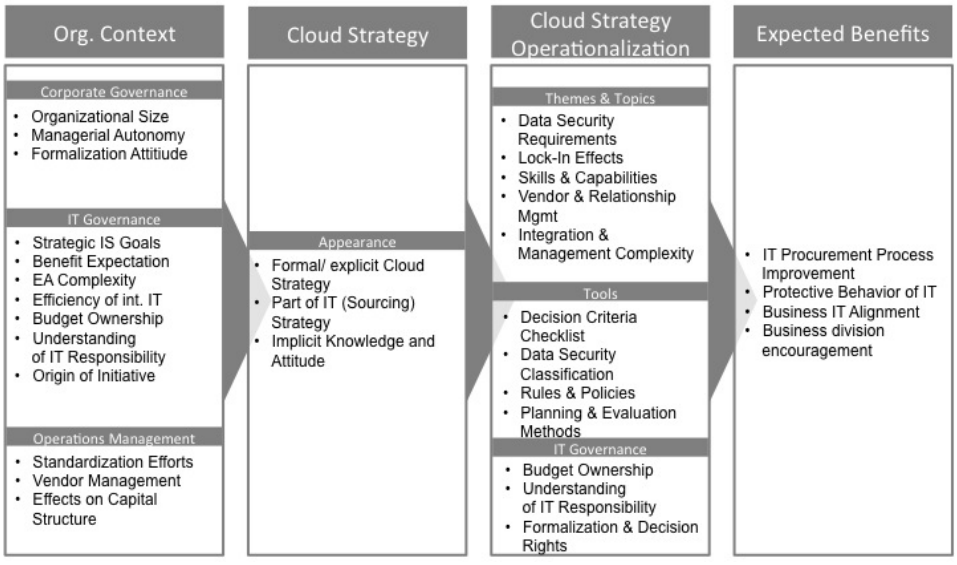

Figure 2: Model for cloud computing strategy.

Organizational Characteristics (Casual Conditions)

Based on the interview data, we argue that there exist various factors that determine the appearance of a cloud strategy. Accordingly, we clustered these influences into the following three categories (‘*corporate governance’*, ‘*IT governance’* and ‘*operations management’*). The ‘*corporate governance’* category depicts the organizational context and the structure. ‘*IT governance’* details further aspects in the decision and governance process for IT solutions within a firm, whereas ‘*operations management’* comprises influencing factors for the management and integration of these IT solutions.

Within the ‘*corporate governance*’ category we identified three influencing factors*: ‘organizational size’*, ‘*managerial autonomy’* and ‘*formalization attitude’*. Most of them are well known and established in the field of IT governance as well. Both ‘*organizational size’* and ‘*managerial autonomy’* have an impact on the mode of IT governance (Sambamurthy & Zmud, 1999). Whilst smaller firms tend to organize their IT departments in a centralized manner for superior coordination of interdependencies between business functions, larger firms do quite the opposite. The proposition can be derived that larger firms are more likely to have a formal cloud strategy. Furthermore, we expect that ‘*managerial autonomy’* influences the appearance and necessity of a cloud strategy. This finding is supported by two arguments based on the conducted interviews. First, business-line managers with a greater autonomy would likely decentralize IT governance for cloud solutions and applications. Second, business-line managers with a greater autonomy are more likely use or allow usage of shadow-IT in order to take advantage of IT solutions as fast as possible (“We have shadow-IT […] some units already use cloud in order to develop on their own without corporate IT involvement”). Additionally, previous studies in the IT governance field identified such correlation between overall firm governance and IT governance (Brown & Magill, 1994). Next, we propose *formalization attitude* as an additional influencing factor (e.g. Daft, 2009, p. 15) representing a company´s (incl. their employees) attitude towards formalization such as policies (“Our company has an ambivalent attitude towards policies […] one the one hand they help for e.g. information security but on the other hand they help in certain situations for e.g. limiting liabilities of employees”).

The second category comprises conditions that are related to overall IT governance and IT strategy with a specific focus on cloud solutions. We propose ‘*strategic IS goals’* (Chen et al., 2010) as one influence factor. As the corporate strategy and the respective business model drive the IT strategy, it determines the long-term ambitions and must support the corporate goals. For instance, a growth-oriented company with a differentiation focus would require an IT architecture that supports flexible and fast growth (of systems, customers, users etc.). Therefore we hypothesize that the better the fit of cloud solutions and strategic IS goals the more likely a (formal) representation of the cloud strategy. As a second factor, we identified the ‘*benefit expectation’* that a firm has in implementing a cloud solution. Benefits mentioned by experts ranged from decreasing costs to an increasing flexibility and quality amongst others. If the expected benefits of implementing cloud solutions are high then a company may decide to manifest a “cloud-only” policy in a cloud strategy. The ‘*enterprise architecture complexity’* is another condition, which refers to the size and total number of hardware and applications as well as their relations and interfaces between each other to support business processes. Hence, a more formal cloud strategy beneficial for architectures that are of high complexity is expected (e.g. Ross & Beath, 2006). Next, we identified ‘*budget ownership’* as an influence factor. Due to the fact that cloud costs are operational expenses and can be simply booked with a corporate credit card, the budget ownership influences the strategy. This could possibly turn former non-IT budgets into unwanted IT budgets where vendors will find it easy to sell directly to business divisions (“users become more self-determined […] and therefore vendors are impacted in terms of how to structure their sales”). As the next factor within this category we identified ‘*efficiency of internal IT’* which refers to a comparison between internal and external IT considering factors such as cost and quality, i.e. a determining factor is whether the internal IT can deliver the same service with a competitive price. Therefore we expect that a competitive internal IT will lead to a weakened relevance of a cloud strategy. The next identified factor refers to the shared ‘*understanding of IT responsibility’* which might change drastically in a way that the IT organization will not mainly provide the systems but will rather integrate solutions and advise business (e.g. Guillemette & Paré, 2012 for IT function profiles). The last condition of this category is the ‘*origin of initiative’*, which represents the organizational unit initiating and pushing a cloud solution. A business driven initiative might emphasize the functional requirements over security concerns.

Our first proposed influencing factor in the ‘*operations management’* category is ‘*standardization efforts’*. We understand this as the efforts of companies to standardize their processes as well as their IT applications and infrastructure. Additionally, the third category consists of the ‘*vendor and relationship management’* that describe the current capabilities of an organization to manage outsourcing relationships and projects (LP Willcocks, Venters, Whitley, & Hindle, 2012). We hypothesize that high capabilities in outsourcing governance will increase the likelihood of taking a step towards flexible outsourcing relationships through cloud delivery. This would also suggest a more formal approach for a cloud strategy. As a third factor within this category we identified ‘*effects on capital structure’*. When a company´s usage of cloud services increases, a shift from capital-intensive (followed by depreciation on these assets) to an operating expenditure focused budget

happens. This effect is especially relevant when constraints are put from management to reach certain financial ratios ("I exaggerate […] our CFO told us that the cost do not matter as long as they are not operational expense").

Cloud Strategy (Phenomenon)

The phenomenon of our study is the attitude of companies towards the necessity and drivers of a cloud strategy. This targets the question if practitioners believe that a separate cloud strategy is beneficial or if the strategic direction should be manifested somewhere else. We observed that there are two beliefs about the appearance: Cloud Strategy as part of (IT) Sourcing Strategy and Implicit Knowledge ("We have not seen companies having a cloud strategy already in place […] they are rather develop one using experience from current /first cloud projects."). The former can be understood as a formalized (subsection) within the sourcing strategy which specifically deals with cloud computing. The latter can be seen as values or attitude towards cloud computing and how to deal with it. In contrast to our expectations, none of the interviewees thought it would be beneficial or helpful to define a separate cloud strategy. Further, when asked who should be responsible driving such a cloud strategy, experts predominantly named the IT department followed by business divisions and executives.

Cloud Strategy Operationalization (Content and Strategies)

The variables defining the cloud strategy content are central to the phenomenon as they are expected to correlate with the appearance of a cloud strategy (i.e. formal document, part of IT (sourcing) strategy). Hence, these covariances operationalize the concept of cloud strategy. The various operationalization aspects were grouped into the following three categories: '*Themes & Topics*', '*Tools*' and '*IT Governance*'.

Within the '*Themes & Topics*' category we classified aggregated concepts, which should be considered when thinking about a long-term plan incorporating cloud solutions. The concept that was mentioned by every interviewee is '*data security requirements*' comprising various sub-concepts such as information security, compliance and regulatory conditions, data locality as well as loss of control (e.g. Subashini & Kavitha, 2011; LP Willcocks et al., 2012). As a second aspect, we propose '*lock-In effects*' which refers to the threat of unsatisfied users finding themselves being bound to a certain solution with only high switching costs or without any alternative at all (LP Willcocks et al., 2012). The next identified aspect within a cloud strategy is '*skills & capabilities*' that we understand as the analysis of current skills and definition of the required skills with respect to future cloud requirements. This is in line with basic principles of organizational design (e.g. Daft, 2009, p. 17 "Professionalism") and has been evaluated in this context (Leslie Willcocks, Feeny, & Olson, 2006). Next, experts report of the necessity to rethink the role of vendor and relationship management which we grouped as the '*vendor & relationship management*' concept. This aspect includes the institutionalization of vendor management capabilities within e.g. functional organization or process design (in addition to the changed skill set) (LP Willcocks et al., 2012). As a last aspect, we propose '*integration & management complexity'*. This factor considers the effort of companies to integrate solutions into their enterprise architecture (IT systems and processes). For example, when a manufacturer replaces his CRM-system he will have to implement interfaces to his production system and make sure that the order-to-cash process. Further, the complexity of administration (e.g. Change and SLA Management) will increase as the responsibility is shifted to the provider (LP Willcocks et al., 2012).

The category *'Tools'* captures methods and tools that help to implement a cloud strategy in a structured way. The first method that has been mentioned by all experts is a generic '*decision criteria checklist*' that can be applied to a variety of cloud evaluations. This aims to reduce the effort, shorten duration and increase quality of system evaluations, as not every project has to develop them on their own. Further, a company-wide standard of minimal requirements is achieved. Next, we identified 'data security classification' which is understood as a classification of data in terms of a company wide data model and assigned classes of confidentiality. These classes are then assigned to conditions and consequences for out-/cloud-sourcing. As a third tool we propose '*rules & policies*' that can be used to guide the decisions of employees in a way that benefits the companies (strategic) goals. For example, enterprise policies or standard operating procedures (SOP) can be used to instruct certain actions (e.g. develop risk mitigation plan). The last identified aspect is '*planning & evaluation methods*' which consists of a plethora of possible methods. These include for example risk analysis and scenario-based business cases (e.g. different assumptions about quantity of required transactions or users). Further mentioned concepts are an approach of gaining experience with non-critical applications and goal definition ("Evaluation methods are used that consider planning under uncertainty […] such as varying purchase quantities (of IT services)").

The last category comprises aspects of '*IT governance*', which, in contrast to the equally named category within the contingencies, comprises aspects that should possibly be reconsidered within a cloud strategy. The first aspect is '*budget ownership*' that needs to be reviewed from the perspective of the interviewed experts. Typically, budget for IT solution is

organized centrally within corporate IT. Appropriate reasons for partially relocating IT budget ownership to business might be strategic focus on business growth and flexibility. In the same vein, '*understanding of IT responsibility*' can be reconsidered, especially in the light of cloud implementation projects. At last, we propose '*formalization & decision rights*' as another aspect that might be rethought when defining a cloud strategy. Executives and managers have to ask themselves if the existent decision rights are appropriately allocated or if a shift has to occur. Especially in the light of an increased risk profile for e.g. public cloud solutions, decision committees could become an alternative. Also, some executives might want to find themselves in a role to decide whether the risk is worth the promised benefits.

Expected Benefits (Consequences)

As a first consequence of our phenomenon we propose '*IT procurement process improvement'* which we understand in a variety of dimensions, namely transparency, quality, speed and cost. The experts affirmed that a more formal manifestation would improve the IT procurement process, e.g. reduction of evaluation effort. As a second factor we identified '*protective behavior of IT*' that we interpret as the fear of IT organizations and staff for loss of responsibility, importance or jobs ("If the core competence of IT is software hosting, they will come up with several reasons against the Cloud"). Another identified consequence from out data is '*Business-IT-Alignment*'. We suggest that a strategic consideration of cloud computing on enterprise level will improve or tighten the alignment between the goals of business and IT. Further, we contend that the more formal this consideration is the greater the likelihood of success will be. At last, we propose '*business division encouragement*' as a possible implication of our phenomenon. This construct comprises both, encouraging and allaying fear of business managers or users of doing something that could have negative consequences and thereby dismissing the objectively best option ("Departments are becoming more autonomous (in terms of IT application). […] In the decision process, taking fear away from the people is a main point. A lot of people we talk to are unsure whether cloud can be an option").Table 1 summarizes the identified concepts that are unique in the context of Cloud Computing and states propositions that need be validated in further studies.

No.	Category/ Concept	Proposition
P1	Managerial Autonomy	The more autonomous managers are, the more beneficial would be a rather formal cloud strategy as the likelihood of shadow IT is rather high.
P2	Budget Ownership	The more budget of business divisions can be spent for IT solutions, the more beneficial would be a rather formal cloud strategy.
P3	Protective Behavior of IT	A rather formal cloud strategy will help to avoid or weaken the protective behavior of the IT department against Cloud Computing.
P4	Business division encouragement	A rather formal cloud strategy will help to increase transparency and encouragement for the business divisions in terms of Cloud Computing.

Table 1. Proposition for cloud computing unique context factors

Implications for Practice

In this section we will elaborate on implications for practice that arise from our results. More specifically, we use the proposed model to give detailed guidelines for practitioners what to consider when developing a cloud strategy. In general, organizations will not need to adapt the complete model but rather use it as a reference.

A manager that considers developing a cloud strategy may find it useful to apply the contextual factors to his own company in order to determine the level of required formalization. Therefore the model can be used as an assessment for the relevance of cloud computing and antecedents that impact the formal level of a cloud strategy. Furthermore, we give an overview of aspects that need to be addresses within a cloud strategy, i.e. what topics need to be considered. In addition, we provide a list of evaluation methods and tools which is by no means complete but rather serves as a starting point. Further, applicability of these tools has not been evaluated in this context. The cloud as a new service paradigm brings up new challenges that may require a reconsideration of governance aspects. For details, we refer to recent studies on e.g. SaaS governance that contemplate the extensive literature on overall IT governance. Within our elaboration on consequences we give managers an indication of what might be achieved reflecting some of the most important issues for companies in terms of cloud adoption: uncertainty of employees and decision makers.

Implications for Research

From a research perspective we present a first study examining this topic from an experimental point of view. As outlined in the findings section there already exists knowledge in various areas of interest. Adjacent fields are for example corporate and IT governance, IT strategy and strategic IS planning as well as outsourcing governance and strategy. In general, we suggest examining the applicability of theories that can be borrowed from these fields in this particular context.

More specifically, research has to be carried out in order to strengthen the understanding on relationship between factors and their impact on the formal level of cloud strategy within the organizational context by e.g. using a contingency analysis within a multiple case study methodology. The model construct of contingencies should further be evaluated in terms of completeness and exhaustiveness. Furthermore, the appearance (and therefore level of formalization) can be evaluated in more depth and future research might examine how a cloud strategy can be implemented as a part of an IT (sourcing) strategy. We already introduced propositions that are unique in the context of Cloud Computing that need to be evaluated. These elements should be investigated in terms of relationship with intra-organizational power as part of organization theory (see e.g. Hickson, Hinings, Lee, Schneck, & Pennings, 1971). The relationship between the appearance of a cloud strategy and the direct effect on the consequences might be of interest as well. Especially, if there is a difference for different forms of appearance and their effect on consequences, i.e. if a formal cloud strategy has a stronger effect on the '*protective behavior of IT*' for example. In addition, further perspectives can be used to enrich the model by e.g. incorporating elements of the Technology, Organization and Environment (TOE) framework (see e.g. Low et al., 2011).

CONCLUSION

In this paper we presented the insights from a qualitative exploratory study on cloud strategy. We conducted six in-depth interviews with experts from different companies analyzing the data using the Grounded Theory method. The outcome of our research is a conceptual framework about the appearance (i.e. formal placement) of a cloud strategy. The findings for the phenomenon itself give organizations an overview how other organizations target the topic of a cloud strategy. It shows in which form they can adapt or build a cloud strategy or how they can approach cloud usage from a more strategic perspective. Within this framework we proposed organizational context factors that influence a cloud strategy. We further hypothesized how these factors impact the necessity and appearance of a cloud strategy, i.e. if and how an influence factor calls for a more or less formalized cloud strategy. Furthermore, we learned that experts not only see the benefits of a cloud strategy in terms of efficiency or quality of the procurement process but value change management aspects as well. Additionally, we captured thoughts on how to operationalize a cloud strategy in terms of topics, methods and governance.

Due to the small sample size the generalizability is limited. Particularly, we plan to carry out further interviews with companies from industries not yet covered. In this way, we expect to extend and validate our model. Additionally, we plan to explore the relationships between our influence factors, the phenomenon and the consequences in more detail. Thereby, guidelines can be developed for organizations on developing and implementing an appropriate cloud strategy.

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