MARRIED FOR LIFE? A CLOUD COMPUTING CLIENT-PROVIDER RELATIONSHIP CONTINUANCE MODEL

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Abstract

Cloud computing is moving from the pre-adoption to the post-adoption phase with many cloud client organizations having established relationships with cloud providers. Hence, the most critical cloud computing question for information technology (IT) executives shifts from the issue of adopting cloud computing to the issue of managing existing relationships with cloud providers. Under which conditions do client organizations continue relationships with cloud providers? This paper synthesizes extant cloud computing, IT continuance, and IT sourcing literatures and builds on insights from key informant interviews. It develops a theoretical model that explains and predicts the intention of cloud clients to continue relationships with cloud providers.

Keywords: Cloud computing, post-adoption, continuance intention, IT adoption, IT sourcing, relationship management.

1 Introduction

In 2014, IT executives continue to make significant investments in cloud computing solutions. Organizations are building and replacing systems with solutions from cloud providers such as Accenture, Amazon, Fujitsu, IBM, Microsoft or Rackspace. The market for cloud computing is huge. Forrester Research estimates that the total global cloud computing market was US$ 61 billion in 2012 and will grow to US$ 241 billion in 2020 (Ried, Kisker, Matzke, Bartels and Lisserman, 2011; Venters and Whitley, 2012).

Cloud computing constitutes a paradigm shift for both the economics and the management of information technology (IT) (Marston, Li, Bandyopadhyay, Zhang and Ghalsasi, 2011). Pay-as-you-go and on-demand models of cloud computing replace the large stepped fixed costs of traditional IT. One major consequence of the cloud transformation is a changed role for the IT function. Instead of designing, building, and running technology, the IT function now brokers services, integrates data, and focuses on innovation rather than infrastructure.

Information systems (IS) researchers have examined the drivers and issues of cloud adoption (Yang and Tate, 2012). Cloud computing adoption research provides valuable insights for IT practitioners in identifying benefits and applications of cloud computing. However, with increased cloud computing solutions and client-provider relationships in place, IS research recently moved on to cloud client-provider relationship management (Hoberg, Wollersheim and Krcmar, 2012; Yang and Tate, 2012). This paper contributes to this emerging research stream.

Cloud client-provider relationships are strategically significant. Cloud providers are responsible for software, hardware, networks, support staff, and management processes. For most cloud clients, there
are few, if any, options for individual adjustments (e.g., skipping a software upgrade, purchasing more reliable hardware, or installing faster networks). Cloud clients need to rely on the cloud providers making the right IT decisions. Delegating IT decisions and responsibilities creates lock-in and high switching costs for cloud clients. Intra-organizational relationships with high switching costs are considered “strategically important” (Porter, 1996).

“What makes cloud clients continue (or not) their relationships with cloud providers?” This is the question we address in this research-in-progress. Specifically, we develop a model of cloud client-provider relationship continuance by drawing on the literatures on cloud computing, IT continuance, and IT sourcing as well as from key informant interviews.

The remainder of this paper is structured as follows. The next section reviews related works. The following section develops the theoretical model by integrating insights from extant theory and literature. The paper concludes with a discussion of implication (if the model survives empirical tests).

2 Related Work

What is “cloud computing”? Indeed, quite a substantial number of cloud computing papers address issues of defining and conceptualizing cloud computing (Böhm, Leimeister, Riedl and Krcmar, 2011; Hoberg et al., 2012; Leimeister, Riedl, Böhm and Krcmar, 2010; Yang and Tate, 2012). Hoberg et al.’s review of the cloud computing literature found that 48 of 60 papers are primarily addressing cloud computing characteristics (Hoberg et al., 2012). Similarly, Yang and Tate’s review found that conceptualization of cloud computing one of the dominant cloud computing topics (Yang and Tate, 2012). Böhm et al.’s review of 17 academic and practitioner sources discussed 14 inconsistent definitions of cloud computing that are based on hardware attributes, software attributes, data services, and/or pricing models (Böhm et al., 2011). Cloud provider advertising certainly contributes to the confusion by attaching cloud terminology to various services and products (Böhm et al., 2011; Regalado, 2011). However, a consensus appear to have emerged (Yang and Tate, 2012), manifested in the National Institute of Standards and Technology (NIST) definition (Mell and Grance, 2011). For the purpose of this paper, we understand cloud computing as “the use of scalable IT resources available over communication networks”.

The adoption of cloud computing has seen the extensive research (Yang and Tate, 2012). This research stream (Aleem and Sprott, 2013; Iyer and Henderson, 2010; Lin and Chen, 2012; Loebecke, Thomas and Ulrich, 2012; Manguc, 2011; Marston et al., 2011; McAfee, 2011) helps organizations understand cloud computing’s benefits, costs, and risks. This research help organization to take the decision to adopt (or not to adopt) cloud computing.

Once a general decision for cloud computing is made, a cloud provider needs to be identified. Only a few papers explore how cloud client’s chose cloud providers (Koehler, Anandasivam, Dan and Weinhardt, 2010; Ojala and Tyrväinen, 2011). Koehler et al. found that trust and fixed fee models were significant provider advantages (Koehler et al., 2010). IT practitioners certainly need more research on provider selection because “right” provider selection is a key concern in practice.

Benefits from cloud computing can finally materialize once a cloud provider been found, a relationship has been established, and the cloud is in operation. Iyer and Henderson investigated the business impact and business value of cloud computing after adoption (Iyer and Henderson, 2012). According to their study, cloud computing helps organizations to focus on core business, to experiment with new business models, mitigate business risks, and to create applications that work on mobile and social platforms (Iyer and Henderson, 2012). Generally, cloud computing is reported as bringing significant cost reductions (e.g., 37%) (Khajeh-Hosseini, Greenwood and Sommerville, 2010).

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1 We have conducted eight interviews with cloud clients and cloud providers. This is in addition to longitudinal case research with cloud computing client organizations.
In the long term, one key concern for cloud clients is if they should remain with their cloud provider or switch to another. However, the issue of “provider continuance” has had little research. Benlian et al. examined the client’s quality perception regarding Software-as-a-Service (SaaS) (Benlian, Koufairy and Hess, 2012). In their study, they found that cloud clients evaluate providers quality with traditional service quality measures, with particular emphasis on security and flexibility (Benlian et al., 2012). This paper explores this gap in more detail to build a theoretical model for evaluating existing cloud-provide relationships and the prospects of their continuation.

3 Theory Development

Cloud computing is certainly different from in-house IT. Cloud computing as a form of IT/IS sourcing requires a particular set of capabilities (Feeny and Willcocks, 1998; Willcocks, Reynolds and Feeny, 2007; Willcocks and Kern, 1998). Indeed, cloud computing and other forms of IT/IS sourcing are often chosen for similar reasons (Iyer and Henderson, 2012; McLellan, Marcolin and Beamish, 1995). Cloud computing and IT/IS sourcing are based on on-going service delivery rather than an off-the-shelf or one-off transaction with an external provider and hence involved deeper intra-organizational relationships. Cloud computing and IT/IS sourcing bear the risk that the organization’s core technological competencies might degrade and the client might become locked-in (Willcocks and Lacity, 1995).

However, cloud computing is also different from traditional IT/IS sourcing. Cloud computing typically involves multiple clients simultaneously sharing the cloud provider’s resources. For example, Amazon Web Services, Microsoft Office 365, and Rackspace share cloud services with thousands or millions of clients at the same time. Governance of shared IT infrastructure is already problematic within one organization (Boynton and Zmud, 1987), which at least has a CEO to resolve contention. In cloud environments, the provider and their other dominant clients may have disproportionate influence, leaving little influence to the focal client organisation. On the other hand, the cloud model provides more scalability and flexibility than traditional IT/IS source. Because of such differences, cloud computing presents a unique context and involves new challenges for IT executives, for example in regard to managing cloud computing client-provider relationships (Hoberg et al., 2012; Yang and Tate, 2012).

Different theoretical models explain why a client would continue using an IT product or service. Bhattacharjee’s IS continuance model (Bhattacharjee, 2001) combines elements from the technology acceptance model (TAM) (1989) and expectation-confirmation theory (Oliver, 1980) to explain and predict the continued use of IS after adoption. These two theories before discussing the IS continuance model itself on which this paper extends.

One of the most often used theories in IS, TAM focuses on initial adoption of an IS (Venkatesh, Morris, Davis and Davis, 2003). Bhattacharjee’s IS continuance model replaces pre-adoption constructs of TAM-based IS acceptance research with post-adoption constructs by drawing on research into re-purchase decisions (Bhattacharjee, 2001; Oliver, 1980). An example of a pre-adoption construct is “perceived ease of use”, which measures a cognitive belief regarding an IS prior to actual use of an IS (Davis, 1989). An example of a post-adoption construct is “satisfaction” based on actual use of an IS (Bhattacharjee, 2001; Oliver, 1980).

The expectation-confirmation theory is used in marketing research to explore repurchase behaviour and customer satisfaction (Anderson and Sullivan, 1993; Oliver, 1980; Oliver, 1993; Spreng and Olshavsky, 1993; Tse and Wilton, 1998). Expectation-confirmation theory proposes that a consumer’s re-purchase intentions are determined by their satisfaction with use of the product (Anderson and Sullivan, 1993; Oliver, 1980; Oliver, 1993). Satisfaction is measured by determining a purchaser’s confirmation of expectations regarding the product (Oliver, 1980). The expectation confirmation construct compares pre-purchase expectation to actual post-purchase performance (Oliver, 1980). That is, the purchaser is held not to evaluate a product against absolute performance but instead to compare experienced performance with expected performance.
One problem of the expectation-confirmation theory is how it models time. The model includes both “expectations” (t1, pre-purchase) and “experience” (t2, post-purchase) constructs. That is, the theory includes constructs from two points in time (Bhattacherjee, 2001). This is problematic because individuals adjust their perceptions and expectations over time (Bem, 1972), and hence the value reported for “expectations” is dependent on the time of measurement. To alleviate the issue, the IS continuance model removes the antecedents “performance” and “expectations” of “confirmation” from the model “because the effects of any pre-acceptance variables are already captured within the confirmation and satisfaction constructs” (Bhattacherjee, 2001, p. 355.). However, the construct “confirmation” in the IS continuance model captures the relation between pre-adoption expectation and post-adoption experience with items such as “My experience with using [IS] was better than what I expected” (Bhattacherjee, 2001). In our perspective, the above continuance models are post-adoption phase models rather than long-term use phase models (Benlian et al., 2012 come to a similar conclusion). Yet, this paper is interested in the post-adoption phase of cloud computing and hence within this implicit boundary condition of the IS continuance model and the expectation-confirmation theory.

The IS continuance model (Bhattacherjee, 2001), shown in a simplified version in Figure 1, holds that the “confirmation” of previous expectations lead to increases in both users’ “perceived usefulness” of the IS as well as their “satisfaction” with the IS. Users’ “perceived usefulness” increases both their “satisfaction” as well as their “continuance intention” regarding the IS. “Satisfaction” in turn also increases the “continuance intention” While the IS continuance model was developed with individual users of IS in mind, the core claims and constructs of the model have been shown to be relevant for studying organizational users of IS as well, including in the context of cloud computing (Benlian et al., 2012).

Both models agree that a positive causal relation exists between “confirmation” and “satisfaction”. Certainly, a foundation for the continued relation between a service client and service provider is the fulfillment of the promises made and the expectations created (Bitner, 1995). Evidence for a positive causal link between “confirmation” and “satisfaction” has been found in different contexts (e.g., Bhattacherjee, 2001; Sivadas, Holmes and Dwyer, 2012). Hence, we expect that cloud computing clients “satisfaction” is depending on the “confirmation” of their expectations. That is, the cloud computing client will be more satisfied if the actual experience with the cloud providers is as expected.

**Proposition 1:** Confirmation of the expectations of the cloud client increases their satisfaction with the cloud provider.

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2 Note that Oliver argues that “perceived performance” is an antecedent to “confirmation” (of a consumer regarding a product) while Bhattacherjee argues that “confirmation” is an antecedent to “perceived usefulness” As both are measures of a products’ ability as perceived by its user, it might be necessary to clarify the difference between the constructs “performance” and “usefulness” and the causal relation to “confirmation”.

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Further, the extant literature also consistently reports that “satisfaction” with IT service provision increases the likelihood of the relationship “continuance intention” (e.g., Benlian et al., 2012; Bhattacharjee, 2001; Sivadas et al., 2012). Hence, we expect that cloud client’s satisfaction with a cloud provider leads to an intention to continue business relationships with that provider.

**Proposition 2: Satisfaction of the cloud client increased their intention to continue the relation with the cloud provider.**

While not present in current IS continuance models, our interviews with key informants and indications in the cloud computing literature suggest that “relationalism” and “dependency” are two additional major factors relevant for continued cloud client-provider relationships. The following provides some exemplary interview citations to ground these claims.

A senior manager of a leading cloud provider explained the role of relationalism: “[Shared norms/relationships/relationalism] are extremely important. If a customer doesn’t trust you [then] you’re competing on price. And there’s no way to differentiate on price unless you drop your price. [...] The relationship [...] starts with [presales], investing enough time in understanding the customer”. The senior manager further explained how relationalism is built: “[Initially] through reference calls or helping them develop the business case. And then as you move into implementation, a model that we’re putting in place now is that one of our advisory consultants sits on the project committee. So, I sit on the steering committee of the bank that I was talking about, their project. It’s a multimillion dollar project, you want to make sure that it’s right [...] They trust us now, and it’s something that we ensure that we don’t abuse or lose”.

Correspondingly, several cloud clients reported that they value someone “speaking the same language” and a real, local contact that they can call and meet over coffee rather than having to interact exclusively with an online dashboard. One senior executive explained: “If I’m [CIO of major Australian bank] and I’m making a big investment in [major international cloud provider], I want to be able to call somebody in Australia and know that they’re working on my particular outage right now”.

The relationship between service providers and clients relies on both fulfillment of promises (e.g., as per level agreement) and a trustful and interactive relationship. Cloud computing includes on-going services provision during which the relationship between cloud computing client and service provider evolves. Shared norms, codes of conduct, and communication practices becomes an important factor (e.g., Benlian et al., 2012; Bhattacharjee, 2001; Sivadas et al., 2012) as provider and client become acquainted with each other. Relational norms, such as codes of conduct and routines for cooperating, develop with an on-going transactional relationship (Sivadas et al., 2012). The benefits of good relationships are, for example, that the client and the provider understand each other and anticipate the other’s behaviour (Gundlach, Achrol and Mentzer, 1995). As a consequence of a good relationship, the client will remain loyal to the provider even when competitive alternatives emerge because of the investments and experiences made in the relationship (Bitner, 1995). Our model hence considers “relationalism” – the relation between cloud computing client and cloud computing provider in terms of shared norms and values – as an antecedent for “continued use”.

**Proposition 3: A strong positive cloud client-provider relationship increases the client’s intention to continue the relation with the provider.**

Finally, the cloud client enters into some degree of dependence on the cloud provider.

One senior executive from a cloud provider discussed dependence and lock-in in the following way: “Think about marriage and divorce. One of the things the industry’s only just figuring out is and building standards around is [...] import protocols. How do you bring data from other systems into our networks and into our applications? What they haven’t done a great job of is thinking about the opposite: How do you get them out of those applications into other applications in the seamless way as well? [...] So, one question a client should always be asking the vendor is, if we were to break up, how do I get data out of your system and into another one? And that’s the SLA [service level agreement] on that and what do you do with my data once I’ve removed the data from your system?"
Do you destroy it, do you archive it, what do you do with it? You know, all these questions they need to ask. [Providers] have no interest in providing standards or even having a capability that allows data to be removed from the data center.” Other clients and providers agree that while standards might be eventually forced upon providers, the de facto situation is that many clients are to some degree technical “locked-in” with their cloud provider.

Sivadas et al. (2012) propose measuring “dependence” through the strength of structural and technical ties (Sivadas et al., 2012). Dependence makes it more difficult for the client to stop the relationship with a service provider. Both business lock-in (e.g., contractual arrangements, interlinked business processes) and technical lock-in (e.g., non-standard data storage formats, transaction costs) can be captured with the “dependence” construct. This paper proposes that the client’s dependence on the provider positively impacts on the client’s intention to remain with the provider.

**Proposition 4**: Technical and structural ties (dependence) between the cloud client and the cloud provider increases the client’s intention to continue working with the provider.

Figure 2 shows our proposed theoretical model for the continuance intention of cloud clients regarding relations with cloud providers.

**Figure 2. Proposed Cloud Client-Provider Relationship Continuance Model.**

### 4 Discussion and Conclusion

As discussed above, there is a lack of research addressing post-adoption issues of cloud computing, including client-provider relationships. However, as cloud computing continues to move from pre-adoption to post-adoption phases in practice, IS research is shifting from pre-adoption to post-adoption research as well. This paper contributes to this emerging research stream on the post-adoption phase of cloud computing by proposing a theoretical model of cloud computing client-provider relationship continuance.

The model in this paper model describes the mechanisms at play in cloud computing client-provider relationships. “Satisfaction”, “relationalism”, and “dependence” are major antecedents for “continuance intention”. “Satisfaction” in turn results from the “confirmation” of expectations regarding the relationship. The model draws on earlier IT adoption research that considered “satisfaction” and “perceived usefulness”. The model adds “relationalism” (e.g., shared norms) and “dependence” (e.g., structural lock-in). The model aims to “explain and predict” (Gregor, 2006) the intention of the cloud computing client to remain in existing relationship with the cloud computing provider.

Assuming that the model holds in empirical tests, several implications for research and practice follow. For future research that directly continues the work of this study it will be valuable to test this model in different contexts. Special attention should be paid to the model’s boundary conditions. That is, while the model development was motivated by and has a background in current cloud computing developments, the model might be helpful to explain continuance regarding IS services more broadly.
For cloud clients, the model highlights the role of “dependence” component. If faced with several offers of competitive delivery of technical services at market prices, clients should take strongly into consideration in what type of dependence and lock-in they are entering (e.g., clear, explicit arrangements for dis-continuing the relationship). Cloud service standardization efforts may prevent or reduce dependency, but such efforts are in their infancy.

For cloud providers, the model highlights the role of “relationalism”. It will be wise for providers to build good relations (e.g., through local representative with direct client interaction) rather than focusing exclusively on technical delivery within the service level agreements. The overall cloud market is size is rapidly increasing, yet many industry observers expect the number of cloud providers to consolidate. The competitive edge might well lay in developing better relations rather than competing on price or technical delivery.

Due to the complex trade-offs around cloud computing, practitioners certainly need further research examining relations between key players in cloud computing.

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6 References


