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Strategic signaling through cloud service certifications: Comparing the relative importance of certifications' assurances to companies and consumers

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ABSTRACT

Cloud service certifications (CSCs) are assessed by practitioners to support strategic cloud adoption decisions with the aim to reduce information asymmetries. Both businesses and consumers scrutinize CSCs' assurances as ex ante signals indicating a cloud provider's future service quality. While some research has examined the aggregate effects of certifications on decision variables, recipients' evaluations of certifications and their assurances before making IT-related decisions have received little attention. Furthermore, prior research has predominantly focused on privacy and security assurances in e-commerce certifications. Drawing on signaling theory, we propose that certifications are signals that recipients decompose into a set of fine-grained assurance signals that they weigh to evaluate certifications. We evaluate the responses of 113 company representatives and 317 consumers to a best-worst scaling survey to examine the relative importance these two groups attach to ten assurances from CSCs. Our results show that similar to other online contexts, security and privacy are important assurances, but additional assurances related to availability, the customer friendliness of contracts, and legal compliance are also demanded, particularly by companies. Privacy, security, and availability are most crucial to both companies and consumers, but their relative importance varies substantially between the two groups. Post-hoc subgroup analyses reveal significant differences in assurances' relative importance for provider and user companies, adopter and non-adopter consumers as well as companies using different types of services and from different industries. Our findings indicate that recipients evaluate certifications as a bundle of signals with varying importance due to recipients' characteristics and context. With this conceptualization, we contribute to an advanced understanding of the sense-making of certifications and lay out how it influences cloud service adoption theories. Our study has practical implications for certification authorities that design CSCs as well as for providing insights to cloud service providers on customers who draw on CSC assurances when making cloud service adoption decisions.

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Introduction

With the advent of cloud computing, the role of technology is profoundly shifting for companies and consumers alike. For businesses, technology is moving from serving as a support function to playing a strategic role and is defining winning business models (Benlian and Haffke, 2016; Tallon et al., 2019). For consumers, technology has become increasingly embedded into their daily lives. Disruptive technologies such as cloud computing have dramatically altered the way companies and consumers access technology and use distributed resources (Benlian et al., 2018; Merali et al., 2012). Cloud services are evolving more rapidly in terms of functionality and underlying infrastructure than past on-premises technologies, leading to shorter adoption and replacement cycles, while at the same time becoming less transparent in terms of their inner properties and working mechanisms. As a result, it has become a strategic necessity for organizations and consumers to be informed about the technologies they adopt (Ravichandran, 2018) and for technology providers to ensure that their customers are confident in making adoption decisions.

IT-related certifications have established themselves among company decision makers and consumers as tools that signal a provider's service quality in traditional IT outsourcing (e.g., ISO 27000 or the Capability Maturity Model, CMM) and in consumer e-commerce (e.g., TRUSTe). In such contexts, IT-related certifications traditionally function as strategic signals to build trust (Belanger et al., 2002), which plays a crucial role in users' adoption decisions for new technologies (Li et al., 2008). Cloud computing typically involves a self-service approach with few human interactions (Mell and Grance, 2011). As a result, institutional trust-building signals that do not rely on personal interactions, such as IT-related certifications, become even more important (Lansing and Sunyaev, 2016). Hence, concomitant with the proliferation of cloud computing among companies and consumers, organizations such as Cloud Security Alliance (CSA) and EuroCloud have started to develop a novel class of IT-related certifications: cloud service certifications (CSCs). The main users of CSCs are company decision makers who evaluate CSCs as part of procuring a cloud service for their organization and consumers who evaluate CSCs in the context of selecting a cloud service for personal use. Making the right cloud service adoption decision is of strategic importance to organizations because such outsourced services not only allow to better manage cost and to internalize innovation (Aubert et al., 2015; Oshri et al., 2015) but they also contribute to overall service quality (e.g., reliability, responsiveness), which is directly related to organizational performance (Gorla et al., 2010). Yet, approximately half of all outsourcing relationships result in low performance, with service quality conflicts being one of the root causes (Lacity and Willcocks, 2017). These challenges are particularly reinforced in cloud service adoption decisions, in which consumers and companies face numerous cloud-specific uncertainties on service quality concerning not only security and privacy but also, among other uncertainties, availability, interoperability, contracts, and legal compliance (Armbrust et al., 2010; Benlian and Hess, 2011; Marston et al., 2011).

CSCs signal cloud service quality and allow decision makers to make ex ante assessments, increase market transparency and ultimately support better adoption decisions, leading to better service fit and higher service quality. As such, the implementation of CSCs is of strategic importance for company decision makers and consumers when making cloud service adoption decisions (Khan and Malluhi, 2013; Sunyaev and Schneider, 2013). Moreover, CSCs need to be configured with the right composition of assurances to function as information signals and mitigate cloud-specific uncertainties. For example, Dropbox, a cloud service for storing and exchanging documents, needs to overcome users' uncertainties about the security, privacy, and continuous availability of and access to data when that data is stored in the cloud rather than on users' local computers (Dropbox, 2017b). Without assurances covering specific service details, adopters would remain uncertain regarding service levels. For instance, they would not know whether their personal data gets locked in or lost due to non-interoperability or whether their personal data will be processed according to compliance rules and regulations by the cloud service provider. While some of these uncertainties may also be covered by contracts, assurances allow for an in-advance check and are based on third-party inspection. To mitigate prospective adopters' uncertainty and facilitate the adoption of their service, Dropbox obtained ISO 27017 and CSA STAR certifications (Dropbox, 2017a), two certification schemes that provide security assurance. Because these CSCs do not provide privacy or availability assurances, Dropbox is also certified as ISO 27018 (privacy) and ISO 22301 (business continuity, availability). In this example, ISO chose to develop separate certifications for each type of assurance. EuroCloud, by contrast, chose to bundle security, privacy, and availability assurances in one certification. Certification authorities must therefore make a strategic decision to define their nascent CSCs and include the most appropriate set of assurances for their respective target groups. Similarly, to foster the adoption of their cloud services, managers of cloud service providers face the strategic task of selecting a CSC that signals appropriate assurances to customers. If they do not know which assurances are more or less important to different customers, certification authorities and cloud service providers may develop or acquire CSCs that do not fit their customers' needs for assurance or that are too broadly scoped, which may obfuscate the CSCs' meaning and render CSC adoption uneconomical owing to complex certification processes. Thus, it is important to understand which assurances company decision makers and consumers value in a CSC when evaluating it as a decision factor for the adoption of a cloud service.

Prior IS research on certifications has conceptualized certifications as an aggregate signal and examined their effect on decisions and decision antecedents such as perceived risk, perceived assurance, and trust (Sturm et al., 2014). Furthermore, scholars have juxtaposed certifications' effects on these antecedents with those from other signals, e.g., disclosure statements or reputation (Kim et al., 2008; Wang et al., 2004). Given that prior research focused on instances of real-world certifications, the implicit focus was put on certifications that provide either security or privacy assurances. Recent studies applying adoption theories in the cloud context, however, found that adoption decisions are influenced by perceptions of uncertainties beyond those related security and privacy, such as performance (interoperability, reliability), system unavailability, or contract conditions (e.g., Benlian and Hess, 2011; Bhattacherjee and Park, 2014; Heart, 2010; Repschlaeger et al., 2013). Prior to making an adoption decision on a cloud service without assurances beyond security and privacy (e.g., guarantees on the interoperability and availability of data or legal compliance),

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