

MOVING IN THE RIGHT DIRECTION?: MAPPING LITERATURE ON CLOUD SERVICE CERTIFICATIONS' OUTCOMES WITH PRACTITIONERS' PERCEPTIONS

Benjamin Sturm

University of Cologne, Cologne, Germany, sturm@wiso.uni-koeln.de

Jens Lansing

University of Cologne, Cologne, Germany, lansing@wiso.uni-koeln.de

Ali Sunyaev

University of Cologne, Cologne, Germany, sunyaev@wiso.uni-koeln.de

Follow this and additional works at: <http://aisel.aisnet.org/ecis2014>

Benjamin Sturm, Jens Lansing, and Ali Sunyaev, 2014, "MOVING IN THE RIGHT DIRECTION?: MAPPING LITERATURE ON CLOUD SERVICE CERTIFICATIONS' OUTCOMES WITH PRACTITIONERS' PERCEPTIONS", Proceedings of the European Conference on Information Systems (ECIS) 2014, Tel Aviv, Israel, June 9-11, 2014, ISBN 978-0-9915567-0-0
<http://aisel.aisnet.org/ecis2014/proceedings/track11/2>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2014 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

MOVING IN THE RIGHT DIRECTION?: MAPPING LITERATURE ON CLOUD SERVICE CERTIFICATIONS' OUTCOMES WITH PRACTITIONERS' PERCEPTIONS

Complete Research

Sturm, Benjamin, University of Cologne, Cologne, Germany, sturm@wiso.uni-koeln.de

Lansing, Jens, University of Cologne, Cologne, Germany, lansing@wiso.uni-koeln.de

Sunyaev, Ali, University of Cologne, Cologne, Germany, sunyaev@wiso.uni-koeln.de

Abstract

Cloud service certifications (CSCs) are proposed in practice as instruments to mitigate the prevailing uncertainties about cloud computing, but research on their efficacy in business contexts thus far is lacking. In addition, previous research on other types of IT certifications is consumer-focused and inconclusive in terms of certifications' effects on factors that influence decisions, resulting in a vast literature body on certifications' outcomes that lacks structure. To address these research needs, we first derive a conceptual model of certifications' outcomes based on a systematic literature analysis of 42 empirical studies. Next, informed by the conceptual model, we explore outcomes of CSCs and related contingency factors through seven interviews with cloud computing experts. We find that cloud service certifications influence decisions directly and indirectly via perceived assurance, perceived risks and trust. Moreover, these outcomes are moderated by contingency factors, such as trust in the certification and cloud experience. Our study contributes to research by structuring the variety of concepts in literature on certifications' outcomes and serving as a knowledge base for future research. Furthermore, it contributes to practice by helping practitioners to understand CSCs' outcomes and contingency factors.

Keywords: Cloud Service Certifications, Certification Outcomes, Cloud Computing, Cloud Services

1 Introduction

Cloud service certifications (CSCs) were recently declared a key action of the European Union's cloud computing strategy (European Commission, 2012) and numerous CSCs are currently under development, for example TRUSTed Cloud Data Privacy Certification, EuroCloud SaaS Star Audit or Cloud Security Alliance STAR. Certifications provide information about otherwise unobservable attributes about certified organizations, products or services (ISO/IEC 17000:2004). Such information is important for decision-makers who are responsible for selecting and procuring cloud services because it supports evaluating a cloud service's true quality, for example in terms of security, privacy and interoperability (Schneider et al., 2014; Sunyaev and Schneider, 2013). Hence, it is believed that CSCs help to mitigate the prevailing uncertainties about cloud computing (European Commission, 2012; Lansing and Sunyaev, 2013; Sunyaev and Schneider, 2013) and help to establish trust in certified cloud services (Khan and Malluhi, 2010). Apart from research on potential CSC dimensions (Lansing et al., 2013; Schneider et al., 2014), empirical evidence for CSCs' efficacy and a common understanding of CSCs' outcomes in terms of their effects on individual cloud service customers' (CCs) beliefs, attitudes, and behaviors as well as contingency factors are lacking. However, without knowing what CSC's effects on CCs' beliefs, attitudes, and decisions are and which contingency factors exist, cloud

service providers (CPs) could misjudge the potential benefits of adopting CSCs and would risk adopting CSCs that do not result in the expected outcomes.

The present literature on IT certifications provides only limited help in understanding the outcomes of CSCs. First, though gaining attention in consumer contexts, most cloud services are used in business contexts. However, to date little research exists on certifications' effects on an individual level of analysis in business-to-business contexts. Second, the majority of studies on IT certifications on the individual level of analysis is set in the business-to-consumer e-commerce context. The focus of these studies lies on certifications' effects on consumers' buying decisions for physical goods, making certifications only relevant for mitigating uncertainties that are present during initiation of transactions. In contrast, cloud adoption decisions lead to continuous use of an IT artifact. As a result, any uncertainties (e.g., security, privacy) persist during use, which changes the nature and scope of certifications for those decisions. Third, extant research on certifications examines outcomes and contingency factors of various different certificates in diverse contexts, impeding a direct transference of insights. Finally, empirical findings on outcomes of certifications are inconclusive (cf. Lowry et al., 2012). For example, some studies found that privacy certifications have a significant effect on individuals' trust in a vendor (e.g., Kim and Kim, 2011), while other studies did not find a significant effect (e.g., McKnight et al., 2004), which suggests that contingency factors exist that moderate certification's effects. Hence, to systematically investigate and fully understand the efficacy of CSCs, a clear understanding of their outcomes and contingency factors is necessary.

The objectives of this paper are to identify CSCs' outcomes in form of their effects on beliefs, attitudes and behaviors of individual decision-makers as well as contingency factors. The focus lies on decision-makers on the customers' end, who are responsible for selecting and procuring cloud services within their organizations. We systematize the multifarious outcomes of certifications identified in the literature and provide a starting point for future research on CSCs' outcomes to ultimately help practitioners to better understand the effects of CSCs. We follow a two-step approach to achieve these objectives. First, we perform a systematic literature analysis on certifications' outcomes and synthesize the findings into a conceptual model. Second, we conduct seven semi-structured interviews with cloud practitioners to examine the model's applicability and completeness in the cloud context. In particular, we investigate practitioners' perceptions of the literature-based findings and seek to identify any factors that were not yet examined in the literature. We used the insights gained in the interviews to refine and extend our model.

The remainder is structured as followed. First, we give background on cloud computing and information systems (IS) research on IT certifications. Second, we outline the research methods applied for the structured literature analysis and the qualitative expert interviews. Third, we present the theoretical outcomes of certifications suggested by the literature analysis and the final conceptual model resulting from the expert interviews. We conclude with a brief discussion of findings and implications for research and practice.

2 Background

Cloud computing is a model for enabling on-demand network access to a shared pool of computing resources that are provisioned elastically with minimal management effort or provider interaction (Mell and Grance, 2011). Cloud computing encompasses three service models of increasing level of abstraction: infrastructure (Infrastructure as a Service, IaaS), platforms (Platform as a Service, PaaS), and applications (Software as a Service, SaaS) (Mell and Grance, 2011). While cloud computing offers many benefits such as reduced costs and the ability to scale up services (e.g., Marston et al., 2011), it also comes with a loss of physical control over outsourced data and applications. Hence, cloud computing bears many risks and uncertainties, such as data confidentiality or service security and availability (Marston et al., 2011).

Certification refers to a process in which a product, process or system is evaluated against a predefined set of criteria via an audit conducted by a third party, which formally acknowledges that the standard defined by the criteria is met (ISO/IEC 17000:2004). Certifications are recognized as a viable measure to mitigate CCs' uncertainties about cloud computing (Khan and Malluhi, 2010). However, research on outcomes of CSCs is scarce, despite calls for investigating the efficacy of certifications in the cloud computing context (Venters and Whitley, 2012).

A vast body of literature exists on the outcomes of certifications on various levels of analysis and in diverse contexts, ranging from the firm level (e.g., Bellesi et al., 2005; Sine et al., 2007) to the level of individual private consumers (e.g., Kim and Kim, 2011; Kovar et al., 2000a). The majority of studies on IT certifications examined the outcomes of certifications on individual consumers in e-commerce contexts. In addition to the various levels of analysis and contexts, previous research on IT certifications also investigated a plethora of different outcome concepts. For example, studies that were conducted in a business context examined the impact of certifications on individual customers' decision processes (e.g., Bellesi et al., 2005; Jobber et al., 1989) as well as on a company's performance, such as firm exports (Gao et al., 2010), costs of operation (Gopal and Gao, 2009), growth of production (Terlaak and King, 2006) or venture success (Sine et al., 2007). Likewise, studies in the consumer context – though generally focused on the effect of certifications on the individual believes, attitudes, and behaviors – investigate outcomes in terms of numerous different concepts with varying level of abstraction. For instance, while some studies focus on certifications' effects on trust (e.g., Rifon et al., 2005), others focus on perceived risk (e.g., Kim et al., 2008a), perceived assurance (e.g., Lowry et al., 2012) or certifications' direct effect on purchase decisions (e.g., Zhang, 2005). Moreover, previous research investigates certifications' outcomes through different theoretical lenses, for example elaboration likelihood model (ELM) (e.g., Lowry et al., 2012), trust theory (e.g., McCord and Kimery, 2002), or signaling theory (Wang et al., 2004). The diversity of levels of analysis, contexts and theoretical lenses resulted in a rich body of knowledge on certifications with many alternative models that explain certifications' effect mechanisms and that consist of interrelated – or even substitutable – concepts, which exacerbates transference of models and concepts to novel contexts and thus impedes accumulation of knowledge on certifications' effect mechanisms. To rectify this situation for the systematic study of CSCs, we next derive a conceptual model of the outcomes and contingency factors that explain the effect mechanisms of CSCs on an individual decision-maker level of analysis.

3 Research Method

We followed a two-step approach to identify the outcomes of CSCs and contingency factors. First, we conducted a systematic literature analysis to uncover patterns and themes in previous research on certifications' outcomes. The analysis was conducted in July and August 2012, following the recommendations of Webster and Watson (2002). We selected 84 top rated English journals¹ from the fields of information systems (IS), marketing and decision science. We searched within the title, abstract and keywords for 'cachet*', 'certif*' and 'seal*', which resulted in 623 articles. The articles addressed a variety of topics, most of them unrelated to research on certifications' outcomes. Therefore, we manually removed those articles that did not examine certifications at all (136), were not research papers (85), did not examine third-party certifications of products or practices of companies (273), or did not examine outcomes on customers' believes, attitudes, or behaviors (107). Next, we performed a back-and forward search based on the remaining 23 articles, resulting in another 33 articles. Subsequently, we analyzed the 55 articles following the coding procedure outlined in Lacity et al. (2010). For each article, we coded the hypothesized relationships in which a certification was either the dependent or independent variable. We also coded moderators and mediators as well as variables that were

¹ The journal selection comprises the AIS top 50 (AIS, 2013), complemented by highly ranked marketing and decision science journals taken from Schrader and Henning-Thurau (2009). The complete list is available from the authors on request.

hypothesized to affect the same outcomes as certifications. For each relationship we coded its dependent and independent variables, the direction (positive or negative) and whether the relationship was found to be statistically significant at $p < 0.05$. If available we also coded the formal theories that were used to define the relationship in order to delineate and structure the concepts and relationships in the final conceptual model as well as to enable us to better understand interviewees' statements from the empirical study. Next, we aggregated all variables in an iterative process into broader meta-concepts. In order to strengthen the evidence of our findings and raise independence from study-specific factors, we excluded relationships (on meta-concept layer) that were investigated by less than three studies. Of the 55 articles, 13 focus only on outcomes or contingency factors that were examined by less than two other articles and are therefore not discussed in this paper. Afterwards, we rated the derived relationships, as outlined in Lacity et al. (2010). We used a '+' ('-') if 60 to 80% of the findings were significantly positive (negative) and '++' ('--') if more than 80% of the findings were significantly positive (negative). The relationship was rated as not significant if the ratio of significant findings was below 60%.

As a second step, we conducted qualitative expert interviews to gain in-depth insights into outcomes of CSCs from the practitioner's perspective. Potential interviewees were approached by electronic enquiries to companies that were identified either as CCs, CPs, or consultants involved in cloud computing decisions (i.e., selection and implementation), aiming for a pool of interviewees with in-depth knowledge about cloud-related decisions. Interviewees were either responsible for the selection and procurement of cloud services within their organization (i.e., CC) or CPs involved in CCs' procurement processes of their offered cloud services and can thereby function as an empirical proxy for CC decision processes. We chose to conduct semi-structured interviews to allow for both discussing our literature findings and exploring novel outcomes and contingency factors. The interview protocol was structured to cover three themes. To allow for contextualization of interviewee's statements, we first asked them for their professional background, including their work experience, their current job role and the number of cloud projects they were involved in. Second, to gather perceptions of CSCs and their role in cloud-related decisions indirectly, we asked the interviewees to reflect on past cloud projects, including the decision processes, drivers and inhibitors of decisions as well as selection and evaluation criteria. Third part, we asked interviewees directly for their perceptions of CSCs' outcomes and CSCs' features to examine their understanding of CSCs. All the questions followed the same pattern. We started with open questions to avoid any potential response biases, followed by specific questions on the interviewee's view on yet unmentioned certification outcomes identified in literature and earlier interviews. All interviews were recorded and transcribed, as outlined by Flick (2009). Following validation and approval of the transcripts by the interviewees, we analyzed the interviews iteratively by coding outcome concepts and relationships between concepts. We additionally coded the interviewee's perceived direction of each relationship (positive or negative). In the course of this process, we successively refined the coded concepts and relationships by continuously adding emerging concepts or merging them with existing concepts and relationships. After finishing this process, we compared the coded concepts and relationships with the model derived from the literature analysis to validate existing and identify novel concepts and relationships. The findings are summarized in the conceptual model depicted in Figure 2.

In total, we conducted seven expert interviews in October and November 2012. Interviews were held via telephone and were on average 79 minutes. Table 1 provides an overview of interviewees' characteristics. Interviewees have an average work experience of 18 years and were on average engaged in 6 projects involving deployment or procurement of cloud services. 3 of the 7 interviewees are executives or from top management, 3 from middle management and 1 is a consultant.

Code	Organization	Job title	Point of view	Company revenue category	Number of cloud projects	Work experience (years)

#1	Software solutions (established)	Sales Manager	CP	< €2 m	1 (continuous)	20
#2	Software solutions (established)	Head of Business Development	CP	> €250 m	n/a	25
#3	Software solutions (start-up)	CTO	CP, CC	< €2 m	3	5
#4	Software solutions (start-up)	CTO	CP, CC	n/a	n/a	30
#5	Logistics (established)	Senior IT Professional Project Management	CC	> €250 m	10	22
#6	Software solutions (start-up)	CIO & CTO	CC	< €2 m	8	5
#7	Consulting (established)	Security Advisor, Consultant	CC	€ 2-10 m	8	20

Table 1. Interviewee details.

4 Results

4.1 Literature analysis

In this section we present the results of our literature analysis on certifications' outcomes and contingency factors. The 42 articles in our literature base examine various types of certifications (e.g., e-commerce, management standards and software development process quality). The majority of 38 articles examine outcomes of certifications for the consumer e-commerce context (e.g., TRUSTe privacy seal). Following the method outlined in the section 3, we identify 7 main and mediated certification outcomes as well as 4 contingency factors in 42 articles (Table 2).

Reference	Outcome: Certification → Purchase decision	Outcome: Certification → Trust	Outcome: Certification → Perceived	Outcome: Certification → Perceived risks	Outcome: Perceived assurance → Trust	Outcome: Perceived risks → Trust	Outcome: Trust → Purchase decision	Contin.: Relationship specific experience	Contin.: Level of online experience	Contin.: Decision involvement	Contin.: Knowledge about the certification
Aiken and Boush, 2006		X			X						
Belanger et al., 2002	X						X				
Bellesi et al., 2005	X										
Chang et al., 2012	X										
Clemons, 2007		X									
Gefen et al., 2003		X					X				
Gefen, 2004		X									
Hassanein and Head, 2002	X							X			
Houston and Taylor, 1999	X		X								
Hu et al., 2003	X										
Hu et al., 2010		X									
Hui et al., 2007	X										
Jiang et al., 2008		X									X
Jobber et al., 1989	X										
Kaplan and Nieschwietz, 2003	X	X		X			X				
Karimov et al., 2011		X									
Kim and Kim, 2011		X	X		X					X	

Kim et al., 2008a		X		X	X	X	X				
Kim et al., 2008b											X
Kim, 2008		X			X		X				
Kimery and McCord, 2006		X									X
Kovar et al., 2000a	X										
Kovar et al., 2000b	X					X					
LaRose and Rifon, 2007	X			X					X		
Lowry et al., 2012			X								
Mai et al., 2010	X										
Mauldin and Arunachalam, 2002	X					X					
McCord and Kimery, 2002		X				X					
McKnight et al., 2004		X			X			X			
Miyazaki and Krishnamurthy, 2002	X		X								
Moore, 2005		X									
Nöteberg et al., 2003	X			X		X					
Odom et al., 2002	X										
Parkinson, 1975	X										X
Rifon et al., 2005	X	X	X						X	X	
Sha, 2009		X			X						
Silvana and Silvana, 2006			X			X					
Sine et al., 2007								X			
Wang et al., 2004	X	X					X				
Wu et al., 2010		X		X		X					
Yang et al., 2006			X							X	X
Zhang, 2005	X								X		
Count	21	19	7	5	6	7	6	3	3	3	5

Table 2: Literature-based outcomes and contingency factors of certifications.

Most of the 42 studies draw explicitly on one or more formal theories to specify outcomes and contingency factors of certifications and relationships between those. We found that the 11 identified outcomes and contingency factors (Table 2) are primarily investigated through the lenses of ELM (12 times), trust theory (10 times), and signaling theory (7 times). As intimated above, we will draw on these three theories in defining the final conceptual model and discussing interviewees' statements. In the following, we thus briefly introduce the three theories and refer to the cited literature for more detailed explanations.

- Signaling theory builds on the premise that an information asymmetry between transaction partners influences “the terms of the transaction and the relationship between the parties” (Kirmani and Rao, 2000, p. 66). To reduce information asymmetries the less knowledgeable party will make assumptions based on information the second party provides (Kirmani and Rao, 2000). One way of providing such information are “signals, which are actions that parties take to reveal their true type” (Kirmani and Rao, 2000, p. 66). Because CSCs provide information about otherwise unobservable attributes of a cloud service and its provider, they are signals for a provider's or cloud service's compliance with a given standard.
- Trust theory proposes that formal institutional mechanisms engender trust between two unknown parties, irrespective of the characteristics of the parties and the nature of the interaction, especially in exchange relationships between unfamiliar parties and across geographical distances (Zucker, 1986). Certifications are an instance of such formal mechanisms. From a psychological perspective, a certification elicits trust through trust-building cognitive processes in two ways (Kim and Benbasat, 2006). First, certifications communicate trust-assuring arguments, thereby allowing trustees to infer a certified party's intentions and predict its future behaviors (Kim and Benbasat, 2006). Second, certifications trigger trust transference from a trusted certification authority to the certified party (Kim, 2008).

- ELM describes how individuals process persuasive messages and how these change the individual's attitudes and behaviors (Petty and Cacioppo, 1986). From an ELM perspective, a certification is a persuasive message and ELM can be used to explain how certifications influence individuals' attitudes and decisions. ELM defines two types of processing routes: a central route and a peripheral route. Individuals with high elaboration likelihood (i.e., high motivation and ability) will process a persuasive message (i.e., in this case a central cue) via the central route and closely examine the quality of arguments in the message. In contrast, individuals with low elaboration likelihood (i.e., low motivation or ability) will process a persuasive message via the peripheral route by evaluating heuristic cues instead of the arguments and their quality (Petty and Cacioppo, 1986). Previous research studied certifications both as heuristic cues (e.g., Jiang et al., 2008; McCord and Kimery, 2002) and as messages processed via the central route (e.g., Kim and Benbasat, 2009; Lowry et al., 2012).

4.1.1 Main and mediated outcomes of certifications

Four direct outcomes of certifications emerged from the literature analysis, of which three are also mediators of certifications' effects on purchase decisions and trust (Table 3). We found that certifications influence purchase decisions directly and indirectly via the mediators perceived assurance, perceived risks and trust. Certifications' influence on trust is also mediated by perceived assurance.

The most frequently examined certification outcome is customer's purchase decision. In this article, this concept subsumes both actual decisions to buy a product or service and purchase intentions that directly precede a decision (Kim et al., 2008a). Hu et al. (2003) and Kovar et al. (2000a) draw on ELM to explain certifications' effect on purchase decisions. According to them, certifications are cues which are processed on the peripheral route, thereby influencing customers' purchase decision. The remaining 19 draw on prior literature to hypothesize the relationship between certifications and purchase decisions without formally drawing on a theory. Overall, our findings support the positive effect of certifications on customers' purchase decisions.

A certification's ability to elicit up trust in the vendor was examined by 19 studies of which 16 draw on one of the 3 theories to hypothesize this relationship. Certifications are either conceptualized as formal institutional mechanisms (Trust Theory; e.g., Kim et al., 2008a), persuasive message that influence the attitude towards the vendor (ELM; e.g., Jiang et al., 2008) or as signals displayed to communicate that the vendor met the trustworthiness standards of the certification authority (Signaling Theory; e.g., Kimery and McCord, 2006). The remaining three studies draw on prior literature without formally drawing on a theory. We identified 17 significant positive and 11 insignificant findings on this particular relationship. A possible explanation for the inconsistent findings that contradict the relationships' strong theoretical foundation could be the presence of contingency factors which influence certifications' effect on trust. We elaborate on contingency factors in greater detail in section 4.1.2.

Independent concept	Dependent concept	Studies	Findings ²			Rating
			+	Not sign.	-	
Certification	Purchase decision	21	23	7	0	+
Certification	Trust	19	17	11	0	+
Certification	Perceived assurance	7	7	2	0	+
Certification	Perceived risks	5	1	1	5	-
Perceived assurance	Trust	6	10	1	0	++
Perceived risks	Purchase decision	7	0	1	8	--

² The number of findings exceeds the number of articles because some articles comprise of several studies that resulted in findings with different levels of significance, but that all map on the same aggregated relationship.

Trust	Purchase decision	6	7	0	0	++
-------	-------------------	---	---	---	---	----

Table 3. Findings from the literature analysis on main and mediated outcomes of certifications.

Two further certification outcomes are perceived risks and perceived assurance. Perceived risks refers to a customer's assumed possibility of a negative outcome of a specific online transaction (Kim et al., 2008a). Through the lens of trust theory certifications can be described as formal institutional mechanisms that reduce perceived risks through guarantee-like assurances (Karimov et al., 2011). Perceived assurance refers to a customer's general perception of protection against risks (cf. Yang et al., 2006). Drawing on ELM, Lowry et al. (2012) hypothesize that a certification is a persuasive message which elicits perceived assurance if the customer understands the meaning of the certification (i.e., prior central processing). Our literature analysis shows strong support for certifications' negative effect on customers' risk perception (e.g., Nöteberg et al., 2003; Wu et al., 2010) and positive effect on perceived assurance (e.g., Kim and Kim, 2011; Silvana and Silvana, 2006).

To better understand potential mediation effects, we additionally examined the factors that were hypothesized to affect the same concepts as certifications and that were also influenced by certifications. We found that trust in the vendor is reported to have a positive impact on customers' purchase decisions (e.g., Kim et al., 2008a). Perceived risks on the other hand have a negative effect on customers' purchase decisions (e.g., Kaplan and Nieschwietz, 2003). Furthermore, perceived assurance has a positive effect on trust in the vendor (e.g., Aiken and Boush, 2006). As discussed above, previous research found those four concepts to be direct certification outcomes. Hence, the independent concepts (trust, perceived risk and perceived assurance) fulfill two of three conditions for being mediators: A variable functions as a mediator if (a) the independent variable significantly influences the presumed mediator, (b) the mediator significantly influences the dependent variable, and (c) a previous significant relationship between the independent and dependent variables is no longer significant when controlling for the other two relationships (Baron and Kenny, 1986). The third condition is only tested in two studies: Aiken and Boush (2006) found that a certification's effect on trust is mediated by perceived privacy and security assurance. Miyazaki and Krishnamurthy (2002) have reported that certifications only had a positive effect on purchase decision if the product related risks were high, but not if they were low. Although additional empirical mediation tests are required to finally confirm the third condition of all three (potential) mediators, we regard the evidence as strong enough to include the mediated relationships in our final conceptual model.

4.1.2 Contingency factors

As outlined in the previous subsection, contingency factors are a possible explanation for the inconsistent findings on certification's outcomes. Table 4 presents four contingency factors identified in the literature analysis.

Contingency factor	Studies	Findings			Rating
		+	Not sign.	-	
Level of online experience	3	0	1	3	-
Relationship specific experience	3	0	0	3	--
Purchase decision involvement	3	0	1	3	-
Knowledge about the certification	5	7	0	0	++

Table 4. Findings from the literature analysis on contingency factors.

The first contingency factor that emerged from the literature analysis is customers' level of online experience. According to the ELM, a higher ability to process a persuasive message's content (e.g., obtained through message repetition) can raise individuals motivation to process the message's content directly and reduces their attention towards heuristic cues (Petty and Cacioppo, 1986). Zhang (2005) finds that customers with low online shopping experience are more likely to use external sources of

information (i.e. certifications) when choosing an online vendor. In contrast, experienced customers base decisions on their own experience (Zhang, 2005). Furthermore, extant research shows that the positive influence of certifications on purchase decisions is significantly higher when a customer has lower internet self-efficacy (LaRose and Rifon, 2007; Rifon et al., 2005).

A second contingency factor we found in the literature analysis is the level of relationship-specific experience. This factor can be described as the extent of previous interactions between a customer and the certified vendor (cf. Hassanein and Head, 2002). The higher the frequency of interactions between a customer and a vendor is, the better the customer will be able to judge the vendor's intentions and thereby its trustworthiness (McKnight et al., 2004). Sine et al. (2007) show that a certification lost its positive effect on business success after legal certainty was established in a previously uncertain market. Even though this finding does not relate to the individual relationship level, it indicates that certifications become less relevant with the availability of more reliable information. To gain deeper insights into this contingency factor, we examined our literature base on certifications' effect on trust on a lower level of abstraction. We thus categorized the studies that investigate the meta-concept 'trust' into (1) studies that examine the effect on initial trust in unknown parties (e.g., Hu et al., 2010) and (2) studies that examine the effect on trust in familiar parties (e.g., Kim et al., 2008a), henceforth named 'general trust'. As reflected in Figure 1, we found that the percentage of studies which found a significant effect of certifications on trust is higher among studies that examined the outcome on initial trust than among those that examined general trust.

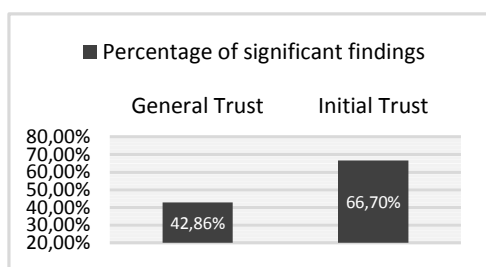


Figure 1. Certifications' outcomes on trust by type of trust.

The third contingency factor that emerged from the literature analysis is decision involvement, which is defined as "the extent of interest and concern that a consumer brings to bear upon a purchase decision task" (Mittal, 1989, p. 150–150). Drawing on ELM, a customer with higher motivation will more likely use the central route (e.g., first-hand information) for processing a persuasive message instead of the peripheral route (e.g., certifications) (Kim and Kim, 2011; Petty and Cacioppo, 1986). In line with this proposition, previous studies found that consumers rely on certifications to a higher extent if their decision involvement is low rather than if it is high (Kim and Kim, 2011; Yang et al., 2006). Zhang (2005) found that the positive effect of information-assurance certifications on online purchase decisions is higher for commodity products than for look-and-feel products. A possible explanation for this findings is that look-and-feel products are harder to evaluate online and therefore raise higher concerns about their quality (Zhang, 2005), suggesting decision involvement is higher for look-and-feel products than for commodity products.

The fourth and last contingency factor that emerged from the literature analysis is customers' knowledge about a certification. Following signaling theory, certifications have to be known in order to be an effective signal (Kimery and McCord, 2006). Extant research found that a certification's effect on a customer's purchase decision is higher in case the customer recognizes the certification (Kim et al., 2008b; Kimery and McCord, 2006; Yang et al., 2006) and comprehends the certified aspects (Kimery and McCord, 2006; Yang et al., 2006). Kim et al. (2008b) tested the effect of a lecture on certifications on subjects' attention to certifications in purchase decisions and found that subject paid higher attention to certifications and that certifications were more important for subjects' purchase decision after the educational treatment.

4.2 Exploratory interviews

In this section, we present the findings from the qualitative expert interviews. Figure 2 depicts the conceptual model of CSCs' outcomes and contingency factors resulting from the literature synthesis in section 4.1 supplemented by three new contingency factors that we identified in the expert interviews. The concepts of 'certification', 'purchase decision' and 'online experience' were relabeled to 'CSC', 'cloud adoption decision', and 'cloud related experience' (Figure 2).

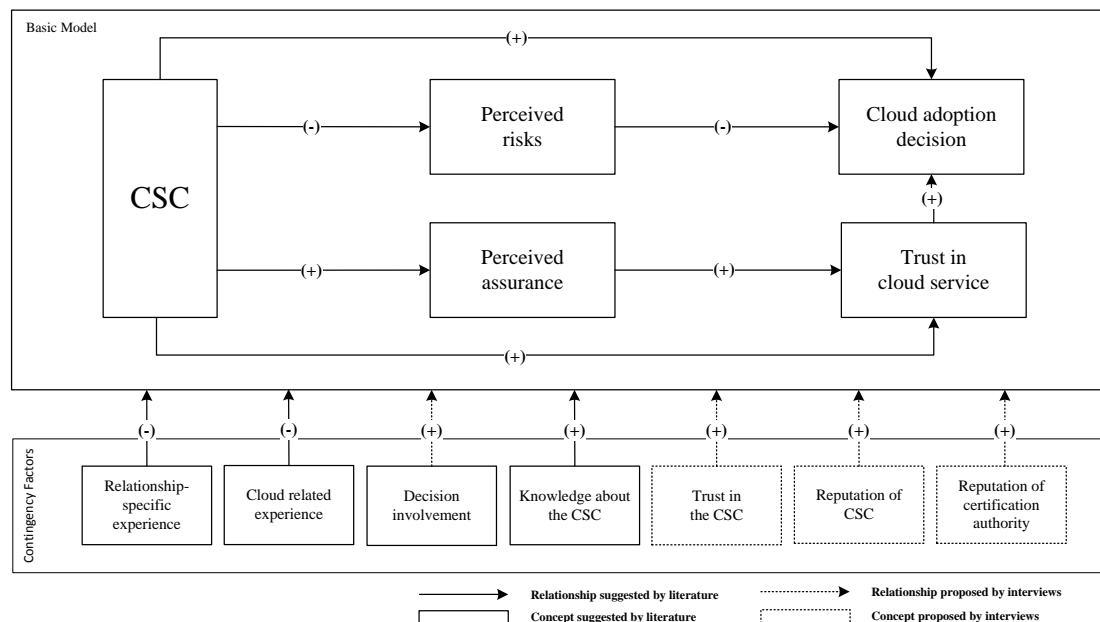


Figure 2. Conceptual model after expert interviews.

4.2.1 Experts' perceptions on the literature-derived outcomes and contingency factors

Overall, the interviewees' perceptions about CSCs' outcomes coincide with the outcomes of certifications derived from the literature analysis. Table 5 maps illustrative quotes with each relationship derived from the literature analysis. With regards to direct certification outcomes, interviewees stated that the presence of a CSC has a positive effect on the adoption decision. Interviewees #4 and #5 mentioned that certifications are mandatory prerequisites for adopting cloud services, owing to legal requirements and procurement processes requiring certifications (Table 5). Furthermore, CSCs are perceived to engender trust in a cloud service. Interviewees ascribed this trust-engendering effect to the perceived higher credibility and reliability resulting from the CP's voluntary disclosure of otherwise unavailable information. In line with our literature analysis, interviewees stated that adopting a certified cloud service bears lower risks than adopting an uncertified service. The most frequently stated sources of risks were privacy issues, followed by vendor lock-ins and legal compliance. Only interviewee #2 had a dissenting notion (Table 5). Even though he acknowledged CSCs' ability to reduce perceived risks in general, he was not able to confirm this outcome for his CCs because of their overall low risk perception: "[our customers] implicitly assumed that we maintain confidentiality of customer data. Our certifications didn't matter" (#2). In addition to the effect on perceived risks, interviewees also acknowledged a positive effect of certifications on perceived assurance. The mentioned CSC outcomes were privacy assurance, followed by assurance of the CSP's financial stability and legal compliance. Interviewees ascribe the increased assurance perception to the CP's compliance with a formal standard. Furthermore, they regarded a CP's investment of time and money in acquiring a certification as a symbolic act that demonstrates the CP's commitment to its CCs.

Category	Concept	Illustrative quote
Outcome	Adoption decision	"We would not have been able to contract with [anonymized CC] without [anonymized CSC]" (#4).
Outcome	Trust	"Trustworthiness, reliability and credibility. [...] I think those are the main characteristics [of a certified provider versus a non-certified provider]. It is always a matter of trust" (#4).
Outcome	Perceived risks	"I expect higher risks if the provider is not certified." (#5)
Outcome	Perceived assurance	"I think the benefit is that customers can be assured that certain security aspects are definitely fulfilled. [...] I think privacy is a major topic" (#1).
Mediator	Negative influence of perceived risks on the cloud adoption decision	"Data confidentiality is always a challenge. [...] In certain domains, like source code management, we deliberately avoid using cloud services, even though excellent services are available. The issue of data confidentiality is too sensitive in those domains" (#6).
Mediator	Positive influence of trust on the cloud adoption decision	"The certification attests that the provider has certain experience. That makes the provider more credible and trustworthy. I would not enter a business relationship with a provider that does not have such a certificate and is also unwilling to obtain the certificate" (#5).
Mediator	Positive influence of perceived assurance on trust in cloud service	"[...] for me, trust manifests in how far the provider protects my data" (#6).
Contingency factor	Cloud related experience	"[...] we care rather less for certifications when we buy cloud solutions, since we have hardly any need for them. This is because we are very well informed. I think I know almost all existing cloud solutions. [...] I do not need a certificate that provides assurances. But for other customers, who are less informed, I think it is a completely different story" (#3).
Contingency factor	Relationship-specific experience	"[...] certifications engender trust in case the customer doesn't know the provider well. But in an existing business relationship [...] it [CSC] does not matter because trust is uphold [from prior experience]" (#2).
Contingency factor	Knowledge about the CSC	"It [CSC] has to be simple things that you stumble upon frequently. Maybe there were certification icons and hints on some websites. But if you see such things for the first time, they won't mean much to you" (#3).
Contingency factor	Decision involvement	"[...] certifications are probably less important if it is not a matter of special applications with higher security relevance" (#7).

Table 5. Illustrative quotes from interviewees on relationships emerged from literature.

In addition to CSCs' direct outcomes the interviewees also mentioned the negative influence of perceived risks and positive influence of trust on the cloud adoption decision as well as the positive influence of perceived assurance on trust in the cloud service. Following the argumentation used in section 4.1.1, we regard the evidence as strong enough to include the mediated relationships in our final conceptual model.

Interviewees mentioned all four contingency factors that emerged from the literature analysis (Table 5). In line with our conceptual model, interviewees' statements indicate that CSCs become less relevant for CCs with advanced technical skills or cloud-specific knowledge. Experienced CCs tend to rely to a greater extent on their own knowledge and capabilities to evaluate a cloud service than on certifications. Interviewees also commented on the impact of CCs' experience with a provider on a CSC's relevance for an adoption decision. Established CPs stated that certifications were less relevant in existing customer relationships. From the CC's perspective, interviewees emphasized the particular importance

of certifications at the beginning of a relationship. Overall, the experts' perceptions imply that the effects of CSCs on its outcomes decreases with the maturity of the business relationship between a CC and a CP. The positive effect of CCs' knowledge about a CSC on its influence on outcomes matched with statements of interviewees'. Interviewees pointed out that recognizing a certification and prior knowledge about its dimensions are preconditions for its ability to engender trust and facilitate adoption decisions. For example, Interviewee #4 stated his company adopted a CSC because it was known by their target CCs. In reverse, interviewee #7 noted to have a negative attitude towards a particular CSC because of a lack of available information about its underlying standard.

With regards to the level of decision involvement, interviewees noted that a higher involvement in cloud adoption decisions increases the importance of CSCs for the decision. For example, interviewees #3 and #4 mentioned that certifying their cloud services is of particular importance for CCs from industries with high privacy requirements, for example from the financial or medical sector. Furthermore, interviewee #7 stated that certifications are less important if the certified service bears low risks (Table 5), implying that involvement is low. At first sight, this statement contradicts studies from our literature-base drawing on ELM, which posit that in low involvement situations the importance of heuristic cues such as certifications diminishes in favour of central cues such as first-hand information (Kim and Kim, 2011; Yang et al., 2006). In contrast, Lowry et al. (2012) demonstrate that certifications become central cues if a CC understands a certification's meaning and certified aspects. It is plausible to assume that decision-makers with high involvement also have expertise in a given context and therefore also know the available quality signals such as CSCs and explicitly seek for and scrutinize them. Based on these findings, we changed the moderating influence of the level of decision involvement in the conceptual model from negative to positive.

4.2.2 Novel contingency factors identified in the interviews

Three novel contingency factors emerged from the expert interviews. These factors are trust in the CSC, reputation of the CSC and reputation of the certification authority, as shown in Figure 2.

First, interviewees imply that trust in a CSC moderates a CSC's effect on trust in a cloud service. For example, interviewee #7 stated that he does not trust certifications and that certifications do not help to establish trust: *"I do not trust most certificates very much in this regard [certification process]. [...] The mere availability of a certificates does not imply that I have more trust in the certified firm – probably just a little bit"* (#7). Similarly, interviewee #6 stated: *"[...] from a user's perspective certifications imply trust in the certified provider. [...] But of course it is a precondition that the certification is good"* (#6). This statement supports our conjecture that a low-quality certification will be perceived as less trustworthy. As described earlier, the positive effect of certifications on trust results from the transference of trust from a trusted party (certification) to an unknown party (CP) (c.f. Doney and Cannon, 1997). Certifications build trust in an unknown party by acting as reliable institutions in-between those parties. In that case the certification itself becomes a trustee and therefore needs to be trusted in order to create trust (cf. Shapiro, 1987).

Next, we found evidence that the outcomes of CSCs are moderated by the CSC's reputation. For example, when asked for factors that influence the relevance of CSCs for adoption decisions interviewee #2 stated: *"[...] and its reputation as well. A certification has to build a trustworthy reputation over time. For that to happen, no intentional violations or counter-productive incidents should occur"* (#2). Interviewees mentioned that a certification's good reputation could be harmed by lax certification criteria or known but unpunished intentional violations of certified criteria.

Finally, interviewees mentioned that the reputation of the CSC authority influences the CSC's outcomes. For example, reflecting on organizations issuing CSCs, interviewee #6 noted: *„In the same manner I need to trust an uncertified firm, I need to trust the certifier of a certified firm. [...] A seal is less important if it was issued by a rather unknown organization [...] I think it is very important that it is not an entirely no-name organization issuing an entirely new and unknown certification. I simply would not*

trust such an organization” (#6). Interviewees stated that the reputation of certification authorities also depends on its perceived competence regarding cloud computing, the capability to penalize violations, and its independence.

5 Discussion and Conclusion

Our findings reveal that CSCs positively influence CCs' adoption decision, assurance perception and trust in the cloud service as well as reduce perceived risks. Furthermore, we find evidence that CCs' adoption decision is positively influenced by trust in the cloud service, perceived assurance and the reduction of perceived risks. This suggests that CSCs also indirectly influence adoption decision by reducing perceived risks, raising trust and perceived assurance.

The research contributions of our findings on CSCs' outcomes are twofold. First, we structure the diverse concepts and theories studied in extant research and identify gaps in the literature by systematically analyzing articles on IT certifications' outcomes. Besides identifying outcomes, we also found that CCs' trust and decisions are the most frequently examined outcomes of certifications, followed at a distance by risk and assurance perception. This suggests that the latter two outcomes were of lesser interest to researchers. However, our interviews do not suggest that practitioners perceive risk and assurance to be outcomes of lesser interest. Therefore, we encourage future research to consider all four outcomes when examining the outcomes or efficacy of CSCs. Second, by identifying CSCs' outcomes on individual decision-makers, we address two gaps in the literature: (1) the lack of research on CSCs, and (2) the lack of research on certifications' outcomes on individual decision-makers in business contexts. Both topics deserve further examination, especially because most cloud services are used in business contexts. Third, we identified seven contingency factors. Future research should consider to survey these factors when investigating the outcomes of CSCs to not miss out on any moderating factors.

This study has some limitations that provide opportunities for future research. First, we restricted ourselves to qualitative interviews in order to gain in-depth insights into CSCs' outcomes and contingency factors for these outcomes. Future research should re-examine and confirm the relationship proposed in the conceptual model in a large-scale quantitative study. Furthermore, we exposed three novel contingency factors: trust in the CSC, reputation of the CSC and reputation of the certification authority. However, it is possible that the three factors coincide as one variable empirically. Hence, we call for future studies to closely analyze these three contingency factors and test whether CCs distinguish between the three concepts or not.

Finally, our findings offer four practical implications for decision-makers from CPs and one implication for CSC authorities. First, we clearly delineate the diverse (potential) outcomes of CSCs and contingency factors. Decision-makers from CPs should consider our results to better determine the effects of certifying their cloud services and thereby prevent false expectations and misdirected investments by adopting ineffective CSCs. Second, when evaluating potential CSC to adopt, decision-makers should put emphasis on the reputation of the CSC and its issuing certification authority as well as verify whether the CSC is known and trusted by their target CCs. Otherwise, CPs face the risk that the CSC will have little to no effect on CCs' beliefs, attitudes, or behaviors. Second, CPs should consider the level of knowledge and the importance of their service to their target CCs before acquiring a CSC. Experienced CCs with high technical knowledge and cloud expertise will pay less attention to CSCs than inexperienced CCs. Third, our findings also reveal that CCs with higher decision involvement will rely on the content of CSCs to a greater extent than CCs with low decision involvement. CPs should therefore regard that the content of CSCs need to precisely match their customers' requirements. Finally, the three contingency factors 'trust in the CSC', 'reputation of the CSC', and 'reputation of the certification authority' highlight how important it is for certification initiatives to build up their reputation and trust in their CSCs. This is of particularly relevance for new certification authorities who are currently developing CSCs.

References

- ISO/IEC (17000:2004), 2004. Conformity assessment -- Vocabulary and general principles.
- Aiken, K.D. and Boush, D.M. (2006). Trustmarks, Objective-Source Ratings, and Implied Investments in Advertising: Investigating Online Trust and the Context-Specific Nature of Internet Signals. *Journal of the Academy of Marketing Science*, 34 (3), 308–323.
- AIS (2013). MIS Journal Rankings.
<http://ais.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=432>. Accessed 23.11.2013.
- Baron, R.M. and Kenny, D.A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of personality and social psychology*, 51 (6), 1173–1182.
- Belanger, F., Hiller, J.S. and Smith, W.J. (2002). Trustworthiness in electronic commerce: the role of privacy, security, and site attributes. *The Journal of Strategic Information Systems*, 11 (3-4), 245–270.
- Bellesi, F., Lehrer, D. and Tal, A. (2005). Comparative Advantage: The Impact of ISO 14001 Environmental Certification on Exports. *Environmental Science & Technology*, 39 (7), 1943–1953.
- Chang, R.-D., Fang, C.-J. and Tseng, Y.-C. (2012). The effects of WebTrust assurance on consumers' web purchase decisions: An experiment. *Online Information Review*, 36 (2), 218–240.
- Clemons, E.K. (2007). An Empirical Investigation of Third-Party Seller Rating Systems in E-Commerce: The Case of buySAFE. *Journal of Management Information Systems*, 24 (2), 43–71.
- Doney, P.M. and Cannon, J.P. (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships. *Journal of Marketing*, 61 (2), 35–51.
- European Commission (2012). *Unleashing the Potential of Cloud Computing in Europe*.
- Flick, U. (2009). *An introduction to qualitative research*, Sage Publications, Los Angeles.
- Gao, G., Gopal, A. and Agarwal, R. (2010). Contingent Effects of Quality Signaling: Evidence from the Indian Offshore IT Services Industry. *Management Science*, 56 (6), 1012–1029.
- Gefen, D. (2004). What Makes an ERP Implementation Relationship Worthwhile: Linking Trust Mechanisms and ERP Usefulness. *Journal of Management Information Systems*, 21 (1), 263–288.
- Gefen, D., Karahanna, E. and Straub, D.W. (2003). Trust and TAM in Online Shopping: An Integrated Model. *MIS Quarterly*, 27 (1), 51–90.
- Gopal, A. and Gao, G. (2009). Certification in the Indian Offshore IT Services Industry. *Manufacturing & Service Operations Management*, 11 (3), 471–492.
- Hassanein, K. and Head, M.M. (2002). Trust in E-commerce: Evaluating the Impact of Third-party Seals. *Quarterly Journal of Electronic Commerce*, 3 (3), 307–325.
- Houston, R.W. and Taylor, G.K. (1999). Consumer Perceptions of CPA WebTrust Assurances: Evidence of an Expectations Gap. *International Journal of Auditing*, 3 (2), 89–105.
- Hu, X., Lin, Z. and Zhang, H. (2003). Trust Promoting Seals in Electronic Markets: An Exploratory Study of Their Effectiveness for Online Sales Promotion. *Journal of Promotion Management*, 9 (1-2), 163–180.
- Hu, X., Wu, G., Wu, Y. and Zhang, H. (2010). The effects of Web assurance seals on consumers' initial trust in an online vendor: A functional perspective. *Decision Support Systems*, 48 (2), 407–418.

- Hui, K.-L., Teo, H.H. and Lee, S.-Y.T. (2007). The value of privacy assurance: An exploratory field experiment. *MIS Quarterly*, 31 (1), 19–33.
- Jiang, P., Jones, D.B. and Javie, S. (2008). How third-party certification programs relate to consumer trust in online transactions: An exploratory study. *Psychology & Marketing*, 25 (9), 839–858.
- Jobber, D., Saunders, J., Gilding, B., Hooley, G. and Hatton-Smoother, J. (1989). Assessing the Value of a Quality Assurance Certificate for Software: An Exploratory Investigation. *MIS Quarterly*, 13 (1), 19–31.
- Kaplan, S.E. and Nieschwietz, R.J. (2003). A Web assurance services model of trust for B2C e-commerce. *International Journal of Accounting Information Systems*, 4 (2), 95–114.
- Karimov, F.P., Brengman, M. and van Hove, L. (2011). The Effect of Website Design Dimensions on Initial Trust: A Synthesis of the Empirical Literature. *Journal of Electronic Commerce Research*, 12 (4), 272–301.
- Khan, K.M. and Malluhi, Q. (2010). Establishing Trust in Cloud Computing. *IT Professional*, 12 (5), 20–27.
- Kim, D. and Benbasat, I. (2006). The Effects of Trust-Assuring Arguments on Consumer Trust in Internet Stores: Application of Toulmin's Model of Argumentation. *Information Systems Research*, 17 (3), 286–300.
- Kim, D. and Benbasat, I. (2009). Trust-Assuring Arguments in B2C E-commerce: Impact of Content, Source, and Price on Trust. *Journal of Management Information Systems*, 26 (3), 175–206.
- Kim, D.J. (2008). Self-Perception-Based Versus Transference-Based Trust Determinants in Computer-Mediated Transactions: A Cross-Cultural Comparison Study. *Journal of Management Information Systems*, 24 (4), 13–45.
- Kim, D.J., Ferrin, D.L. and Rao, H.R. (2008a). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision Support Systems*, 44 (2), 544–564.
- Kim, D.J., Steinfield, C. and Lai, Y.-J. (2008b). Revisiting the role of web assurance seals in business-to-consumer electronic commerce. *Decision Support Systems*, 44 (4), 1000–1015.
- Kim, K. and Kim, J. (2011). Third-party Privacy Certification as an Online Advertising Strategy: An Investigation of the Factors Affecting the Relationship between Third-party Certification and Initial Trust. *Journal of Interactive Marketing*, 25 (3), 145–158.
- Kimery, K.M. and McCord, M. (2006). Signals of Trustworthiness in E-Commerce: Consumer Understanding of Third-Party Assurance Seals. *Journal of Electronic Commerce in Organizations*, 4 (4), 52–74.
- Kirmani, A. and Rao, A.R. (2000). No Pain, No Gain: A Critical Review of the Literature on Signaling Unobservable Product Quality. *Journal of Marketing*, 64 (2), 66–79.
- Kovar, S.E., Burke, K.G. and Kovar, B.R. (2000a). Consumer Responses to the CPA Webtrust Assurance. *Journal of Information Systems*, 14 (1), 17–35.
- Kovar, S.E., Kovar, B.R. and Burke, K.G. (2000b). Selling Webtrust: An exploratory examination of factors influencing consumers' decisions to use online distribution channels. *The Review of Accounting Information Systems*, 4 (2), 39–52.
- Lacity, M.C., Khan, S., Yan, A. and Willcocks, L.P. (2010). A review of the IT outsourcing empirical literature and future research directions. *Journal of Information Technology*, 25 (4), 395–433.

- Lansing, J., Schneider, S. and Sunyaev, A. (2013). Cloud Service Certifications: Measuring Consumers' Preferences for Assurances, In Proceedings of the 21st European Conference on Information Systems (ECIS 2013), Utrecht, Netherlands.
- Lansing, J. and Sunyaev, A. (2013). Does Pain Result in Gain? Assessing Cloud Service Certifications' Effectiveness, In Proceedings of the 34th International Conference on Information Systems (ICIS 2013), Milano, Italy.
- LaRose, R. and Rifon, N.J. (2007). Promoting i-Safety: Effects of Privacy Warnings and Privacy Seals on Risk Assessment and Online Privacy Behavior. *Journal of Consumer Affairs*, 41 (1), 127–149.
- Lowry, P.B., Moody, G., Vance, A., Jensen, M., Jenkins, J. and Wells, T. (2012). Using an elaboration likelihood approach to better understand the persuasiveness of website privacy assurance cues for online consumers. *Journal of the American Society for Information Science and Technology*, 63 (4), 755–776.
- Mai, B., Menon, N.M. and Sarkar, S. (2010). No Free Lunch: Price Premium for Privacy Seal-Bearing Vendors. *Journal of Management Information Systems*, 27 (2), 189–212.
- Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J. and Ghalsasi, A. (2011). Cloud computing: The business perspective. *Decision Support Systems*, 51 (1), 176–189.
- Mauldin, E. and Arunachalam, V. (2002). An Experimental Examination of Alternative Forms of Web Assurance for Business-to-Consumer e-Commerce. *Journal of Information Systems*, 16 (1), 33–54.
- McCord, M. and Kimery, K.M. (2002). Third Party Assurances: Mapping the Road to Trust in E-retailing. *Journal of Information Technology Theory and Application (JITTA)*, 4 (2), 63–82.
- Mcknight, D.H., Kacmar, C.J. and Choudhury, V. (2004). Shifting Factors and the Ineffectiveness of Third Party Assurance Seals: A Two-Stage Model of Initial Trust in a Web Business. *Electronic Markets*, 14 (3), 252–266.
- Mell, P. and Grance, T. (2011). The NIST Definition of Cloud Computing: Recommendations of the National Institute of Standards and Technology. <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>. Accessed 23.11.2013.
- Mittal, B. (1989). Measuring Purchase-decision involvement. *Psychology & Marketing*, 6 (2), 147–162.
- Miyazaki, A.D. and Krishnamurthy, S. (2002). Internet Seals of Approval: Effects on Online Privacy Policies and Consumer Perceptions. *The Journal of Consumer Affairs*, 36 (1), 28–49.
- Moores, T. (2005). Do Consumers Understand the Role of Privacy Seals in E-Commerce? *Communications of the ACM*, 48 (3), 86–91.
- Nöteberg, A., Christiaanse, E. and Wallage, P. (2003). Consumer Trust in Electronic Channels. *e-Service Journal*, 2 (2), 46–67.
- Odom, M.D., Kumar, A. and Saunders, L. (2002). Web Assurance Seals: How and Why They Influence Consumers' Decisions. *Journal of Information Systems*, 16 (2), 231–250.
- Parkinson, T.L. (1975). The Role of Seals and Certifications of Approval in Consumer Decision-Making. *Journal of Consumer Affairs*, 9 (1), 1–14.
- Petty, R.E. and Cacioppo, J.T. (1986). The Elaboration Likelihood Model of Persuasion, In Berkowitz, L. (Ed.) *Advances in experimental social psychology*, 46 Bände, Academic Press, San Diego, CA, 123–205.
- Rifon, N.J., LaRose, R. and Choi, S.M. (2005). Your Privacy Is Sealed: Effects of Web Privacy Seals on Trust and Personal Disclosures. *The Journal of Consumer Affairs*, 39 (2), 339–362.

- Schneider, S., Lansing, J., Gao, F. and Sunyaev, A. (2014). A Taxonomic Perspective on Certification Schemes: Development of a Taxonomy for Cloud Service Certification Criteria, In Proceedings of the 47th Hawaii International Conference on System Sciences (HICSS 2014), Big Island, Hawaii, USA.
- Schrader, U. and Henning-Thurau, T. (2009). VHB-JOURQUAL2: Method, Results, and Implications of the German Academic Association for Business Research's Journal Ranking. *BuR - Business Research*, 2 (2), 180–204.
- Sha, W. (2009). Types of structural assurance and their relationships with trusting intentions in business-to-consumer e-commerce. *Electronic Markets*, 19 (1), 43–54.
- Shapiro, S.P. (1987). The Social Control of Impersonal Trust. *American Journal of Sociology*, 93 (3), 623–658.
- Silvana, F. and Silvana, T. (2006). Influence of the Web Vendor's Interventions on Privacy-related Behaviors in E-commerce. *Communications of the AIS*, 2006 (17), 2–68.
- Sine, W.D., David, R.J. and Mitsuhashi, H. (2007). From Plan to Plant: Effects of Certification on Operational Start-up in the Emergent Independent Power Sector. *Organization Science*, 18 (4), 578–594.
- Sunyaev, A. and Schneider, S. (2013). Cloud services certification. *Communications of the ACM*, 56 (2), 33.
- Terlaak, A. and King, A.A. (2006). The effect of certification with the ISO 9000 Quality Management Standard: A signaling approach. *Journal of Economic Behavior & Organization*, 60 (4), 579–602.
- Venters, W. and Whitley, E.A. (2012). A critical review of cloud computing: researching desires and realities. *Journal of Information Technology*, 27 (3), 179–197.
- Wang, S., Beatty, S.E. and Foxx, W. (2004). Signaling the trustworthiness of small online retailers. *Journal of Interactive Marketing*, 18 (1), 53–69.
- Webster, J. and Watson, R.T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly*, 26 (2), xiii–xxiii.
- Wu, G., Hu, X. and Wu, Y. (2010). Effects of Perceived Interactivity, Perceived Web Assurance and Disposition to Trust on Initial Online Trust. *Journal of Computer-Mediated Communication*, 16 (1), 1–26.
- Yang, S.-C., Hung, W.-C., Sung, K. and Farn, C.-K. (2006). Investigating initial trust toward e-tailers from the elaboration likelihood model perspective. *Psychology & Marketing*, 23 (5), 429–445.
- Zhang, H. (2005). Trust Promoting Seals in Electronic Markets: Impact on Online Shopping Decisions. *Journal of Information Technology Theory and Application (JITTA)*, 6 (4), 29–40.
- Zucker, L.G. (1986). Production of trust: Institutional sources of economic structure, 1840–1920. *Research in Organizational Behavior*, 8 (1), 53–111.