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Cloud Computing Adoption: A Literature Review on What Is New and What Still Needs to Be Addressed

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Abstract:

Research on Cloud Computing (CC) recently emerged congruently with the technology's importance for organizations at a fast pace. This makes it difficult for practitioners to obtain a consolidated overview of what determines CC adoption based on the numerous papers in this regard. Moreover, for further research in the field to add value, it is necessary to identify what still needs to be addressed. In this vein, we conducted a descriptive review of 39 papers, integrating the results of a previous review on 23 papers from 2014, to compare findings across studies. We identify 44 determinant factors that exhibit consistent directional influence on the dependent meta-variable "CC adoption", extending previous literature reviews with regard to asset, client, and environmental characteristics. We then critically reviewed the research landscape to identify what is there, and what is not yet covered: Future research should specifically regard the adoption of Infrastructure-, Platform-, and Everything-as-a-Service, private, hybrid, and multi-cloud deployment, investigate vendor, solution, and individual characteristics, analyzing information systems, or the decision-maker.

Keywords: Cloud computing, adoption, determinant factors, literature review, call for research.

[Department statements, if appropriate, will be added by the editors. Teaching cases and panel reports will have a statement, which is also added by the editors.]

[Note: this page has no footnotes.]

This manuscript underwent [editorial/peer] review. It was received xx/xx/20xx and was with the authors for XX months for XX revisions. [firstname lastname] served as Associate Editor.] **or** The Associate Editor chose to remain anonymous.]

1 Introduction

Cloud Computing (CC) has become one of the most important information technologies (ITs) for organizations today. As of 2018, three out of four organizations in developed economies, such as Germany, adopted some form of CC (Pols & Vogel, 2019). Meanwhile, the role that CC plays is magnifying: Global Cloud Service Provider (CSP) revenues will increase from above USD 100 billion in 2012 (Bora, 2012) to about USD 350 billion in 2022 (Costello & Rimol, 2019). Therefore, understanding the determinant factors that facilitate or inhibit the adoption of CC becomes increasingly relevant for organizations seeking to adopt CC – constituting potential practical relevance due to the timeliness of the topic (Moeini, Rahrovani, & Chan, 2019).

In the past, various scholars empirically investigated these determinant factors. The last comprehensive review of these empirical papers on CC adoption analyzed the literature published from September 2009 until 2014 (Schneider & Sunyaev, 2016). It compared the determinant factors of CC adoption and information technology outsourcing (ITO). Only 23 papers addressed CC specifically until April 2014 (Schneider & Sunyaev, 2016), identifying 16 determinant factors for CC adoption, based on the methodology of the paper at hand. While the identified determinant factors mainly describe technology characteristics, further 72 variables exhibited not enough empirical evidence for evaluation. Similar to Yang & Tate (2012), Schneider & Sunyaev (2016) remarked that future empirical research should focus on other factors than technology characteristics.

Between April 2014 until May 2019, we identified further 39 papers that empirically investigated CC adoption determinants. Whether the further empirical papers followed the recommendation to research characteristics other than technology and thereby extended the body of knowledge beyond technology characteristics is not yet evaluated. Such an acceleration in research on a topic makes it increasingly difficult to obtain a holistic overview (Könning, Westner, & Strahringer, 2019) of what findings are consistent across papers and are “common knowledge” on CC adoption.

Additionally, the CC technology and its market are yet evolving: The immaturity of services prohibited CC adoption for a long time (Holloway et al., 2017). Consequently, CSPs focused on reducing adoption barriers, e.g., by enhancing security (El-Gazzar, Hustad, & Olsen, 2017) and contracting (Bjørner & Jayaraman, 2015). This challenges the validity of previously obtained findings on technology characteristics of CC adoption, calling to revisit the more intensely researched technology characteristics likewise.

There is considerable value in summarizing findings across studies, also from previous literature reviews (c.f. e.g., Lacity, Yan, & Khan, 2017); therefore, we extend the findings of Schneider & Sunyaev (2016) while integrating their results. We see the need for this due to the significant current relevance of the topic, the unanswered questions in previous literature reviews, a high amount of papers to answer them, and the changing technology maturity that urges to revisit questions answered some time ago. In this vein, the paper at hand investigates the following research question (RQ):

RQ1: What are the determinant factors of CC adoption?

Furthermore, it becomes increasingly difficult for researchers to design studies that truly enhance the body of knowledge on CC adoption, with every further publication. Hence, the question is what future research efforts can contribute to enriching the already existing knowledge, i.e., to identify “what is missing” (Leidner, 2018, p. 554) and should be addressed by future research, leading to RQ2:

RQ2: What aspects of CC adoption still need to be addressed?

For the investigation of RQ1, we integrate knowledge gained in empirical studies to quantitatively summarize research progress on CC adoption in a descriptive review (King & He, 2006; Schryen, Wagner, Benlian, & Paré, 2020). Researching RQ2 identifies further aspects to be analyzed by future research efforts. We investigate RQ2 by conducting a critical review (Alvesson & Sandberg, 2011; Rowe, 2012; Schryen et al., 2020) of the papers in the sample. We critically describe the extant literature to identify weaknesses or inconsistencies in an attempt to suggest a “path that will not likely reconcile with existing knowledge” (Schryen et al., 2020, p. 138). By this, we provide focus and new directions for future research efforts (Schryen et al., 2020).

The paper at hand utilizes and builds on the results of Schneider & Sunyaev (2016) while analyzing the most recent literature on CC adoption. Therefore, we apply the same methodology to ensure

methodological continuity and consistency while identifying new findings over a comprehensive and up-to-date set of papers on CC adoption. Moreover, this design choice limits the scope of the paper towards CC adoption by (private sector) organizations, i.e., the business to business context. Hence, this paper does neither analyze CC adoption by private consumers (business to consumer), nor CC adoption by governmental organizations (business to government).

As a data foundation for this paper, we utilized the literature review results of Schneider & Sunyaev (2016), which covered the timeframe until April 2014 and added to it our own sample, covering May 2014 to May 2019. The aggregation of the two samples, therefore, covered the full timeframe of research on organizational CC adoption so far. For this purpose, we apply the methodological approach from Schneider & Sunyaev (2016), i.e., we mapped authors' variables to an existing set of master variables to evaluate the consistency of findings across papers.

The remainder of the paper is structured as follows: Section 2 provides background on the research subject by introducing terminology and summarizing related literature reviews. Section 3 outlines the methodology applied to retrieve literature, map variables, code and evaluate the influence, and characterizes the papers in the sample. Section 4 describes determinant factors and inconsistent findings across papers. Section 5 highlights further opportunities for research and the results of a critical review of the papers in the sample regarding five dimensions: delivery models, deployment types, variable categories, level of analysis, and the studies' respondents of the papers identified. Section 6 concludes the paper and elaborates on its limitations.

2 Research Background

2.1 Terminology

We define CC as a "model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources […] that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell & Grance, 2011, p. 2). Its essential characteristics are on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service (Mell & Grance, 2011). The technology's key advantages from a business perspective are 1) lower cost of entry, 2) immediate access, 3) lower IT barrier for innovation, 4) scalability of services, and 5) new classes of applications (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011).

Two relevant dimensions for the understanding of the paper at hand are the delivery model and deployment type. Typically, CC distinguishes the delivery models Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), or Software-as-a-Service (SaaS) (Ramgovind, Eloff, & Smith, 2010). IaaS provides "processing, storage, networks, and other fundamental computing resources" (Mell & Grance, 2011, p. 3). PaaS works similar to IaaS, but additionally includes functionalities (Ramgovind et al., 2010), as a software framework or database storage (Zhang, Cheng, & Boutaba, 2010). In contrast, SaaS provides web-based applications (Ramgovind et al., 2010). Wulf, Westner, Schön, Strahringer, & Loebbecke (2019) ascertain that the roles and responsibilities in the adoption vary between SaaS (IT department as guideline provider) and IaaS/PaaS (IT department as technology enabler).

The deployment type can either be public, private, or hybrid (Zhang et al., 2010): Private deployments are available for the general public, while private deployment is exclusively designed for an organization that is either self-managed or acquired by a CSP. Hybrid deployment combines IT services from private and public deployments. Private clouds offer greater control over the infrastructure (Marston et al., 2011), whereas the term CC often implicitly refers to public deployment (Yang & Tate, 2012).

2.2 Related Work on CC Adoption

Multiple literature reviews examined CC adoption in the past. Yang & Tate (2012) descriptively reviewed the themes discussed on CC providing a classification of topics. Hoberg, Wollersheim, & Krcmar (2012) qualitatively described 15 CC adoption determinants found in the literature. Müller, Holm, & Søndergaard (2015) synthesized the literature on CC benefits in a maturity model, establishing a framework for practitioners on how to realize them.

Schneider & Sunyaev (2016) compared the adoption determinants of ITO to CC, finding multiple commonalities (e.g., cost savings) but also peculiarities of CC (e.g., security concerns). Overall, the study

identified eleven variables to yield consistent directional influence on CC adoption.[1] The authors identified that the vendor's service capability, cost savings, access to specialized resources, flexibility, reduced time to market, and market maturity positively influence CC adoption. Whereas the strategic importance of the asset, availability risk, and perceived complexity negatively influence CC adoption, and that there is a modal difference between industries. The authors evaluate that most of the conducted research summarized in their paper regarded technology characteristics of CC, highlighting the need for further research regarding other characteristics.

3 Methodology

3.1 Overview of Methodological Process

Determinant factors for CC adoption can be operationalized by an independent variable that influences the dependent meta-variable "CC sourcing decision" (Schneider & Sunyaev, 2016). We base the methodological process followed in the paper at hand on Jeyaraj, Rottman, & Lacity (2006), who developed a method to compare the influence of independent variables across empirical studies. This research methodology identifies the relevant empirical literature (qualitative and quantitative), develops a coding scheme for the dependent and independent variables used in the papers, and codes the relationship between the independent and dependent variables (Jeyaraj et al., 2006). In this vein, the literature review by Schneider & Sunyaev (2016) already applied this method to code variables authors used in the context of CC, incorporating variables from the broader ITO context (Lacity, Khan, Yan, & Willcocks, 2010; Lacity, Willcocks, & Khan, 2011). This review method was also recently applied by Könning, Westner, & Strahringer (2019) in the ITO context. Because a coding scheme for variables relevant to the context of CC adoption already exists (the set of master variables from Lacity et al. (2010, 2011) and Schneider & Sunyaev (2016)), we slightly alter the method proposed by Jeyaraj et al. (2006) by mapping the variables found in the retrieved papers towards this existing coding scheme. For variables that do not match any master variable definition, we define additional master variables. Lastly, we code the influence per variable on CC adoption to identify determinant factors, which are variables with consistent findings (Sunyaev & Schneider, 2013). Figure 1 illustrates the methodological process.

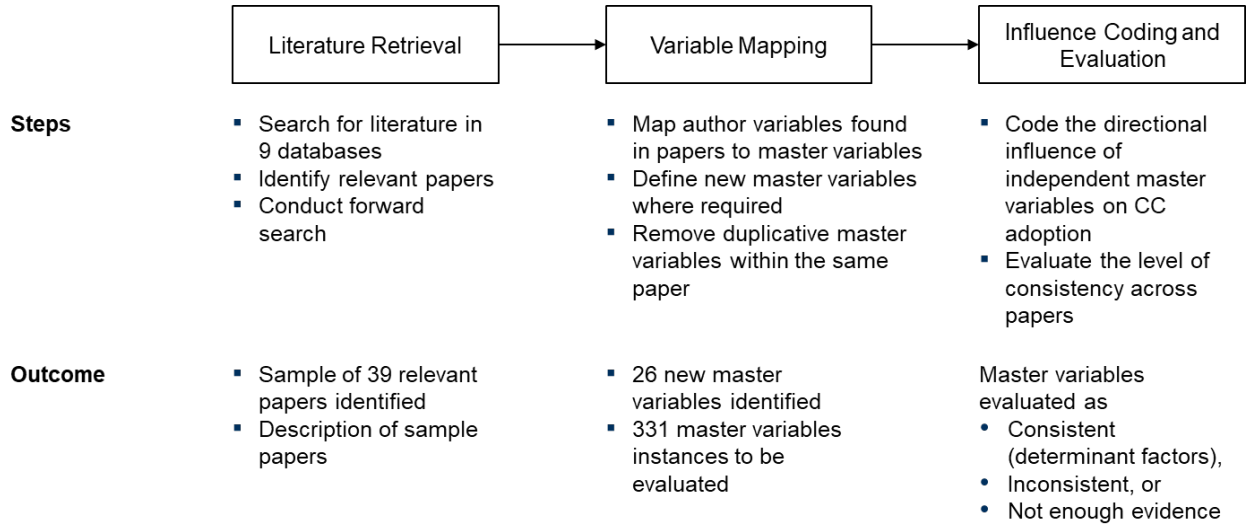

Figure 1. Methodological Process

[1] 16 variables applying the cut-off criteria outlined in sub-section 3.4.

3.2 Literature Retrieval

This paper applies a structured approach to identify the relevant literature for addressing the previously mentioned RQs. First, we searched nine databases for the keywords “cloud” AND “computing” in conjunction with any combination of “adoption”, “implementation”, or “migration” to find papers related to our RQs, as presented in Table A1 in Appendix A. We limited the search to peer-reviewed publications in English and German language published from May 2014 until May 2019 in academic journals or conference proceedings. Asterisks were used for “adopt*”, “implement*”, and “migrat*” for the searches in the databases where it was technically feasible. We deviated from the search string of the precedent study because outsourcing is out of scope for the paper at hand, and we considered the terms IaaS, PaaS, and SaaS to be covered by the more general term CC. Second, we read the abstracts of all search results and only deemed papers as “relevant” if they empirically investigated determinant factors of CC adoption in an organizational context. Additionally, we only considered those papers in which the “CC sourcing decision” or proxies thereof represented the dependent variable. The dependent variables used in the literature to explore the phenomenon CC adoption are the intention to adopt CC (e.g., Loske, Widjaja, Benlian, & Buxmann, 2014)), the decision outcome (e.g., van de Weerd, Mangula, & Brinkkemper, 2016)), or the motivation for CC adoption (e.g., Boillat & Legner, 2014)). Considering multiple dependent variables to compare findings, allows the inclusion of papers in the analysis, which we justify by close positive linkages to actual adoption (e.g., intention and purchase (Kim, Ferrin, & Rao, 2008)). Third, for all relevant papers, a forward search was conducted using Google Scholar to find further papers not retrieved from the database searches. In total, the literature search identified 39 papers as relevant for the investigation of the outlined RQs, as displayed in Figure 2.

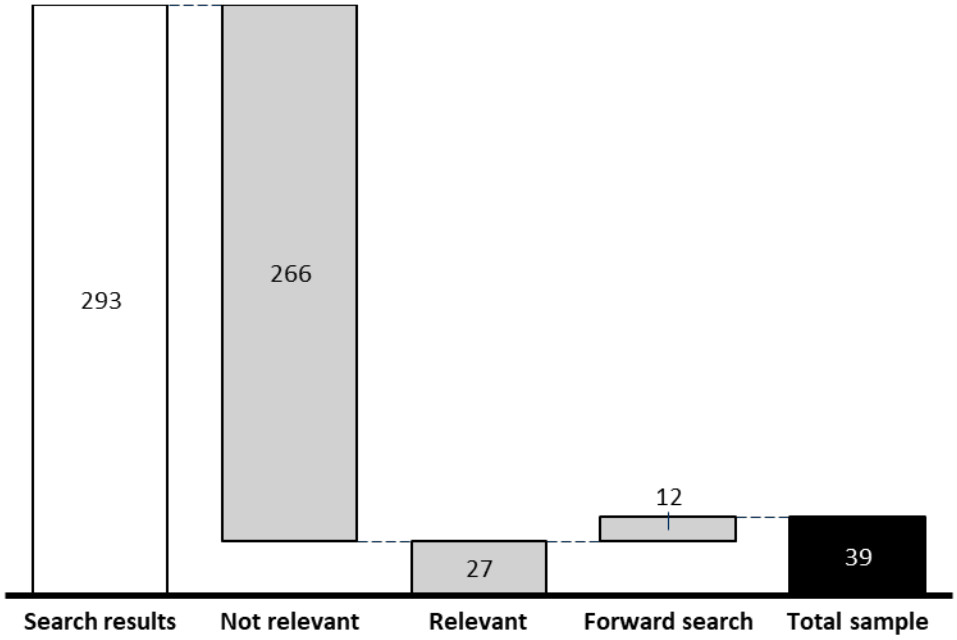

Figure 2. Construction of Sample Covering May 2014 until May 2019

Figure 3 describes the sample by research approach (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004), research type, data collection approach, and theories used. Most papers’ approach was designed to explore either the relevant determinant factors of CC adoption or to confirm a specific research model. The type of research conducted was either purely quantitative or qualitative. Few papers applied a mixed-methods approach by combining quantitative and qualitative methods or qualitative comparative analysis (both coded as “mixed methods”). Researchers collected data primarily via surveys or case studies. Analyzing these three characteristics identified two archetypes of studies in the field of CC adoption: (1) Exploratory, qualitative case studies compiling relevant determinant factors for CC adoption, and (2) confirmatory, quantitative studies testing hypotheses and causal models mainly in the form of structural

equation models. In total, researchers employed 17 different theories and frameworks to explain CC adoption. The most commonly used are the Technology-Organization-Environment (TOE) framework, Diffusion of Innovation (DOI) Theory, Technology Acceptance Model (TAM), or a combination thereof. Theories grouped in "Others" were not used more than three times in the sample, examples of those theories are Theory of Planned Behavior, Information Systems Success Theory, or Unified Theory of Acceptance and Use of Technology. Appendix A entails further details on the publication type and year of the identified papers (Figure A1).

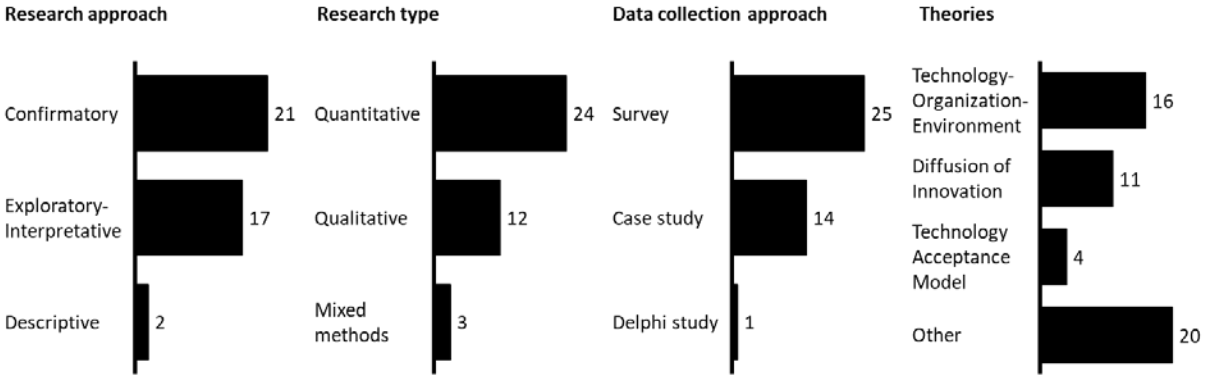

Figure 3. Sample Description (multiple items per paper possible)

3.3 Variable Mapping

To be able to compare findings across papers and with previous research, required to correct for the usage of different terms used by scholars while describing the same variable. We reviewed all retrieved papers for independent variables of CC adoption (in the following "authors' variables"). In total, the sample comprised 364 authors' variable instances, which required mapping to master variables. We mapped these author variable instances to the classification of 111 "master variables" prepared by Lacity et al. (2010, 2011) and Schneider & Sunyaev (2016). This classification comprises a list of independent variables identified in the CC and ITO context until 2014 grouped into vendor, solution, client, individual, asset, technology, and environmental characteristics.

We compared the description of the authors' variables found in the papers to the definitions of the master variables from Lacity et al. (2010) and Schneider & Sunyaev (2016), and mapped the variables, if possible. We mapped 295 of the 364 authors' variable instances to the 111 master variables.

The remaining 69 authors' variable instances required the definition of additional master variables as the concerning theme has not been researched before May 2014 and, hence, not defined in the literature review undertaken by Schneider & Sunyaev (2016). Therefore, new master variables had to be defined to map the remaining 69 authors' variable instances found in the literature, resulting in 26 new master variables and a total number of 137 master variables. See Appendix B for a comprehensive list of the master variables used in this paper and their definitions).

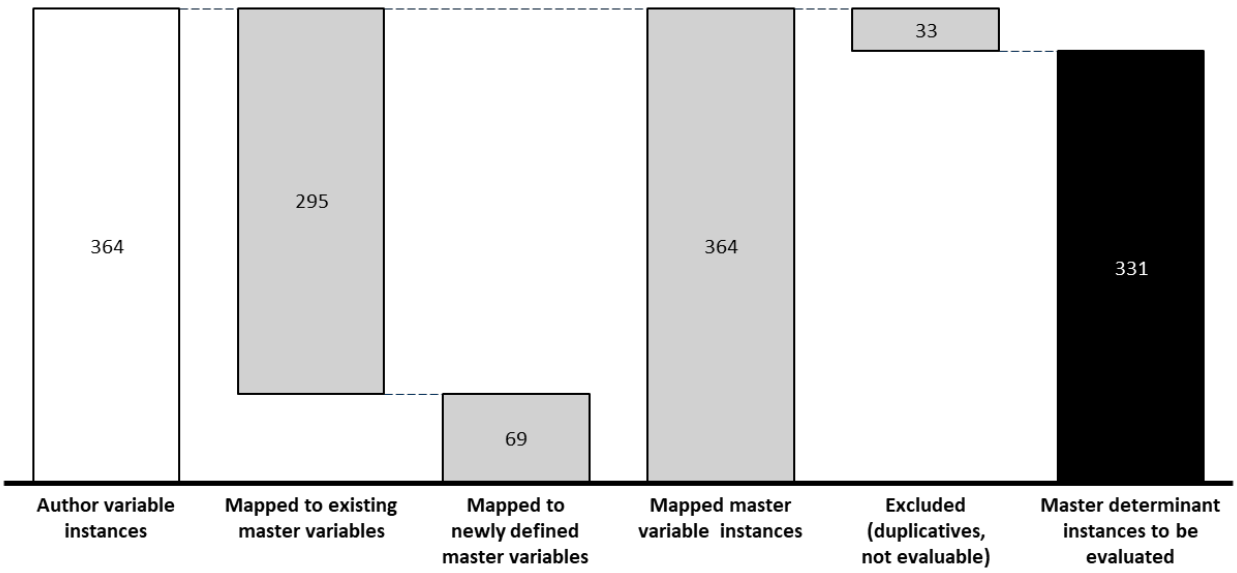

Figure 4. Illustration of the Mapping Process

At times, researchers used multiple authors' variable instances in their paper, which map to the same master variable. These "duplicative" master variable instances (24 in total) were excluded from evaluation to prevent double-counting (see also the end of sub-section 2.4). Additionally, for nine variable instances, the relationship between the independent variables and the dependent variable was not evaluable. We identified 331 distinct and evaluable master variable instances within the sample papers. Figure 4 illustrates the process of mapping the authors' variables to master variables.

After the mapping, the second author of the paper at hand manually examined the mapping to identify inconsistent mappings or errors. Any issues were discussed and then resolved with input from all authors. The list of analyzed papers and mapped variables can be requested from the first author.

For linguistic simplicity, we refer to the evaluated master variables as "variables" in the remainder of the paper.

3.4 Influence Coding and Evaluation

Comparing results across papers necessitates coding the directional influence of a variable instance on CC adoption. The directional influence of variables can be either positive (+), negative (-), modal (M), or not significant (0) (Lacity et al., 2010; Schneider & Sunyaev, 2016) on CC adoption in a specific instance. One variable instance is either a finding from a case, delphi, or qualitative comparative study with a strong argument, or a survey with a confidence level of over 95% (Lacity et al., 2010; Schneider & Sunyaev, 2016). For each of the 331 variable instances in our sample (sub-section 2.3), we denoted and consolidated the empirically obtained directional influence per variable instance.

Tables C1 to C7 in Appendix C display how often a variable exhibited a directional influence on CC adoption (+, -, M, or 0) for our sample. Schneider & Sunyaev (2016) analyzed variables' influence analogously, for their sample of 23 papers on CC adoption. Building upon already existing knowledge, we created a "combined sample" of our sample of 39 papers from May 2014 to May 2019 and Schneider & Sunyaev's (2016) sample of 23 papers from September 2009 until April 2014 for which the results are presented in Tables C1 to C7 as well.

Evaluating the directional influence of variables across multiple papers could either yield consistent (papers find the same influence, e.g., all +) or inconsistent findings (different findings across papers, e.g., some + and some -) regarding the variable's influence. We, therefore, evaluated the level of consistency across papers with the following decision-rule: We evaluated the directional influence of master variables if: (1) they were researched in at least five of the papers in the combined sample (Lacity et al., 2010; Schneider & Sunyaev, 2016). (2) If variables were researched in three to four papers and showed a high consistency, i.e., in at least three (out of three or four) papers the variable has the same directional influence. Variables with consistent evidence in 80% or more of their occurrences were marked as ++/--,

or +/- when 60% to 80% of the papers exhibited consistent findings (Lacity et al., 2010; Schneider & Sunyaev, 2016). Table 1 illustrates this assessment method.

Table 1. Method to Assess the Consistency of Findings per Master Variable (adjusted from Lacity et al., 2010; Schneider & Sunyaev, 2016)

Number of times a master variable was researched	Evaluation
≥ 5 times	"++" / "--", if ≥ 80% of papers found a positive / negative influence
	"+" / "-" if < 80%, but ≥ 60% of papers found a positive / negative influence
	"?" If < 60% of papers found a positive / negative influence
4 times	"++" / "--" if all papers found a positive / negative influence
	"+" / "-" if 3 papers found a positive / negative influence
	Not evaluated otherwise
3 times	"+" / "-" if all papers found a positive / negative influence
	Not evaluated otherwise
2 / 1 time(s)	Not evaluated

The method described above exhibited some practical difficulties which required attention. At times, researchers used multiple (author) variables in their paper that map to the same master variable. For example, Karunagaran, Mathew, & Lehner (2016) considered the benefits of the master variable "flexibility" as the factors "scalability" and "on-demand servicing". In those papers, the empirical evidence of the factors was accounted once for the respective master variable, and we excluded the duplicative master variable from the evaluation. Few papers split their sample into two sub-samples. For these papers, each sub-sample was accounted with factor 0.5, leading to non-integer values for various determinant factors in some cases.

4 New Empirical Findings on Cloud Computing Adoption

4.1 Results Overview

We assessed all 137 variables following the method presented in sub-section 3.3. To evaluate the degree of novelty of our findings, we compare the results to the CC sub-sample of the precedent literature review by Schneider & Sunyaev (2016). In total, we evaluated 44 master variables to exhibit consistent findings, i.e., identified the variable as determinant factors of CC adoption.

As explained in sub-section 3.2, this paper identified 26 additional master variables researched in the literature. Of these 26 variables, eight exhibited consistent findings, and 18 did not have enough empirical evidence to be categorized as consistent or inconsistent.

From the initial 111 master variables of Schneider & Sunyaev (2016), we evaluated 20 further variables as consistent and added three additional master variables to the list of variables with inconsistent findings. Therefore, the results of Schneider & Sunyaev (2016) remain unchanged in our analysis: The 16 determinant factors (for the CC sub-sample, applying the assessment method of sub-section 3.4 for evaluation) identified in 2014 exhibited the same consistent, directional influence. Three out of five variables with inconsistent findings identified in Schneider & Sunyaev (2016) still exhibited inconsistent findings across papers. Two master variables (internal IT capabilities and competitive pressure) now exhibit consistent findings but were inconsistent in 2014.

4.2 Determinant Factors of Cloud Computing Adoption

An overview of the identified determinant factors, i.e., variables with consistent empirical evidence, is given in Figure 5.

We describe the determinant factors categorized as vendor, solution, client, individual, asset, technical, and environmental characteristics (Schneider & Sunyaev, 2016).

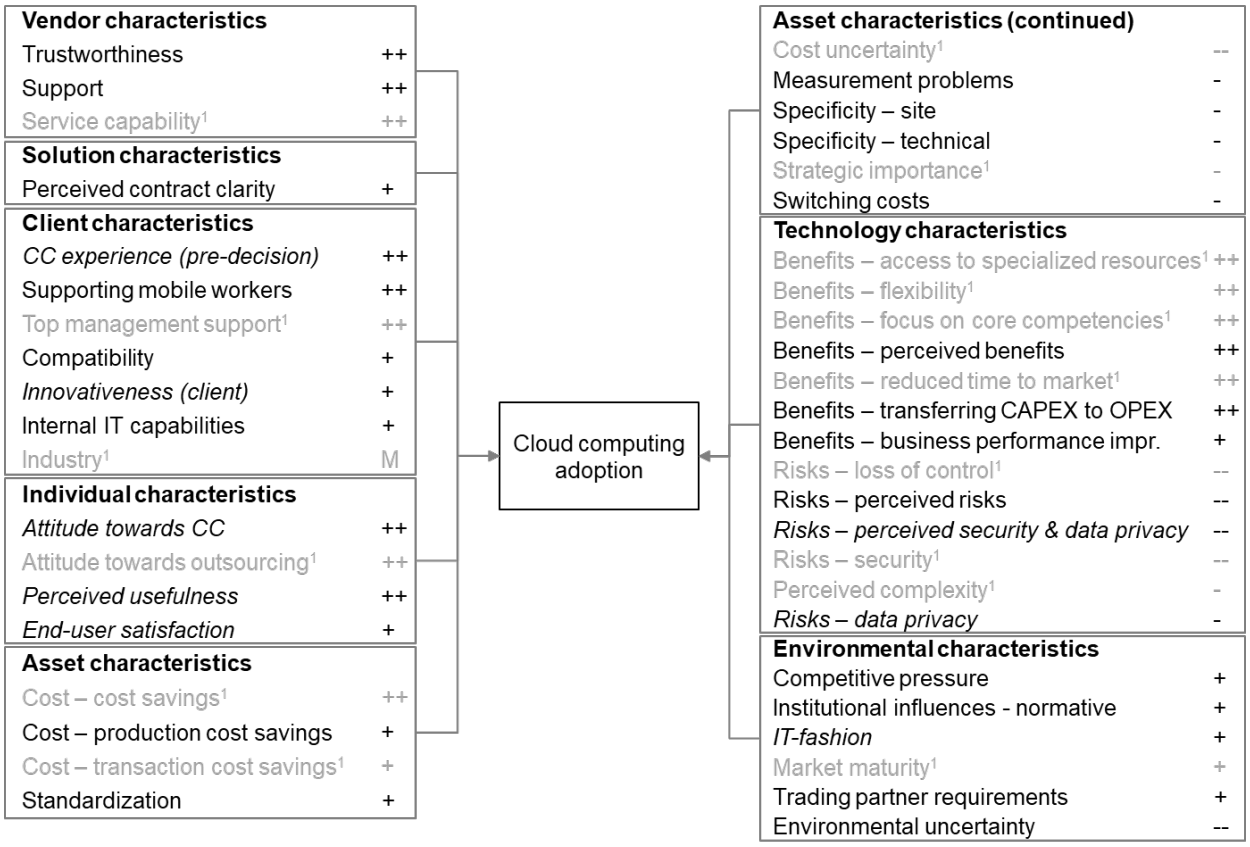

Figure 5. Determinant Factors of CC Adoption

Legend: ++/-- if 80% or more papers in the combined sample came to the finding; +/- when 60% to 80% of papers in the combined sample came to the finding, M denotes modal influence. Newly identified determinant factors in italics. Footnote: 1 Already identified as consistent in Schneider & Sunyaev (2016) for the CC sub-sample, applying the assessment method of sub-section 2.4 for evaluation (grayed-out).

4.2.1 Vendor characteristics

The most important vendor characteristic is the vendor's **trustworthiness**, with ten out of eleven papers finding a positive influence on CC adoption. Trust is required because the client relies on the vendor when adopting CC (Lin & Lin, 2019). The **support** offered by the vendor has a dual role (Hachicha & Mezghani, 2018): It integrates the expected benefits and mitigates the risks from CC (positive influence in seven out of nine papers). Schneider & Sunyaev (2016) identified the importance of vendors' **service capability** as a facilitator of CC adoption. In the combined sample, nine out of eleven papers identified its positive influence.

4.2.2 Solution characteristics

Perceived contract clarity is the only solution characteristic with consistent empirical evidence (three out of three papers), and positively influences CC adoption (Friedrich-Baasner, Fischer, & Winkelmann, 2018; Lang, Wiesche, & Krcmar, 2018).

4.2.3 Client characteristics

Client characteristics describe the attributes of the organization that consumes cloud services. A determinant factor identified in this paper is **CC experience (pre-decision)** (seven out of seven papers). Actual CC experience grows by pilot applications (Holloway et al., 2017) and previous experience with CC in general (Al-Sharafi, Arshah, & Abu-Shanab, 2017). Also, the potential to gain experience with the technology before deploying CC, i.e., trialability of the product (Al-Isma'ili, Li, Shen, & He, 2016; Al-Sharafi et al., 2017; Hsu & Lin, 2016; Karunagaran et al., 2016; Lang et al., 2018), influences adoption positively. The variable to **support mobile workers** resulted in all five times in evidence for a positive influence on CC adoption. **Top management support** was studied in 17 papers, of which 14 found a positive influence on CC adoption. **Compatibility**, defined as the degree to which an innovation fits with potential adopters' existing values, previous practices, and current needs (Rogers, 1995; Schneider & Sunyaev, 2016), was studied in 18 papers, of which eleven papers found a positive influence. Primarily, compatibility regards the possibility to integrate with the existing information system (IS) landscape (e.g., Karunagaran et al., 2016; Lang et al., 2018). The **innovativeness (firm)** of the firm, i.e., the CC consuming organization, is found in three out of five papers to promote CC adoption (Alharbi, Atkins, & Stanier, 2017; Kyriakou & Loukis, 2015; Priyadarshinee, Raut, Jha, & Gardas, 2017). **Internal IT capabilities** comprise various aspects but primarily relate to the expertise and availability of internal resources (Friedrich-Baasner et al., 2018; Lang et al., 2018; Loukis, Arvanitis, & Kyriakou, 2017; Lynn et al., 2018; Priyadarshinee et al., 2017) or the availability of the technological prerequisites (Al-Shura, Zabadi, Abughazaleh, & Alhadi, 2018; Gutierrez & Lumsden, 2014; Ming, On, Rayner, Guan, & Patricia, 2018). Despite the broad range of aspects considered in this variable, 19 out of 31 papers find a positive impact on CC adoption. In the combined sample, the determinant factor now yields consistent results but did not in Schneider & Sunyaev's (2016) literature review. Lastly, the **industry** of the organization was of modal relevance in five out of seven papers, finding different levels of CC adoption across industries. Exemplarily, manufacturing organizations are significantly more likely to adopt CC than organizations in the service or financial industry (Hsu & Lin, 2016).

4.2.4 Individual characteristics

The research on individual characteristics regards the attributes of the individual in charge of the sourcing decision or the end-user. An individual's **attitude towards outsourcing** had a positive influence on the adoption decision in all four papers in Schneider & Sunyaev's (2016) sample. Attitude refers to the expression of a person in (dis-)favor towards an object or a concept (Velázquez & Ho, 2015). In our own more recent sample, we find that attitude towards outsourcing was not studied, but rather **attitude towards CC**, specifically. In our sample, the role of attitude towards CC was studied four times and consistently resulted in a positive impact on CC adoption. **Perceived usefulness** defined as "the degree, an individual believes innovation will help them perform a set task" (Ratten, 2015, p. 85) positively influences CC adoption according to four out of five papers in the combined sample (Cheng, 2017; Friedrich-Baasner et al., 2018; Loske et al., 2014). The **end-user satisfaction** with the CC solution was researched three times with consistent positive influence (Donovan, Guzman, Adya, & Wang, 2018; Güner & Sneiders, 2014; Holloway et al., 2017). Donovan et al. (2018) considered end-user satisfaction in the sense of the participant's satisfaction using the IS.

4.2.5 Asset characteristics

Cost savings (consistent in 21 out of 27 papers) and **production cost savings** (consistent in ten out of 13 papers) have a positive influence on CC adoption. Additionally, **transaction cost savings** foster CC adoption (three out of four papers in Schneider & Sunyaev (2016)'s sample). The opportunity for **standardization** by adopting CC influences the decision outcome positively in all three papers. The c**ost uncertainty** related to CC yields a negative influence in four out of five papers. Hence, one could conclude that the merit of standardization does not accommodate technically specific assets. **Measurement problems**, or the lack of performance measurement (Karunagaran et al., 2016), hinder CC adoption in three out of four papers. Some assets exhibit site-specificity (**specificity – site**), which negatively influences CC adoption according to seven out of ten papers. In our interpretation, CC becomes less suitable in case the storage of data in the cloud takes place out of the country. However, if vendors succeed in accommodating legal requirements regarding in-country storage, site-specificity was found to influence the sourcing decision positively (El-Gazzar et al., 2017; Lang et al., 2018). A technically specific asset was found less suitable for CC (**specificity – technical**), in ten out of 14 papers. The **strategic importance** of the asset or the criticality of the business process (Güner & Sneiders, 2014) had

a negative influence on the decision to adopt CC in seven out of nine papers. However, no study after 2014 in our sample investigated this determinant factor, which could have potentially changed its mathematical sign, now that more and more organizations from the ecosystem adopt CC. **Switching costs** prohibited CC adoption in four out of six papers.

4.2.6 Technology characteristics

For the sake of brevity, we focus the discussion on benefits and risks stemming from the technology itself on the determinant factors additionally identified as consistent compared to the determinant factors of Schneider & Sunyaev's (2016) sample. For the well-studied determinant factors, the analysis is simple: **Benefits** are facilitating factors for adoption, whereas **risks** and the **perceived complexity** can be considered barriers for adoption (as shown in Figure 5). The most frequently studied benefits in our sample are **perceived benefits**, which positively influence CC adoption in 20 out of 25 papers.

Regarding the risks in CC, our sample identified two emerging themes: **data privacy risks** (negative influence in three out of four papers), and **perceived security and data privacy risks** (negative influence in five out of six papers). We acknowledge that the concepts of data privacy and information security are closely linked and require differentiation. Regarding the role of the vendor (managing the user's data), the data privacy risk lies within how the vendor utilizes the data. Therefore, information privacy is the extent to which an individual is concerned about organizational practices related to the collection and use of his or her personal information (Donovan et al., 2018; Smith, Milberg, & Burke, 1996). This data utilization would constitute a breach of data privacy, but not security. Moreover, respondents in empirical papers often state non-specified skepticism regarding the remote storage of data. Analogously to the more general **perceived risks** determinant factor, we attribute this skepticism to perceived security and data privacy risks (Daylami, Ryan, Olfman, & Shayo, 2005; Schneider & Sunyaev, 2016). The difference between security and data privacy is very nuanced. Hence, we believe that these general perceptions are not attributable to either one but should be regarded as a distinct determinant factor to catch all allured unspecified statements in this regard.

4.2.7 Environmental characteristics

Competitive pressure was studied in 16 papers of the combined sample, of which ten papers find a positive influence on CC adoption. In contrast, six papers do not find a significant empirical influence. **Institutional influences – normative** as certification (Lang et al., 2018) or accreditation (Alharbi et al., 2017) positively influence the decision to adopt CC, in three out of four papers. **IT-fashion** positively influences the adoption decision in all three papers because CC is perceived to be fashionable in IT (Polyviou, Pramatari, & Nancy, 2015), advantageous for the image (Friedrich-Baasner et al., 2018), or following a general business trend (Holloway et al., 2017). **Market maturity** comprises the vendors' ability to offer a legally (Lang et al., 2018) and regulatory compliant (Alharbi et al., 2017; Chen & Chen, 2015; Hsu & Lin, 2016) product without taxation issues (Karunagaran et al., 2016) (positive influence in eleven out of 17 papers). Furthermore, market maturity includes the vendors' ability to provide mature services (Holloway et al., 2017). Analogously as the pressure from the competition may drive CC adoption, **trading partner requirements** describe the pressure exercised by trading partners (Al-Shura et al., 2018; Gutierrez & Lumsden, 2014) or the broader business ecosystem (Alharbi et al., 2017) (positive influence in three out of five papers).

4.3 Inconsistent Findings on Cloud Computing Adoption

Various variables were studied five times or more and exhibit inconsistent findings, according to the rule outlined in sub-section 2.4. A client characteristic with differing findings is the organization's **size**. The findings for the combined sample are wide-spread with four papers finding a positive, five a negative, five a modal, and 14 no influence on the organization's propensity to adopt CC. A reason for the mixed results might lie in the model specifications: Results of regression analyses often display no effect of the size of an organization; however, segmentation of samples by size exhibits variations in the coefficients of the variables (Hsu & Lin, 2016; Lee & Xia, 2006).

Within the asset characteristics, the directional influence of **technical complexity** is yet unclear. In total, three papers find a positive influence (Deil & Brune, 2017; Hachicha & Mezghani, 2018), and three papers a negative influence (Al-Sharafi et al., 2017; Al–Shura et al., 2018; Chen & Chen, 2015) in the combined sample. An explanation for this inconsistency could be the duality of technical complexity. On the one hand, the technical complexity of the asset under consideration could prohibit CC adoption, given the high

degree of cloud offerings' standardization. On the other hand, the technical complexity of the asset could be the ultimate reason to migrate the asset to the cloud for less advanced IT organizations.

In the technology domain, the direction of the potential influence of variables is straight forward, because benefits influence adoption positively, whereas risks influence adoption negatively. Ambiguous is the **availability (benefit and risk)** variable: Availability benefits from the self-service characteristic of CC without relying on a vendor to access services (Cheng, 2017; Karunagaran et al., 2016), but migrating production-relevant IS into the cloud could put manufacturing at risk (Güner & Sneiders, 2014). Two papers found a positive influence, three papers a negative influence, five papers no influence. One paper found that the self-service characteristic of CC decreases availability for large organizations, but increases it for small- and medium-sized enterprises (Karunagaran et al., 2016).

Environmental characteristics exhibit two determinant factors with inconsistent results. **Environmental uncertainty** in general, or specifically regarding demand, product, technology, or behavior (Schneider & Sunyaev, 2016), has three times positive, six times negative, and three times no influence on CC adoption in the combined sample. Similarly, **institutional influences – coercive** exhibited mixed directional influence on CC adoption. Four papers found a positive, three papers a negative, one a modal, and seven no influence on CC adoption. It defines as formal and informal pressure exerted on organizations by other organizations upon which they are dependent as laws, regulations, and sanctions (DiMaggio & Powell, 1983; Schneider & Sunyaev, 2016). The absence of standards and policies could prohibit CC adoption. However, favorable political reforms (El-Gazzar et al., 2017), government support (Al-Sharafi et al., 2017), and subjective norms (Chen, Chen, & Chang, 2017; Mezghani, 2014; Velázquez & Ho, 2015) enable CC adoption. However, coercive influences may also cause legal issues (Caldarelli, Ferri, & Maffei, 2017), or restrictive regulations discourage organizations from adopting CC (Güner & Sneiders, 2014). Hence, further research requires a more granular consideration of institutional coercive influences' nature.

5 Critical Review of the Research Landscape

5.1 Overview of Aspects to be Addressed by Further Research

5.1.1 Avenues for further research

The numerous research papers on CC adoption could indicate saturation of research in this field. Critically reviewing the research landscape alludes that further research can deepen the understanding of the dimensions specific to CC adoption: delivery model and deployment type. Additionally, research could enhance understanding by regarding certain variable categories or focusing on a specific unit of analysis. Table 2 exhibits the areas in which we see the most potential for further research, summarizing the gaps identified in the critical review. The discussion below summarizes what research "is missing" (Leidner, 2018, p. 554), while the subsequent sections discuss what "is there". Thus, we highlight "the discrepancy between what we know and what we need to know", to provide researchers opportunities for key contributions (Webster & Watson, 2002, p. xix).

Research on the delivery models IaaS and PaaS is scarce. Since the resource management split between the adopting company and the CSP depends on the delivery model (Zhang et al., 2010), it has distinct business implications (Yang & Tate, 2012). Research should, therefore, address whether adoption determinant factors depend on the considered delivery model. Specifically, research did not yet fully explore the peculiarities of the delivery models IaaS and PaaS. Moreover, the scope of services delivered by CC emerges beyond software, infrastructure, and platform services, referred to as Everything-as-a-Service (XaaS) (Duan, Fu, Zhou, Sub, Narendra & Hu, 2015). Likewise, other authors identified the missing differentiation between delivery models and deployment types as areas that require further research (Hsu & Lin, 2016; Loukis et al., 2017). In this paper's sample, we could not identify research that specifically focusses on the case of private deployment. Building on this, research does not address the phenomenon of combining multiple CC vendors and deployment types. Hybrid deployment combines private and public deployment (Li, Li, Chen, Lee & Lou, 2015), whereas multi-cloud approaches combine several public CC services (Jamshidi, Pahl, Chinenyeze & Liu, 2015). We see value in the investigation of adoption determinants across deployment types, because, e.g., private deployment exhibits fewer security risks (Ramgovind et al., 2010), but does not benefit from pooling infrastructure with further tenants.

The call of Schneider & Sunyaev (2016) for research on other characteristics than technology is yet not fully followed. Even though more papers became available researching asset, organizational, and

environmental characteristics, few papers investigate the characteristics of vendor, solution, and individuals. Lastly, we see that few papers regarded the specific decision to use an IS or the decision-maker as the unit of analysis. We anticipate interesting results from studies regarding the interplay of individuals involved in forming the CC adoption decision.

Table 2. Overview of Aspects for Further Research

Dimension	Areas for further research
Delivery model	IaaS, PaaS, XaaS
Deployment type	Private, hybrid, multi-cloud
Category	Vendor, solution, individual characteristics
Unit of analysis	Information system, decision-maker

5.1.2 Hypotheses to test

The beforehand analysis of inconsistent findings (sub-section 4.3), the results of papers on CC adoption differentiating the delivery models, and the missing acknowledgment of deployment types (sub-section 5.2.1) indicate a gap in the literature regarding these two dimensions. Therefore, a discussion on the potential differences in the influence of determinant factors by delivery model and deployment type would be beneficial for advancing our understanding of the CC phenomenon. We aim to provide hypotheses that may guide further research on determinant factors. In Table 3, we provide an overview of selected determinant factors for which we hypothesize differences in relevance depending on the delivery model or deployment type. The positive influences of vendor support, CC experience, knowledge, innovativeness, and competitive pressure are, from the authors' perspective, less relevant for SaaS than for the other delivery models. We attribute this hypothesis to the reduced resources managed by the client organization in SaaS. Moreover, as the vendor manages virtually all resources, compatibility to the existing IT landscape is no relevant determinant factor for the sourcing decision. As SaaS often represent internal IS that are highly standardized, time to market and competitive pressure also become irrelevant.

Table 3. Hypothesis on the Influence of Determinant Factors Differentiated by Delivery Model and Deployment Type

Variable	Evaluation	Importance depending on delivery model			Importance depending on deployment type
		SaaS	PaaS	IaaS	
Vendor – support	+	Less	More	More	NR
Client – compatibility	+	NR	More	More	More relevant for public cloud
Client – internal IT capabilities	+	Neg	Pos	Pos	More relevant for private cloud
Client – CC experience (pre-decision)	++	Less	More	More	NR
Client – innovativeness	+	Less	More	More	More relevant for public cloud
Client – size	?	NR	Pos	Pos	NR
Individual – CC knowledge	?	Less	More	More	NR
Individual – perceived usefulness	++	More	More	NR	NR
Individual – innovativeness	+	Less	More	More	NR

Costs – cost savings	++	More	Less	More	More relevant for public cloud
Asset – strategic importance	-	Equal	Pos	Pos	More relevant for public cloud
Asset – technical complexity	?	Pos	Pos	Neg	NR
Environmental – competitive pressure	+	Less	More	More	NR

Less / More / Equal regards the relative relevance for the specific delivery model compared to the influence identified by the literature review
NR: not relevant for the delivery model or irrelevant regarding the deployment type
Pos / Neg regards a hypothesized positive/negative influence depending on the delivery model

For two variables, we hypothesize different directional influences depending on the delivery models (positive influence on one delivery model, and negative influence on another delivery model). For internal IT capabilities, we would expect that PaaS and IaaS delivery models necessitate development resources and hence, positively impact the sourcing decision. In contrast, a lack of internal IT capabilities constitutes a strong argument for using a SaaS (negative influence). The availability of development resources could lessen an organization's interest in SaaS. Likewise, the technical complexity of the asset may infer different influences across delivery models. A highly complex infrastructure will potentially not be suitable for applying IaaS, e.g., through standardized EC2 instances. However, a complex asset in the case of SaaS and PaaS means that more of the complexity is managed by the vendor, which positively influences the adoption decision. Linking the two previous thoughts may lead to the hypothesis of a moderating effect of the presence of internal IT capabilities via the technical complexity of the asset on the adoption decision.

Concerning the client organization size, we hypothesize a positive influence on CC adoption for PaaS and IaaS because the higher number of potential users of an application would incentivize developing on PaaS or IaaS. Cost savings could be more relevant for IaaS (cost savings compared to on-premise infrastructure) and SaaS (cost savings compared to application service provisioning) than for PaaS, which constitutes a new sourcing mechanism. The usefulness perceived by the decision-maker is hypothesized to be relevant for SaaS and PaaS, but not for IaaS, where the service is less subject to ambiguity for the decision-maker.

Regarding deployment type, we hypothesize that most determinants are more relevant for public cloud than for private clouds, as this is a key differentiating characteristic of CC compared to other sourcing options. Many risks (and benefits) of CC originate from the characteristic of outsourcing or the multi-tenant-shared infrastructure characteristic (Wulf, Strahringer, & Westner, 2019). Hence, the deployment of private cloud solutions eases security concerns (Alharbi et al., 2017; Güner & Sneiders, 2014), and resolves regulatory barriers (Chen & Chen, 2015). However, deploying private cloud solutions comes at the expense of economic disadvantages compared to public clouds (Senarathna, Warren, Yeoh, & Salzman, 2014).

5.2 Overview on Aspects Addressed by the Literature

5.2.1 Review of delivery models and deployment types

Overall, the literature on CC adoption rarely differentiates CC adoption as a decision-making problem specific to the delivery model under consideration, as depicted in Figure 6. However, we argue that this might be the cause of differing results regarding the influence of certain variables. At its core, the delivery model choice determines the split of resources managed by the vendor and the client organization (Zhang et al., 2010), which leads to different implications for various determinant factors depending on the context of CC adoption. The delivery-specific findings of certain papers show the necessity for differentiation (see the next paragraph). Surprisingly, the issue of missing delivery model consideration became more apparent since the review conducted by Schneider and Sunyaev (Schneider & Sunyaev, 2016). In their sample, eleven papers regarded SaaS specifically, whereas twelve papers discussed CC in general. Hence, less research differentiated the delivery models in the past five years, compared to the papers published before 2014. We forth following summarize research results that differentiate the delivery model.

Cheng (2017) models the choice of delivery model as an endogenous part of the decision-making process. The summary statistics provided in the study indicate that low levels of IT budget dedicated to CC, a short time horizon of the considered application, and little experience of the decision-maker with CC result in SaaS as a delivery model choice. Boillat & Legner (2014) differentiate the capabilities of CC delivery models in the case of enterprise resource planning. The authors find that organizations apply CC as a standardized IT platform for innovating and optimizing business processes. This highlights the potential of the PaaS delivery model to leverage an existing, standardized development platform for the integration of various services which can comprise cloud and on-premise services. Van de Weerd et al. (2016) explore the relationship between organizational characteristics and the decision outcome to adopt SaaS. The qualitative comparative analysis shows that top management support and small organizational size are enabling factors for SaaS adoption in an Indonesian setting. However, organizational readiness (in terms of internal IT capabilities, resources, and budget) is not found to improve SaaS adoption. The authors analyze that the findings on size and organizational readiness contradict the common rationale, as argued by Schneider & Sunyaev (2016): various papers report a differing directional influence of these two determinant factors. Regarding SaaS adoption, however, the negative influence of size might stem from the fact that smaller organizations have fewer resources for in-house development, and fewer internal IT capabilities are required to integrate SaaS solutions (as well proposed as a rationale by Schneider & Sunyaev (2016)). Deil & Brune (2017) empirically derive a CC adoption model specifically for PaaS. The authors conclude from a study among German SMEs that relative advantages (benefits discounted for risks), compatibility, top management support, competitive pressure, and support of non-IT employees are positively related to the decision to adopt PaaS, in line with the general findings on CC adoption. Perceived complexity (of the technology) negatively influences PaaS adoption, which could be explained with the application layer being managed by the client organization (Zhang et al., 2010).

Figure 6 summarizes how often the deployment type is considered in our sample of empirical papers on CC adoption. Twelve papers acknowledge that determinant factors of CC adoption potentially depend on the deployment type, but do not analyze the results concerning the deployment type. Seven papers attributed the finding of the paper towards public clouds specifically, whereas 20 papers do neither discuss nor mention deployment types. No paper in the sample empirically investigates the differences between public, hybrid, and private clouds. Therefore, one can only speculate that the papers discuss the case of public cloud environments. In conclusion, a critical review on findings differentiated by deployment type is not possible given the lack of differentiated papers on various deployment types.

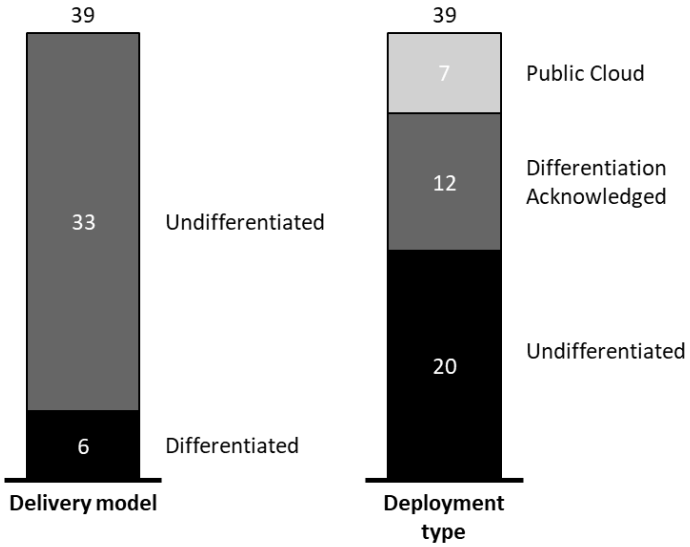

Figure 6. Consideration of the Delivery Model and Deployment Type in the Sample of 39 Papers

5.2.2 Review of research categories

The extent to which researchers studied the influence of determinant factors on CC adoption differs by variable category, which Figure 7 depicts. The categories client, asset, technology, and environmental characteristics are by far more often researched than vendor, solution, and individual characteristics. Hence, the call for research on categories other than technology characteristics (Schneider & Sunyaev, 2016) has been followed only in regard to client, asset, and environmental characteristics. There are multiple possible explanations for this observation. Vendor, solution, and individual characteristics could simply be not so relevant for an organization's decision whether to adopt CC. This explanation is compromised by the eight determinant factors identified to yield consistent results in Figure 5 (sub-section 4.2), despite the relatively few papers that researched these characteristics. An alternative explanation is that these dimensions are less often researched because the papers researched other units of analysis on which the characteristics are less relevant.

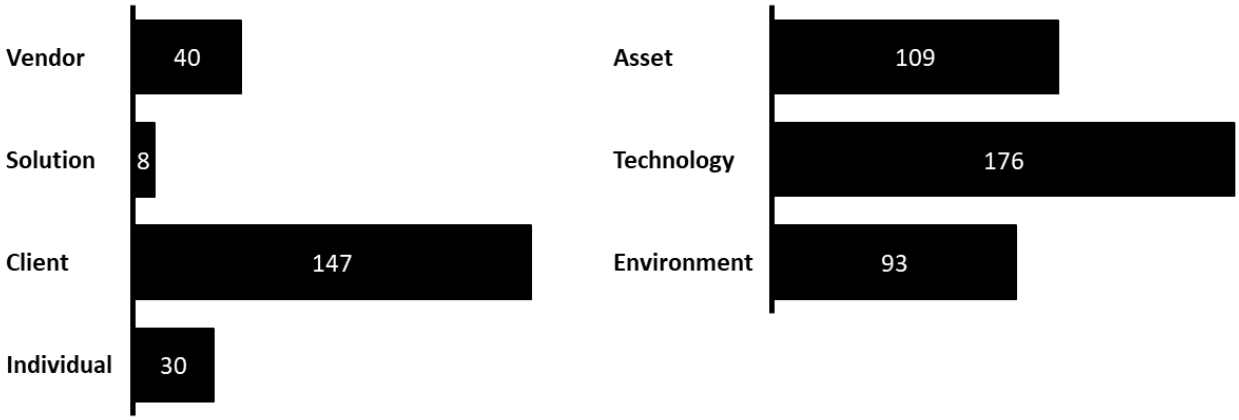

Figure 7. Researched Determinant Factors by Category in the Combined Sample

5.2.3 Review of Level of Analysis and Respondents

Dibbern et al. (2004) consider the level of analysis to categorize empirical papers, as displayed in Figure 8. Most papers investigate CC adoption on an organizational level. Hence, suitable RQs regard the organizational decision of whether to adopt CC. Analogously to the critical review on delivery models and deployment types, we advocate a more differentiated discussion on CC adoption regarding the unit of analysis. The decision of whether to adopt CC is highly context-specific and also requires to address the characteristics of the (information) asset under consideration (Schneider & Sunyaev, 2016). Investigations of the phenomenon on an organizational level remain on the surface of the practical challenge: The initial decision whether to adopt CC is made on an organizational level ("adoption"), while the actual usage of CC within an organization depends on leveraging these platforms ("post-adoption") (Boillat & Legner, 2014; Wulf, Westner, Schön, Strahringer, & Loebbecke, 2019). Therefore, the post-adoptive use of IT includes more than continuity and habit, but also how individuals make new use of it (Bagayogo, Lapointe, & Bassellier, 2014).

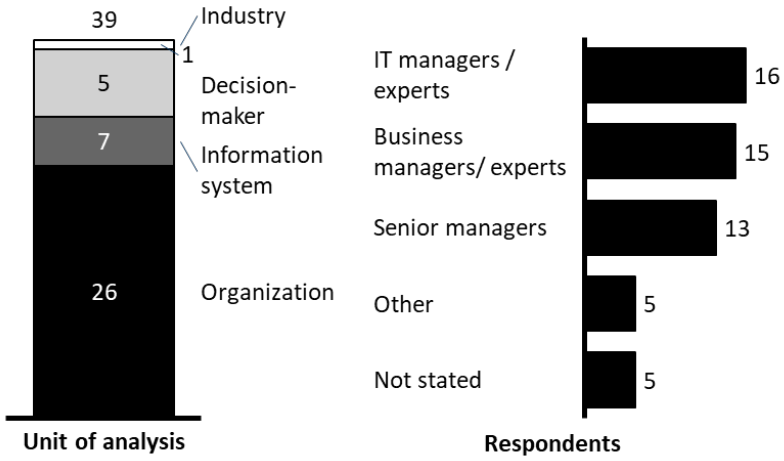

Figure 8. Comparison of the Unit of Analysis and Respondents in the Sample of 39 Papers (multiple items per paper possible)

We evaluate the unit of analysis in conjunction with the respondents from whom researchers obtained empirical evidence, as respondents are only able to answer what they know themselves, individually. Hence, the incongruence between the level of analysis and the respondents may question the validity of the obtained results. Figure 8 displays the respondents of the papers in our sample (numbers do not sum up to 39 because various papers asked various role profiles). Mainly, business and IT managers and experts responded to researchers. One can hypothesize that these role profiles usually decide on CC adoption on an IS level rather than for the organizational level. Specifically, acknowledging the high amount of small to medium-sized organizations researched in the sample. Hence, there is a mismatch between the predominant level of analysis (organizational) and the respondents consulted to research that level. Further research in the field should more carefully consider the relationship between the intended level of analysis and the respondents participating in the study.

6 Conclusions

The literature review evaluated 43 variables as determinant factors for CC adoption (RQ1). This set of determinant factors serves practitioners as guidance on what to consider when deciding upon CC adoption. It is particularly helpful for practitioners because it constitutes an aggregation and evaluation of 62 empirical papers that analyzed real-world decisions on CC adoption. This constitutes potential practical relevance by practice-oriented data collection (Moeini et al., 2019). Our extension mainly increases the understanding of asset, client, and environmental characteristics on CC adoption.

The conducted critical review of the papers in the sample (RQ2) revealed further avenues for research on CC adoption that bear the potential for key contributions: Firstly, IaaS, PaaS, and XaaS delivery models require more research. Secondly, research rarely regards hybrid, private, and multi-cloud deployments. Thirdly, individual, solution, and vendor characteristics need further investigation. Fourthly, researchers should consider the IS and the decision-maker as the unit of analysis. Moreover, we find a discrepancy between the unit of analysis and the respondents of empirical research on CC adoption, questioning the validity of the research conducted so far. Based on these findings and incorporating inconsistent determinants' results, we propose hypotheses for future research to test.

The major scope limitation of the paper at hand is that it regards CC adoption only in an enterprise context (i.e., Business to Business). Thus, we excluded research contributions on CC adoption by public institutions (i.e., Business to Government), academia, and private end-users (i.e., Business to Consumer). The issues of missing differentiation by delivery model, deployment type, and the incongruence between the unit of analysis are less relevant regarding private individual users: organizations are the only adopters of PaaS and IaaS (Zeqiri et al. 2017). Methodically, a limitation of the paper arises from the process of mapping variables. Variables that correspond to the same concept could be mapped differently (jangle fallacy), or variables that correspond to different concepts could be mapped to the same (jingle

fallacy) (Larsen & Bong, 2016). We reviewed and compared variable definitions across papers, reviewed items of surveys and quotes in qualitative studies, and applied four-eyes checks to mitigate this potential limitation.

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Appendix A: Details on Literature Retrieval

Table A1. Results of the Literature Search in Eight Databases and Forward Search

Database / Forward Search	Search Results	Thereof relevant
ACM Digital Library	1	0
AISeL	111	17
EBSCO Business Source Complete	2	0
EBSCO Academic Source Complete	1	0
EBSCO EconLit	140	6
Emerald insight	13	3
IEEE Xplore Digital Library	9	1
ProQuest	4	0
ScienceDirect	9	0
Forward Search	n/a	12
Total	**n/a**	**39**

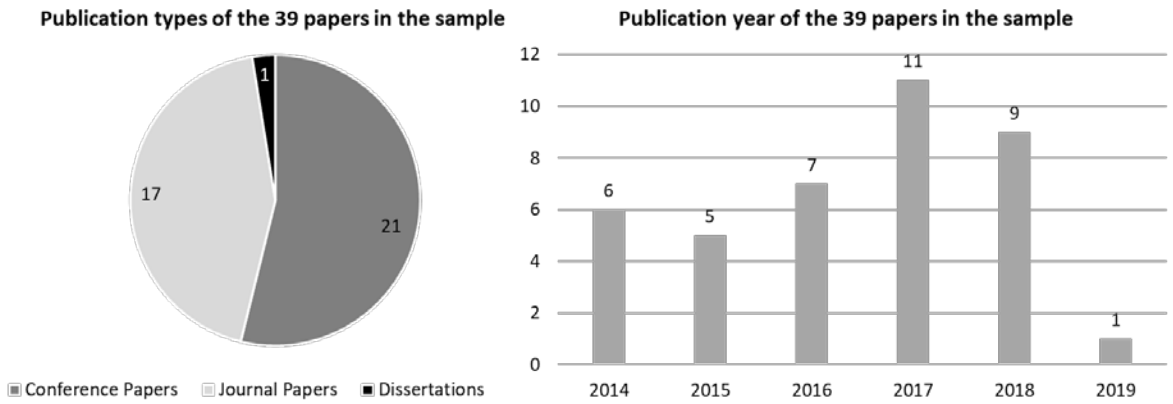

Figure A1. Papers in the Sample by Publication Type and Year

Appendix B: Master Variable Definitions

Table B1. Definition of Cloud Service Provider Characteristics

Master variable	Definition	Origin
Current investment in IT	"The vendor organization's current investments in IT (e.g., Berg & Stylianou (2009)".	Schneider & Sunyaev (2016, p. 31)
Financial stability	"The vendor's ability to stay financially viable" (Currie, Desai, & Khan, 2004).	Schneider & Sunyaev (2016, p. 31)
Service capability	"The vendor's ability to manage and deploy various tangible (e.g., physical IT infrastructure components, human IT resources) and intangible (e.g., knowledge assets, customer orientation) IT resources to provide the service (Bharadwaj, 2000). The capabilities are expressed by the vendor's expertise and knowledge about technology and processes, technical and managerial IT skills, and reputation as perceived by the client (e.g., Schwarz et al., 2009)".	Schneider & Sunyaev (2016, p. 31)
Support	"The degree to which the vendor provides support to the client while evaluating, testing, and selecting services (e.g., Seethamraju, 2013)".	Schneider & Sunyaev (2016, p. 31)
Technology provider influence	*"The influence of technology providers on adoption* (Maqueira-Marín, Bruque-Cámara, & Minguela-Rata, 2017).	*Authors' own definition*
Transferring risks to vendor	"The benefit of transferring risks associated with owning and maintaining IT to the vendor (e.g., Baldwin, Irani, & Love, 2001)".	Schneider & Sunyaev (2016, p. 31)
Trustworthiness	"The degree to which a client can place trust in a provider and remain confident that the trust shall not be betrayed (e.g., Berg & Stylianou, 2009)".	Schneider & Sunyaev (2016, p. 31)
Understanding company needs	"The vendor organization's capability to understand the needs of the client, for instance, because of the vendor organization's expertise in business processes similar to those implemented within the client organization (e.g., Berg & Stylianou, 2009)".	Schneider & Sunyaev (2016, p. 31)
Willingness for value co-creation	"The willingness of the vendor to closely work with the client and to create business value for both the client and the vendor (Seethamraju, 2013)".	Schneider & Sunyaev (2016, p. 31)
Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)		

Table B2. Definition of Solution Characteristics

Master variable	Definition	Origin
Abandonment options	"The opportunity of discontinuing an investment and redeploying remaining resources effectively (e.g., Saya, Pee, & Kankanhalli, 2010)".	Schneider & Sunyaev (2016, p. 29)
Deferral options	"The opportunity of delaying an investment to learn more about it before committing to the investment (e.g., Saya et al., 2010)".	Schneider & Sunyaev (2016, p. 29)
Framing	"The way that information is presented, for instance, in terms of potential losses instead of possible gains (Tversky & Kahneman, 1981)".	Schneider & Sunyaev (2016, p. 29)
Growth options	"The opportunity to pursue potential follow-on investments beyond what was initially anticipated (e.g., Saya et al., 2010)".	Schneider & Sunyaev (2016, p. 29)
Perceived contract clarity	"The understandability of the contract and service level agreements (Heart, 2007)".	Schneider & Sunyaev (2016, p. 29)
Perceived cost effectiveness	"The extent to which the benefit derived from the cloud service is worth the cost invested (e.g., Saya et al., 2010)".	Schneider & Sunyaev (2016, p. 29)

Table B3. Definition of Client Characteristics

Master variable	Definition	Origin
CC experience (pre-decision)	*The degree to which an innovation may be tried out before its adoption* (Karunagaran et al., 2016)*, or experience from pilot applications* (Holloway et al., 2017)*.*	*Authors' own definition*
Compatibility	"The degree to which an innovation fits with the potential adopter's existing values, previous practices, and current needs (Rogers, 1995)".	Schneider & Sunyaev (2016, p. 30)
Complexity of organizational structure	*The number of hierarchy levels with an organization* (Karunagaran et al., 2016)*, as well as its geographical distribution* (Güner & Sneiders, 2014)*.*	*Authors' own definition*
Employee behavior	*The way in which employees respond to specific circumstances or situations in the workplace* (Karunagaran et al., 2016)*.*	*Authors' own definition*
Industry	"Industry of the organization (e.g., Yao, Lee, & Lee, 2010)".	Schneider & Sunyaev (2016, p. 30)
Innovativeness (firm)	*The degree to which a firm is willing to experiment with technological innovations, the firm-wide enthusiasm in trying technologies* (Al-Isma'ili et al., 2016)*, and the technical IT capabilities to create a competitive advantage* (Priyadarshinee et al., 2017)*.*	*Authors' own definition*
Innovativeness (superiors)	*The degree to which a leader is willing to explore and adopt innovations earlier than other members of the same social context or industry* (Polyviou, Pramatari, & Nancy, 2016; Rogers, 1995)*.*	*Authors' own definition*
Internal alignment	*The absence of conflicts of interests between stakeholders emerging from different backgrounds and their various needs* (El-Gazzar et al., 2017)*.*	*Authors' own definition*
Internal IT capabilities	"The pool of resources, technical ability, expertise, knowledge, and skills available within the organization and their efficiency in developing, implementing, managing, and maintaining the organization's IT infrastructure and applications (Daylami et al., 2005; Nam, Rajagopalan, Rao, & Chaudhury, 1996)".	(Schneider & Sunyaev (2016, p. 30)
IT budget	"The budget allocated for IT relative to the organization's revenue (e.g., Li, Tan, Teo, & Tan, 2006)".	Schneider & Sunyaev (2016, p. 30)
IT department size	"Size of the IT department (e.g., Gonzalez, Gasco, & Llopis, 2005)".	Schneider & Sunyaev (2016, p. 30)
National characteristics	"Cultural characteristics of the client organization's nation (e.g., Dibbern, Chin, & Heinzl, 2012)".	Schneider & Sunyaev (2016, p. 30)
Need	*The corporate needs to change the IS.*	*Authors' own definition*
New management forms	"New management forms enabled by IT outsourcing (e.g., Dias Ferreira & Barbin Laurindo, 2009)".	Schneider & Sunyaev (2016, p. 30)
Organizational readiness	*Managers' perception and evaluation of the degree to which they believe that their organization has the awareness, resources, commitment, and governance to adopt CC* (Priyadarshinee et al., 2017; Tan, Shen, Xu, Zhou, & Li, 2008)*.*	*Authors' own definition*
Outsourcing expertise	"The level of management experience with outsourcing and the organization's capability to develop, manage, and maintain outsourcing relationships (Daylami et al., 2005; Gorla & Lau, 2010)".	Schneider & Sunyaev (2016, p. 30)
Scope	*The scope represents the area of operation of a firm* (Senyo, Effah, & Addae, 2016)*.*	*Authors' own definition*
Size	"The size of the client organization (e.g., Guenther & Tamm, 2002)".	Schneider & Sunyaev (2016, p. 30)
Strategic importance of IT	"The degree to which IT is an integral part of the organization's corporate strategy and business success (Teng, Cheon, & Grover, 1995)".	(Schneider & Sunyaev (2016, p. 30)

Strategic vulnerability	"The risk that a company will lose critical resources and capabilities when sourcing assets from an external vendor (Loebbecke & Huyskens, 2006)".	Schneider & Sunyaev (2016, p. 30)
Strategy	"An organization's competitive strategy according to Porter (2008)'s three generic competitive strategies, namely, overall cost leadership, differentiation, and focus (e.g., Berg & Stylianou, 2009), or according to the aggressiveness strategies proposed by (Miles & Snow, 1978), namely, prospector, defender, analyzer, and reactor (e.g., Teng et al., 1995)".	Schneider & Sunyaev (2016, p. 30)
Supporting mobile workers	"The client organization's desire to support mobile workers (Narasimhan & Nichols, 2011)".	Schneider & Sunyaev (2016, p. 30)
Top management support	"The degree to which an. innovation is supported by top management (e.g., Low, Chen, & Wu, 2011)".	Schneider & Sunyaev (2016, p. 30)
Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)		

Table B4. Definition of Individual Characteristics

Master variable	Definition	Origin
*Attitude towards CC/*Outsourcing	*Expression of a person in favor or disfavor toward an object or a concept in a situation* (Velázquez & Ho, 2015).	*Authors' own definition*
CC knowledge	*Tacit knowledge rooted in actions and experiences in a specific context* (Alavi & Leidner, 2001).	*Authors' own definition*
CIO skills	"The decision maker's perception of the skills of the organization's CIO (Blaskovich & Mintchik, 2010)".	Schneider & Sunyaev (2016, p. 30)
End-user satisfaction	*Cloud User Satisfaction referring to the participant's satisfaction in using the cloud* (DeLone & McLean, 1992; Donovan et al., 2018).	*Authors' own definition*
Innovativeness (personal)	*The degree to which a decision-maker is willing to explore and adopt innovations earlier than other members of the same social context or industry* (Polyviou et al., 2016; Rogers, 1995).	*Authors' own definition*
Perceived usefulness	*The prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context* (Davis, 1989; Loske et al., 2014).	*Authors' own definition*
Personality traits - Openness	"Openness describes a person who is imaginative, creative, original, curious, sensitive, unconventional, flexible, broad minded, and adventurous (Li et al., 2006)".	Schneider & Sunyaev (2016, p. 30)
Prior outsourcing experience	"The decision maker's past experiences with sourcing decisions for a specific asset (Vetter, Benlian, & Hess, 2011)".	Schneider & Sunyaev (2016, p. 31)
Satisfaction with current IS	*Satisfaction with the system actually used* (Mezghani, 2014).	*Authors' own definition*
Source credibility	*Source credibility measures perception attributes such as trustworthiness, expertness, and attractiveness* (Lin & Lin, 2019; Patzer, 1983).	*Authors' own definition*
Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)		

Table B5. Definition of Asset Characteristics

Master variable	Definition	Origin
Cost - cost savings	"Total cost advantage of sourcing IT resources from an external vendor compared with the costs for alternative provisioning (e.g., in-house). Total costs comprise transaction costs and production costs".	Schneider & Sunyaev (2016, p. 28)
Cost - production cost savings	"Hardware costs, software costs, and costs related to human resources (Morabito, 2003; Schwarz, Jayatilaka, Hirschheim, & Goles, 2009; Serva, Sherer, & Sipior, 2003)".	Schneider & Sunyaev (2016, p. 28)

Cost - transaction cost savings	"Costs of searching, creating, negotiating, maintaining, monitoring, modifying, and enforcing a service contract between clients and vendors (Dibbern et al., 2012; Randeree, Kishore, & Rao, 2005; Schwarz et al., 2009)".	Schneider & Sunyaev (2016, p. 28)
Cost uncertainty	"The risks associated with unpredictable costs due to the pay-per-use pricing model and limited customization possibilities of cloud services because they are not owned by the client (Benlian & Hess, 2011)".	Schneider & Sunyaev (2016, p. 28)
Information intensity	"Amount of information required to successfully perform the outsourced activity (Asatiani, Apte, Penttinen, Ronkko, & Saarinen, 2014)".	Schneider & Sunyaev (2016, p. 28)
Measurement problems	"The difficulties encountered in the evaluation of the element of exchange (Alaghehband, Rivard, Wu, & Goyette, 2011) in terms of performance measurement complexity (e.g., Loebbecke & Huyskens, 2006) or measurement difficulties (e.g., Asatiani et al., 2014)".	Schneider & Sunyaev (2016, p. 28)
Need of customer contact	"Need for contact between a customer and a third party for the successful accomplishment of a task (Asatiani et al., 2014)".	Schneider & Sunyaev (2016, p. 29)
Specificity - human	"The business-specific knowledge required to provide the asset that arises from learning by doing (Williamson, 1991)".	Schneider & Sunyaev (2016, p. 29)
Specificity – site	"The degree of location dependence of an asset, for instance, when technical infrastructure requirements (e.g., specific servers) are only available within an organization's boundaries (Loebbecke & Huyskens, 2006); when data storage and processing within the asset is sensitive to potential threats such as loss of access, indiscretion, or disclosure (e.g., Badger, Grance, Patt-Corner, & Voas, 2012; Loebbecke & Huyskens, 2006; Schwarz et al., 2009); or when legal restrictions on the data center location apply (Marston et al., 2011)".	(Schneider & Sunyaev (2016, p. 29)
Specificity – technical	"The degree to which an asset can be redeployed to alternative uses and by alternative users without sacrifice of productive value (Williamson, 1991)".	Schneider & Sunyaev (2016, p. 29)
Standardization	"The extent to which rules, procedures, and standards exist to guide the conduct of an activity and to evaluate performance (Aubert, Houde, Patry, & Rivard, 2012)".	Schneider & Sunyaev (2016, p. 29)
Strategic importance	"The degree of strategic value that companies attach to an asset (Benlian, Hess, & Buxmann, 2009). Assets of high strategic importance create and exploit unique sources of value (Loebbecke & Huyskens, 2006) and enable organizations to sustain a competitive advantage (Watjatrakul, 2005)".	Schneider & Sunyaev (2016, p. 29)
Switching costs	"The costs associated with switching providers (e.g., Verwaal, Commandeur, & Verbeke, 2008)".	Schneider & Sunyaev (2016, p. 28)
Technical complexity	"The extent of complexity and interdependence within the hardware and software technology that is required to provide the asset (Kishore, Agrawal, & Rao, 2005; Nam et al., 1996)".	Schneider & Sunyaev (2016, p. 29)
Transaction frequency	"The frequency of how often a transaction occurs, either occasionally or recurrently (Williamson, 1975), that is, the number of recurring acquisitions of the same asset. Each acquisition involves vendor search, screening, and negotiating activities. Even one-time acquisitions of software packages may require recurring activities, such as upgrades and maintenance (Loebbecke & Huyskens, 2006)".	Schneider & Sunyaev (2016, p. 29)
Usage frequency	"The extent of how often an asset is utilized (e.g., Benlian, 2009; Schwarz et al., 2009)".	Schneider & Sunyaev (2016, p. 29)

Table B6. Definition of Technology Characteristics

Master variable	Definition	Origin
Benefits - access to specialized resources	"Client's benefit from economies of skill by leveraging the skills, resources, and capabilities that the vendor offers (e.g., access to the latest technologies and IT-related know-how). These specialized capabilities could not be generated internally (Benlian & Hess, 2011)".	Schneider & Sunyaev (2016, p. 29)
Benefits - availability	"The benefit of the provider being able to provide better availability than the client itself (e.g., Gupta, Seetharaman, & Raj, 2013)".	Schneider & Sunyaev (2016, p. 29)
Benefits - business continuity	*The reliability* (Güner & Sneiders, 2014) *or perceived reliability* (Al-Sharafi et al., 2017) *of an IS.*	*Authors' own definition*
Benefits - business performance improvement	"A client organization's desire to increase overall business performance (i.e., effectiveness and efficiency through deployment) (Brcar & Bukovec, 2013)".	Schneider & Sunyaev (2016, p. 29)
Benefits - flexibility	"The benefits of increased flexibility due to the scalable, on-demand, and pay-per-use provisioning of IT resources and the trialability of services (Saya et al., 2010; Benlian & Hess, 2011)".	Schneider & Sunyaev (2016, p. 29)
Benefits - focus on core competencies	"The organization's ability to focus on core businesses activities (e.g., Benlian & Hess, 2011)".	Schneider & Sunyaev (2016, p. 29)
Benefits – perceived benefits	"The non-monetary benefits associated with cloud sourcing that are not further specified or that are only defined in a generic manner (e.g., Lian, Yen, & Wang, 2014)".	Schneider & Sunyaev (2016, p. 30)
Benefits - quality improvements	"The motivation of the client organization to improve the quality and productivity of IT services by outsourcing to a third-party vendor. Clients expect providers to incorporate industry best practices and total quality management procedures, such as lean management concepts (Benlian & Hess, 2011), and to aim for various quality improvements, such as a faster response time to end-users or higher quality user interfaces and features (e.g., Akhilesh, 2000)".	Schneider & Sunyaev (2016, p. 29)
Benefits - reduced time to market	"The organization's ability to deliver its products or services faster to the market when sourcing services externally (e.g., Seethamraju, 2013)".	Schneider & Sunyaev (2016, p. 30)
Benefits - security	"The benefit of the provider being able to provide better security than the client itself (e.g., Gupta et al., 2013)".	Schneider & Sunyaev (2016, p. 30)
Benefits - transferring CAPEX to OPEX	"The ability to optimize the use of IT resources by transferring fixed costs to variable cost (e.g., Baldwin et al., 2001)".	Schneider & Sunyaev (2016, p. 30)
Data destruction	"The need for compliant and complete data destruction when switching providers (e.g., Brender & Markov, 2013)."	Schneider & Sunyaev (2016, p. 30)
Deployment type	*The mode of deployment: private, hybrid, or public cloud* (Holloway et al., 2017).	*Authors' own definition*
Observability	"The degree to which the impact of an innovation is observable to and can be communicated to others (Rogers, 1995)".	Schneider & Sunyaev (2016, p. 30)
Perceived complexity	"The degree to which an innovation is perceived to be difficult to understand and use (Rogers, 1995)".	Schneider & Sunyaev (2016, p. 30)
Risks - availability	"The risk that cloud services may not be available to the expected level of service (e.g., Benlian & Hess, 2011)".	Schneider & Sunyaev (2016, p. 30)
Risks - business continuity	"The risk of losing business continuity if the vendor fails to deliver the required service (e.g., Currie, Desai, & Khan, 2004)".	Schneider & Sunyaev (2016, p. 30)
Risks – data privacy	*The extent to which an individual is concerned about organizational practices related to the collection and use of his or her personal information* (Donovan et al., 2018; Smith et al., 1996).	*Authors' own definition*
Risks - loss of control	"The risk of losing control or increasingly depending on the provider (Gorla & Lau, 2010)".	Schneider & Sunyaev (2016, p. 30)

Risks – perceived risks	"The non-monetary risks associated with cloud sourcing that are not further specified or that are only defined in a generic manner (e.g., Daylami et al., 2005)".	Schneider & Sunyaev (2016, p. 30)
Risks – perceived security and privacy	*The perception of stakeholders regarding data security risks as a result of external influences (e.g., media)* (El-Gazzar et al., 2017).	*Authors' own definition*
Risks - security	"Security risks associated with remote data hosting, virtualized and shared resources, and data transfer over the Internet (Subashini & Kavitha, 2011)".	Schneider & Sunyaev (2016, p. 30)
Traceability and auditability	"The ability to trace the history, location, or application of an item through recorded documentation (e.g., Morgan & Conboy, 2013)".	Schneider & Sunyaev (2016, p. 30)
Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)		

Table B7. Definition of Environmental Characteristics

Master variable	Definition	Origin
Availability of skilled IT personal	"The degree of availability of skilled IT personal on the market (e.g., Kern, Kreijger, & Willcocks, 2002)".	Schneider & Sunyaev (2016, p. 31)
Availability of skilled external personal	*The availability of external expertise* (Alharbi et al., 2017) *and the support of external consultants* (Ming et al., 2018; Tehrani, 2014).	*Authors' own definition*
CC knowledge sharing	*The spreading of knowledge and experiences and success stories of early-adopters (Rogers, 1995) and success cases* (Maqueira-Marín et al., 2017).	*Authors' own definition*
Competitive pressure	"The level of pressure felt by the organization from competitors within the industry (Low et al., 2011)".	Schneider & Sunyaev (2016, p. 31)
Environmental uncertainty	"Unforeseen changes in the environment related to, for instance, technology (e.g., Ang & Cummings, 1997), demand (e.g., Aubert et al., 2012), requirements (Apte et al., 1997), contracts (Asatiani et al., 2014), and the like (Williamson, 1985)".	Schneider & Sunyaev (2016, p. 31)
Environmental uncertainty – behavioral	"The risk that the provider acts opportunistically (Williamson, 1985)".	Schneider & Sunyaev (2016, p. 31)
Enviromental uncertainty – demand	"Uncertainty arising when parties do not know ex ante the exact volume of product that will be required or ignore the form that the service will take (Alaghehband et al., 2011)".	Schneider & Sunyaev (2016, p. 31)
Enviromental uncertainty – product	"Uncertainty concerning requirements specifications, delivery dates, costs, and information asymmetry problems that relate to the client's difficulty in evaluating the cloud service and predicting how it will perform in the future (Dimoka, Hong, & Pavlou, 2012)".	Schneider & Sunyaev (2016, p. 31)
Environmental uncertainty – technology	"Rapid and unpredictable changes in technological developments (Alaghehband et al., 2011)".	Schneider & Sunyaev (2016, p. 31)
Institution-based trust	"The degree to which the organization believes that effective third-party guarantees are in place to assure the fulfillment of the client's expectations (Pavlou et al., 2006)".	Schneider & Sunyaev (2016, p. 31)
Institutional influences	"Pressures for organizations to adjust their behaviors to conform to shared notions that may manifest as coercive, mimetic, and normative pressures (DiMaggio & Powell, 1983)".	Schneider & Sunyaev (2016, p. 31)
Institutional influences –coercive	"Both formal and informal pressures exerted on organizations by other organizations upon which they are dependent (e.g., laws, regulations, sanctions) (DiMaggio & Powell, 1983)".	Schneider & Sunyaev (2016, p. 31)
Institutional influences – mimetic	"Organizational responses to uncertainty by mimicking the behavior of others (e.g., competitors, experts, market leaders) (DiMaggio & Powell, 1983)".	Schneider & Sunyaev (2016, p. 31)

Institutional influences – normative	"Externally set norms, primarily stemming from professionalization (e.g., best practices, company internal IT principles, certification and accreditation, or compliance requirements) (DiMaggio & Powell, 1983)."	Schneider & Sunyaev (2016, p. 31)
IT-fashion	*The technology is characterized as fashionable in IT* (Polyviou et al., 2015)*, perceived as advantageous for the image* (Friedrich-Baasner et al., 2018)*, or following a general business trend* (Holloway et al., 2017).	*Authors' own definition*
Killer applications	*A service or application able to create value and that is quickly recognized and used by an increasing number of users* (Maqueira-Marín et al., 2017; Xu & Gutiérrez, 2006).	*Authors' own definition*
Market maturity	"The maturity of environmental conditions, such as technological maturity (e.g., Kishore et al., 2005) and legal maturity (i.e., the IT-related legal system is well developed and enforced (Qu & Pinsonneauli, 2011)), as well as the number, diversity, and reputation of viable vendors (e.g., Heart, 2010)".	Schneider & Sunyaev (2016, p. 31)
R&D institutions influence	*The influence of R&D institutions on adoption* (Maqueira-Marín et al., 2017).	*Authors' own definition*
Sharing and collaboration	"The desire to improve collaboration and promote openness both inside and outside the organization (Morgan & Conboy, 2013)".	Schneider & Sunyaev (2016, p. 31)
Social trust	"The extent to which people trust in others in general (Qu & Pinsonneauli, 2011)".	Schneider & Sunyaev (2016, p. 31)
Trading partner requirements	"The requirements of trading partners (e.g., Seethamraju, 2013)".	Schneider & Sunyaev (2016, p. 31)
Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)		

Appendix C: Master Variable Results

Table C1. Results for Vendor Characteristics

Master variable	Own sample					Combined sample: Own and Schneider & Sunyaev (2016)				
	+	-	0	M	#	+	-	0	M	#
Current investment in IT	0	0	0	0	0	2	0	0	0	2
Financial stability	0	0	0	0	0	2	0	0	0	2
Service capability	1	0	0	0	1	9	0	2	0	11
Support	4	0	2	0	6	7	0	2	0	9
Technology provider influence	*1*	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*1*
Transferring risk to vendor	1	0	0	0	1	1	0	0	0	1
Trustworthiness	9	0	0	0	9	10	0	1	0	11
Understanding company needs	0	0	0	0	0	1	0	0	0	1
Willingness for value co-creation	0	0	0	0	0	1	1	0	0	2
Vendor firm characteristics (total)	**16**	**0**	**2**	**0**	**18**	**34**	**1**	**5**	**0**	**40**
Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)										

Table C2. Results for Solution Characteristics

Master variable	Own sample					Combined sample: Own and Schneider & Sunyaev (2016)				
	+	-	0	M	#	+	-	0	M	#
Abandonment options	0	0	0	0	0	1	0	0	0	1
Deferral option	0	0	0	0	0	0	0	1	0	1
Framing	0	0	1	0	1	0	0	1	0	1
Growth options	0	0	0	0	0	1	0	0	0	1
Perceived contract clarity	2	0	0	0	2	3	0	0	0	3
Perceived cost effectiveness	0	0	0	0	0	0	0	1	0	1
Solution characteristics (total)	**2**	**0**	**1**	**0**	**3**	**5**	**0**	**3**	**0**	**8**

Table C3. Results for Client Characteristics

Master variable	Own sample					Combined sample: Own and Schneider & Sunyaev (2016)				
	+	-	0	M	#	+	-	0	M	#
CC experience (pre-decision)	*7*	*0*	*0*	*0*	*7*	*7*	*0*	*0*	*0*	*7*
Compatibility	10	0	4	0	14	11	0	7	0	18

Complexity of organizational structure	*1.5**	*2.5**	*0*	*0*	*4*	*1.5**	*2.5**	*0*	*0*	*4*
Employee behavior	*0.5**	*0.5**	*0*	*0*	*1*	*0.5**	*0.5**	*0*	*0*	*1*
Industry	0	0	0	2	2	0	0	2	5	7
Innovativeness (firm)	*3*	*0*	*2*	*0*	*5*	*3*	*0*	*2*	*0*	*5*
Innovativeness (superiors)	*0*	*0*	*1*	*0*	*1*	*0*	*0*	*1*	*0*	*1*
Internal alignment	*1*	*0*	*1*	*0*	*2*	*1*	*0*	*1*	*0*	*2*
Internal IT capabilities	13	0	4	0	17	19	4	8	0	31
IT budget	1.5*	0	0.5*	0	2	2.5*	0	1.5*	0	4
IT department size	0	0	0	0	0	1	0	1	0	2
National characteristics	0	0	0	0	0	0	0	0	1	1
Need	*1*	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*1*
New management forms	1	0	0	0	1	1	0	0	0	1
Organizational readiness	*1*	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*1*
Outsourcing experience	0	0	0	0	0	0	0	2	0	2
Scope	0	0	1	0	1	0	0	1	0	1
Size	2	2	8	2	14	4	5	14	5	28
Strategic importance of IT	2	0	0	0	2	2	0	1	0	3
Strategic vulnerability	0	0	0	0	0	0	1	0	0	1
Strategy	1	0	0	1	2	2	0	0	2	4
Supporting mobile workers	4	0	0	0	4	5	0	0	0	5
Top management support	10	0	3	0	13	14	0	3	0	17
Client firm characteristics (total)	**59.5**	**5**	**24.5**	**5**	**94**	**76.5**	**13**	**44.5**	**13**	**147**

Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)
Master variables with inconsistent findings are underlined
* 0.5 signifies that the direction of the variable's influence differed among subsamples

Table C4. Results for Individual Characteristics

Master variable	**Own sample**					**Combined sample: Own and Schneider & Sunyaev (2016)**				
	+	**-**	**0**	**M**	**#**	**+**	**-**	**0**	**M**	**#**
Attitude towards CC	*4*	*0*	*0*	*0*	*4*	*4*	*0*	*0*	*0*	*4*
Attitude towards outsourcing	0	0	0	0	0	4	0	0	0	4
CC knowledge	*1*	*0*	*1*	*0*	*2*	*1*	*0*	*1*	*0*	*2*
End-user satisfaction	*3*	*0*	*0*	*0*	*3*	*3*	*0*	*0*	*0*	*3*
CIO skills	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*1*

Innovativeness (personal)	*2*	*0*	*1*	*0*	*3*	*2*	*0*	*1*	*0*	*3*
Perceived usefulness	*4*	*0*	*1*	*0*	*5*	*4*	*0*	*1*	*0*	*5*
Personality traits - openness	1	0	0	0	1	1	0	1	0	2
Prior outsourcing experience	1	0	1	0	2	1	0	1	0	2
Satisfaction with current IS	*2*	*1*	*0*	*0*	*3*	*2*	*1*	*0*	*0*	*3*
Source credibility	*1*	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*1*
Individual characteristics (total)	**19**	**1**	**4**	**0**	**24**	**24**	**1**	**5**	**0**	**30**
Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)										

Table C5. Results for Asset Characteristics

Master variable	**Own sample**					**Combined sample: Own and Schneider & Sunyaev (2016)**				
	+	**-**	**0**	**M**	**#**	**+**	**-**	**0**	**M**	**#**
Cost savings (total)	13	2	4	0	18	31	6	9	1	47
Cost - cost savings	11	1	4	0	16	21	1	5	0	27
Cost - production cost savings	2	0	0	0	2	10	0	3	0	13
Cost - transaction cost savings	0	0	0	0	0	3	0	1	0	4
Cost uncertainty	0	1	0	0	1	0	4	0	1	5
Information intensity	0	0	0	0	0	1	0	0	0	1
Measurement problems	0	1	0	0	1	0	3	1	0	4
Need of customer contact	0	0	0	0	0	0	1	0	0	1
Specificity (total)	2	4	0	0	6	4	17	5	0	26
Specificity - human	0	0	0	0	0	0	0	2	0	2
Specificity - site	2	0	0	0	2	2	7	1	0	10
Specificity - technical	0	4	0	0	4	2	10	2	0	14
Standardization	3	0	0	0	3	3	0	0	0	3
Strategic importance	0	1	0	0	1	0	7	2	0	9
Switching costs	0	3	1	0	4	0	4	2	0	6
Technical complexity	2	3	0	0	5	3	3	0	0	6
Transaction frequency	0	0	0	0	0	0	0	1	0	1
Usage frequency	0	0	0	0	0	0	1	2	0	3
Asset characteristics (total)	**20**	**14**	**5**	**0**	**39**	**45**	**41**	**22**	**1**	**109**
Master variables with inconsistent findings are underlined										

Table C6. Results for Technology Characteristics

Master variable	Own sample					Combined sample: Own and Schneider & Sunyaev (2016)				
	+	-	0	M	#	+	-	0	M	#
Benefits (total)	37.5*	2.5*	5	0	45	68.5*	2.5*	11	0	82
Benefits - access to specialized resources	1	0	0	0	1	7	0	0	0	7
Benefits - availability	1.5*	0.5*	0	0	2	2.5*	0.5*	2	0	5
Benefits - business continuity	1	1	0	0	2	1	1	0	0	2
Benefits - business performance improvement	3	0	1	0	4	3	0	1	0	4
Benefits – flexibility	7	0	1	0	8	15	0	2	0	17
Benefits - focus on core competencies	3	0	0	0	3	7	0	0	0	7
Benefits - perceived benefits	16	1	2	0	19	20	1	4	0	25
Benefits - quality improvements	1	0	1	0	2	1	0	1	0	2
Benefits - reduced time to market	2	0	0	0	2	7	0	0	0	7
Benefits – security	0	0	0	0	0	1	0	1	0	2
Benefits - transferring CAPEX to OPEX	2	0	0	0	2	4	0	0	0	4
Data destruction	0	0	0	0	0	0	1	0	0	1
Deployment type	1	0	0	1	2	1	0	0	1	2
Observability	1	0	1	0	2	2	0	1	0	3
Perceived complexity	0	4	3	0	7	0	8	5	0	13
Risks (total)	1	39	7	0	47	2	60	13	0	75
Risks – availability	0	0	1	0	1	0	3	3	0	6
Risks - business continuity	0	0	1	0	1	0	1	1	0	2
Risks - data privacy	0	3	1	0	4	0	3	1	0	4
Risks - loss of control	0	6	0	0	6	0	10	0	0	10
Risks - perceived risks	0	10	0	0	10	0	12	1	0	13
Risks - perceived security and privacy	0	5	1	0	6	0	5	1	0	6
Risks – security	0	13	3	0	16	0	24	6	0	30
Traceability and auditability	1	2	0	0	3	2	2	0	0	4
Technology characteristics (total)	**40.5**	**45.5**	**16**	**1**	**103**	**73.5**	**71.5**	**30**	**1**	**176**

Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)
Master variables with inconsistent findings are underlined
* 0.5 signifies that the direction of the variable's influence differed among subsamples

Table C7. Results for Environmental Characteristics

Master variable	Own sample					Combined sample: Own and Schneider & Sunyaev (2016)				
	+	-	0	M	#	+	-	0	M	#
Availability of skilled external personal	*2*	*0*	*1*	*0*	*3*	*2*	*0*	*1*	*0*	*3*
Availability of skilled IT personal	0	0	0	0	0	1	0	1	0	2
CC knowledge sharing	*2*	*0*	*0*	*0*	*2*	*2*	*0*	*0*	*0*	*2*
Competitive pressure	8	0	3	0	11	10	0	6	0	16
Environmental uncertainty (total)	0	1	0	0	1	3	6	3	0	12
Environmental uncertainty (general)	0	1	0	0	1	0	4	1	0	5
Environmental uncertainty – behavioral	0	0	0	0	0	0	0	2	0	2
Environmental uncertainty – demand	0	0	0	0	0	1	1	0	0	2
Environmental uncertainty (product)	0	0	0	0	0	1	1	0	0	2
Environmental uncertainty – technology	0	0	0	0	0	1	0	0	0	1
Institution-based trust	0	0	0	0	0	0	0	2	0	2
Institutional influences (total)	7	2	4	1	14	9	3	12	1	25
Institutional influences	1	0	0	0	1	1	0	1	0	2
Institutional influences - coercive	4	2	4	1	11	4	3	7	1	15
Institutional influences - mimetic	0	0	0	0	0	1	0	3	0	4
Institutional influences - normative	2	0	0	0	2	3	0	1	0	4
IT-fashion	*3*	*0*	*0*	*0*	*3*	*3*	*0*	*0*	*0*	*3*
Killer applications	*1*	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*1*
Market maturity	4	1	3	0	8	11	1	5	0	17
R&D institution influence	0	0	1	0	1	0	0	1	0	1
Sharing and collaboration	0	0	1	0	1	1	0	2	0	3
Social trust	1	0	0	0	1	1	0	0	0	1
Trading partner requirements	3	1	0	0	4	3	1	1	0	5
Environmental characteristics (total)	**31**	**5**	**13**	**1**	**50**	**49**	**11**	**32**	**1**	**93**

Master variables written in italics have been added to the set of master variables used in Schneider & Sunyaev (2016)
Master variables with inconsistent findings are underlined

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