

Chapter 2

A Research Framework for Theorizing

What does it take to have something to say? It takes two things. The first is a puzzle, something about the social world that is odd, unusual, unexpected, or novel. The second is a clever idea that responds to or interprets or solves that puzzle. Everything else—the methods, the literature, the description of data—is really just window dressing. The heart of good work is a puzzle and an idea

Andrew Abbot (2004) in his book “Methods of Discovery: Heuristics for the Social Sciences”

Abstract Every IS researcher applies implicitly (by experience) methods of discovery—so-called heuristics—to advance theorizing about the adoption, the utilization and the success of emerging IT innovations. Heuristics represent experience-based theory-building practices of IS researchers that aim for creating new insights on phenomena. Taking positivist cloud innovation research as an empirical sample, this chapter inductively explores previous cloud research with respect to the heuristics applied and subsequently evaluates—based on positivists’ epistemological assumptions—the potential of these heuristics for advancing theorizing and producing scientific progress. The developed research framework can be used as a tool by researchers for better carving out the behavioral changes induced by emerging IT innovations, for critically assessing own research projects, and for developing new perspectives on IT innovation phenomena.

2.1 Introduction

IS research and practice is characterized by temporary waves of interest in new and emerging IT innovations (Baskerville and Myers 2009). These trends are driven by the expectations that these new IT concepts will offer new opportunities for businesses and will sustainably change the management of IS (Fichman 2004). Through empirical studies, IS research aims to examine, e.g., if these new trends will become accepted in practice and which behavioral changes are induced by the IT innovation

(Benbasat and Zmud 2003). In this way, IS research aims to contribute more “objectivity” to the often IT provider-driven hype surrounding new IT concepts and buzzwords. To say it in Andrew Abbot’s words: IT innovation research has not a lack of new “puzzles” (e.g., “Why do companies use cloud services?”) with respect to emerging IT innovations, rather its challenge is to contribute and advance the theorizing about IT innovation phenomena (Abbot 2004; Hevner et al. 2004) with the help of “clever ideas” (or “Blue Ocean” ideas, see Straub 2009). While IS research provides good standards for evaluating theoretical contributions (Bacharach 1989; Gregor 2006; Whetten 1989), there is only little guidance on the process how to get there. Overall, research on emerging IT innovations such as cloud computing lacks a framework for better carving out the behavioral changes induced by emerging IT innovations and for developing new perspectives on these phenomena.

Like almost no other discipline, IS researchers have strong experiences with investigating the changes induced by technological advances in practice due to the short innovation cycles of the IT industry (Baskerville and Myers 2009). E.g., the rapid proliferation of cloud services is certainly one of the most exciting developments in IS practice in recent years (Armbrust et al. 2010; Venters and Whitley 2012). In the following, cloud services are defined as a virtualization-based style of computing where IT resources are offered in a highly-scalable way as a cloud service over the internet (Sect. 2.2.1 for a more detailed classification) (Huntgeburth et al. 2012). On the one hand, IT executives associate cloud services with technological benefits (Forrest 2009), such as the elimination of upfront investment, low administrative costs, and a more flexible and scalable IT infrastructure (Armbrust et al. 2010; Bain & Company 2012; Forrest 2009). On the other hand, cloud services are seen as a strategic tool for companies to focus more closely on core business competencies, to increase the productivity of business processes, as well as to provide simpler IT solutions for employees (Malladi and Krishnan 2012a).

Compared to previous rather descriptive literature reviews on cloud computing (Ermakova et al. 2013; Ernst and Rothlauf 2012; Huntgeburth et al. 2012; Venters and Whitley 2012), this chapter aims to reflect on previous empirical research on cloud services with respect to the techniques—so called heuristics—used for advancing the understanding of the changes induced by cloud computing. Formally defined, heuristics represent experience-based techniques of IS researchers that aim for creating insights on new phenomena. Every IT innovation researcher uses implicitly (by experience) certain techniques to theorize about emerging IT innovations. Based on the example of cloud innovation research, the literature study attempts to recognize common patterns in recent IS research practices. Finally, the literature study aims to evaluate these patterns with respect to their potential to advance theorizing about emerging IT innovations and to create scientific progress. Due to its partly subjective process, the outcome of the literature review does not aim for providing statistics on how often a heuristic was used. Also the examined articles are not divided into good and bad ones. Rather, this chapter presents a number of heuristics and a research framework which evaluates the heuristics based on epistemological considerations. The resulting framework can be used as a tool

by future IT innovation researchers (1) *for better carving out the behavioral changes induced by emerging IT innovations*, (2) *for critically assessing own research projects*, and (3) *for developing new perspectives on IT innovation phenomena*.

The remainder of this chapter is organized as follows. In the next section the characteristics of cloud services are presented. After that, the foundations of heuristics and the epistemological stance are introduced. The first part of the third section introduces the literature analysis method. In the second part of section three, the research framework for theorizing about emerging IT innovations is presented and discussed. The last section sums up and formulates closing remarks.

2.2 Theoretical Foundation

2.2.1 Characteristics of Cloud Services

The idea of cloud services has its origins back in the 1960s, as the vision of “utility computing” was a key driver of the development of the internet (Huntgeburth et al. 2012; Venters and Whitley 2012). A number of technological advances, such as the wide availability of broadband internet, increased processing power of computers, and the increasing standardization of hardware and software, have resulted in the fact that with cloud services the era of IT industrialization has begun (Carr 2003). The first ASP services already existed in the 1990s but did not reach a breakthrough at that time because of immature software and inadequate internet bandwidth on the customers’ side (Susarla et al. 2003).

Similar to the first ASP services also cloud services offer IT resources as a service over the internet. Nevertheless, the technological foundations of cloud services are different. In contrast to simple application services, cloud services are massively scalable because they are usually provided on the basis of a collection of connected and virtualized data centers (Huntgeburth et al. 2012). Furthermore, the services are provided in different granularities. Infrastructure-services (“*infrastructure-as-a-service*”) provide highly standardized and virtualized computing, storage and network resources, which form the basis for other cloud services (Armbrust et al. 2010). Additionally to infrastructure, cloud platforms (“*platform-as-a-service*”) make a development environment from the cloud available to users where they can develop application services (“*software-as-a-service*”). Compared to application services of the 1990s, cloud application services are highly standardized, as they are implemented on the basis of the principle of multi-tenancy. In this way, a single instance of a software application can run multiple clients, which brings enormous benefits from the provider perspective for the supply. Since cloud services have similar characteristics as legacy IT service provisioning models (such as ASP), cloud research needs to focus on the unique characteristics of cloud services in order to advance theorizing about cloud phenomena (Armbrust et al. 2010).

2.2.2 *Heuristics*

In mathematics, a heuristic is an *experience-based technique for problem-solving* (Abbot 2004). The most famous work on heuristics was written by the mathematician George Pólya (1945). In his book “How to solve it” he describes four phases of mathematical problem solving: Understanding of the task, devising a plan, executing the plan, retrospection. A large part of the book includes a list of heuristics that introduces procedures to progress from a math problem to a solution.

Such structured approach is very difficult to implement in IS research. An IT innovation research project consists in particular in filtering the aspects which are actually new and interesting about a phenomenon and which have not been investigated in another, related context. Thus, the heuristics of IS research differ from those of mathematics. The challenge of IS research is mainly to explain the changes induced by the emerging IT innovation and to show empirically how previous research lacks explanatory power for explaining these changes. IS researchers apply less concrete problem-solving strategies than in mathematics, but rather use heuristics as a tool (1) *for better carving out original aspects of a phenomenon*, (2) *for critically assessing own research*, and (3) *for developing new ideas and perspectives on a phenomenon* (Abbot 2004). Heuristics therefore have different functions in different phases of a research paper. On the one hand, heuristics, which are based on experience, can be learned and thereby can increase the likelihood that research can produce scientific progress (Straub 2009). On the other hand, heuristics can help to distinguish major and minor theoretical contributions with a certain degree of systemization.

The positivist part of IS research (Chen and Hirschheim 2004; Orlikowski and Baroudi 1991), which will be the focus of the subsequent literature analysis, illustrates the following perspective on scientific progress due to the empirical principle of falsification (“hypothetical-deductive method”) (Chalmers 1999). (1) On the one hand scientific theories have to be refutable by an empirical evaluation [demarcation criteria according to Popper (1963)]. (2) Moreover, scientific progress consists primarily in the confirmation of bold conjectures and the rejection of central theories and assumptions of the research paradigm (Kuhn 1962). Publications which confirm bold conjectures signify progress, simply because they mark the discovery of something new, which was not known before or was considered unlikely (Chalmers 1999). The rejection of central theories and assumptions in a study marks a progress, because it determines something as false that was seen as unproblematic. E.g., using a meta-analysis Sharma et al. (2009) show that in empirical studies about IS user behavior the path coefficient between perceived usefulness and use is dependent upon the way how use is empirically measured. The result of that study implies that the outcome of many studies was probably more influenced by the choice of the measuring instrument for use than previously thought (“common method bias”). This is a very important finding for future IS research. The falsification of bold conjectures, as well as the direct application of research models in the “new” context do not provide a significant contribution to

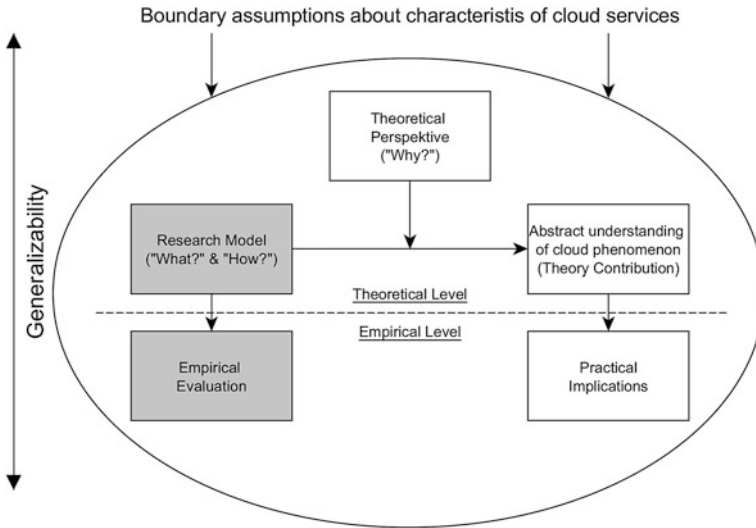


Fig. 2.1 From observations to theory contribution (Bacharach 1989)

research from a falsificationist perspective (for an introduction to falsificationism see: Chalmers (1999)).

The boundary assumptions about the unit of analysis distinguish cloud innovation research from other reference literature streams, such as IT innovation or IT outsourcing research (Bacharach 1989). Cloud services have specific characteristics, which distinguish them from other IT innovations, as explained in detail in Sect. 2.2.1. The motivation to produce new research about cloud services is in particular the expectation that cloud services will sustainably change the management of IS and that previous explanation approaches only insufficiently explain these changes (Huntgeburth et al. 2012). In order to develop an abstract understanding of a cloud phenomenon, positivists develop hypotheses derived from a chosen theoretical perspective to explain a given cloud phenomenon (Fig. 2.1).

The proposed research model is then evaluated on the basis of a suitable empirical method (e.g., survey, experiment, case study, etc.). In that case, it must be ensured that the selected empirical context satisfies the boundary assumptions of the theoretical level. This represents a particular challenge of newly emerging IT innovation since certain IT solutions are often called cloud services by practitioners but they actually do not exhibit all the specific characteristics of cloud services (cf. Sect. 2.1). For instance, if “system investment” and “technical integration” are the most important determinants of cloud service continuance, then there might be an inconsistency with respect to the empirical setting in which the research model is evaluated. As low up-front investment and low switching costs represent important characteristics of cloud services, “system investment” and “technical integration” are questionable antecedents of cloud services continuance (Walther et al. 2013c). In the case of a positive evaluation and a successful dissemination, the findings

become part of the knowledge base about the management of IS. In addition, implications for practice can be derived from advanced understanding of the cloud phenomenon.

2.3 Structured Literature Review

2.3.1 Methodology

To get an overview of empirical studies on cloud services, the most prestigious journals of the discipline (*European Journal of Information Systems*, *Information Systems Journal*, *Information Systems Research*, *Journal of AIS*, *Journal of Information Technology*, *Journal of MIS*, *Journal of Strategic Information Systems* and *MIS Quarterly*, compare Association for Information Systems 2011), as well as the conference proceedings of six leading conferences in the field of IS (*International Conference of Information Systems*, *European Conference of Information Systems*, *Hawaii International Conference on Systems Sciences*, *Americas' Conference on Information Systems*, *Internationale Tagung Wirtschaftsinformatik*, *Multikonferenz Wirtschaftsinformatik*) were scanned regarding the use of the terms “Cloud”, “SaaS”, and “Software-as-a-Service” in abstract or title starting from 2007 when the cloud computing hype has been created (criterion (1)). In total, 206 articles were identified (Table 2.1). In the second step, articles which can be assigned to the positivist research paradigm, i.e. only those articles with a behavioral science approach (criterion (2)), a hypothetical-deductive logic (criterion (3)) and an empirical evaluation of the hypotheses (criterion (4)) were chosen. By this selection 36 articles remained, which were subsequently analyzed.

To be deeply familiar with each study, each paper was read in the first step of the second phase of analysis and notes on special features (such as strengths, weaknesses, methods, theoretical perspectives, studied phenomenon) were taken. On the basis of various techniques (e.g.: grouping the papers, paired comparisons of similarities and differences, compare Eisenhardt 1989b) raw categories of heuristics were generated in the second step (Steininger et al. 2011). In the third step, these raw categories were compared with Abbots (2004) heuristics of the social sciences and the relevant literature of positivist theory building and their evaluation (Bacharach 1989; Gregor 2006; Whetten 1989) with the goal of increasing generalizability, strengthening the conceptualization of categories and thereby increasing the theoretical abstraction level (Eisenhardt 1989b). In the last step, all papers were examined a second time to see whether they use one or more heuristics and whether theoretical saturation has occurred in terms of the categories of heuristics. The procedure can be regarded as transparent, but subjective, as the process required a certain degree of judgment and interpretation from the author. The result of the structured literature analysis is thus *no* descriptive statistics on how often a heuristic was used. Likewise, the papers are *not* divided into good and bad ones in

Table 2.1 Overview of the article selection process

Fulfilled criteria	Number of articles									
	Total	EJIS	JIT	MISQ	JMIS	ICIS	ECIS	HICSS	AMCIS	(MK)WI
(1)	206	1	1	1	6	24	26	67	54	33
(1 + 2)	93	1	0	0	3	19	15	12	28	15
(1 + 2 + 3)	51	1	0	0	3	15	9	4	12	7
(1 + 2 + 3 + 4)	36	1	0	0	3	10	9	3	7	3

Abbreviations *EJIS* European Journal of Information Systems, *JIT* Journal of Information Technology, *JMIS* Journal of Management Information Systems, *ICIS* International Conference of Information Systems, *ECIS* European Conference of Information Systems, *HICSS* Hawaii International Conference on Systems Sciences, *AMCIS* Americas' Conference on Information Systems, *WI* Internationale Tagung Wirtschaftsinformatik, *MKWI* Multikonferenz Wirtschaftsinformatik

the end. Rather, a number of heuristics have been identified and these heuristics—*and not the papers themselves*—are examined based on epistemological considerations. The heuristics identified by this method will be presented and evaluated in the next section. Each heuristic is illustrated by examples from previous cloud innovation research.

2.3.2 Results

A brief overview about the reviewed articles can be found in Table 2.2. The structured analysis reveals that 20 studies evaluate hypotheses using a survey, two with a case study, six with an experiment and eight with secondary data. In the following, five heuristics are introduced which have been identified throughout the in-depth literature analysis: “Instantiation”, “Laundry-List”, “Making an Assumption”, “Making an Analogy”, and “Challenge the Obvious”. These heuristics represent theory-building practices of positivist cloud research. Each heuristics is illustrated by a prominent example. A more detailed overview over the 36 articles is provided in Table A.1 in the Appendix.

2.3.2.1 Instantiation

“Instantiation” describes a heuristics for theorizing about emerging IT innovations that produces new insights by adapting and testing an existing IS research model in a new empirical setting. Essentially, there are two versions of this heuristic. On the one hand, there are studies which directly apply well-established hypothesis systems such as the technology acceptance model (“Perceived Usefulness”, “Perceived Ease of Use”, see Bernius and Krönung 2012), institutional theory (“mimetic pressure”, “coercive pressure”, “normative pressure”, see Kung et al. 2013) or transaction cost theory (“uncertainty”, “specificity”, “frequency” Benlian 2009) to the new context.

As a result, such studies show us that a well-established research model also applies to the context of cloud services. However, this approach is inconsistent with the original idea of cloud research, i.e., that cloud services will sustainably change the delivery of IT and that previous explanatory approaches have only insufficiently explained these changes (cf. Sect. 2.2.2). On the other hand, authors of several papers have identified cloud specific sub-dimensions of a theoretical construct, such as for quality of service (Benlian et al. 2010, 2011) or service success (Walther et al. 2013a, b, c) and tested these sub-dimensions in the new cloud context (cf. also example in Fig. 2.2). In practice, these cloud specific sub-dimensions are useful because evaluation indicators for the management of cloud services can be derived from these models. The potential of this strategy to advance theorizing, however, remains limited because no new theoretical insights can arise from this heuristic. Also Abbot (2004) proposes that this “more-of-the-same heuristic” has its limitations:

Table 2.2 Structured literature analysis

#	Autor (Year)	Outlet	Survey	Case study	Experiment	Secondary data
1	Huang and Wang (2009)	ICIS				X
2	Benlian (2009)	ECIS	X			
3	Susarla et al. (2009)	JMIS	X			
4	Benlian and Hess (2009)	WI	X			
5	Benlian and Hess (2010)	ECIS	X			
6	Koehler et al. (2010a)	AMCIS			X	
7	Ramireddy et al. (2010)	AMCIS		X		
8	Koehler et al. (2010b)	ICIS			X	
9	Saya et al. (2010)	ICIS	X			
10	Benlian et al. (2010)	ICIS	X			
11	Susarla et al. (2010)	JMIS	X			
12	Lehmann et al. (2010)	MKWI			X	
13	Winkler et al. (2011)	ICIS		X		
14	Parameswaran et al. (2011)	AMCIS				X
15	Sun and Wang (2012)	ICIS				X
16	Winkler and Benlian (2012)	ICIS	X			
17	Li and Chang (2012)	AMCIS	X			
18	Malladi and Krishnan (2012b)	AMCIS				X
19	Bernius and Krönung (2012)	ECIS	X			
20	Opitz et al. (2012)	HICSS	X			
21	Retana et al. (2012)	ICIS				X
22	Malladi and Krishnan (2012a)	ICIS				X
23	Ackermann et al. (2012)	ICIS	X			
24	Benlian et al. (2011)	JMIS	X			
25	Kim et al. (2013)	ECIS				X
26	Walther et al. (2013b)	AMCIS	X			
27	Kung et al. (2013)	AMCIS	X			
28	Lansing et al. (2013)	ECIS			X	
29	Walterbusch et al. (2013)	ECIS			X	
30	Walther et al. (2013a)	ECIS	X			
31	Walther et al. (2013c)	ECIS	X			
32	Trenz et al. (2013)	ECIS	X			
33	Bhattacharjee and Park (2013)	EJIS	X			
34	Coursaris et al. (2013)	HICSS	X			

(continued)

Table 2.2 (continued)

#	Autor (Year)	Outlet	Survey	Case study	Experiment	Secondary data
35	Borgman et al. (2013)	HICSS			X	
36	Huntgeburth et al. (2013a)	WI				X
	Overall		20	2	6	8

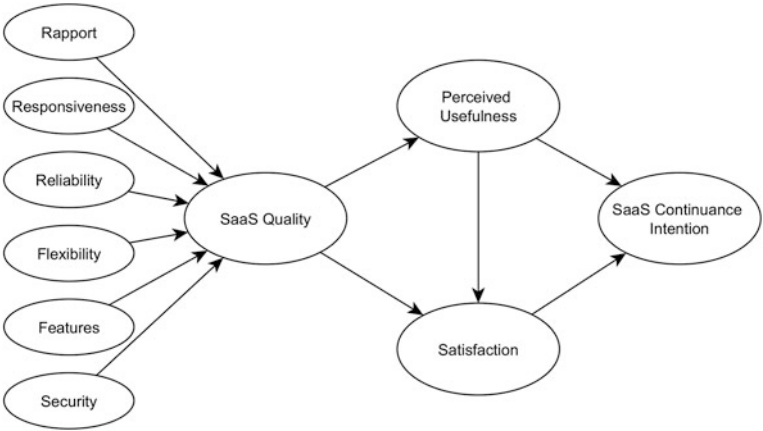


Fig. 2.2 “Instantiation”: quality dimensions for cloud (Benlian et al. 2011)

Adding new cases or variables or rules is always a useful first step in the full evolution of ideas. And so it is right and fitting that most of us begin our careers with the additive heuristic, and it is not at all surprising that many of us never leave it. But the ultimate aim of heuristic is to improve on such normal science. [...] Invention is what we seek, not just addition. (Abbot 2004, pp. 91–92)

2.3.2.2 Laundry-List

The “Laundry-List” approach (also called “pick-and-choose-approach”) describes a heuristic for theorizing about emerging IT innovations, in which a research model is developed in absence of a coherent theoretical perspective. The vast majority of success factors research can also be ascribed to the “Laundry-List” heuristic. In cloud research, manifestations of this heuristics can be found in the fields of adoption decision-making (Borgman et al. 2013; Coursaris et al. 2013) or user behavior (Li and Chang 2012), which test the influence of well-established success factors in this “new” theoretical context without a coherent theoretical framework (cf. also example in Fig. 2.3). As explained in Sect. 2.2.2, an essential part of a theory is an explanation of “which” theoretical constructs are relevant, “how” they

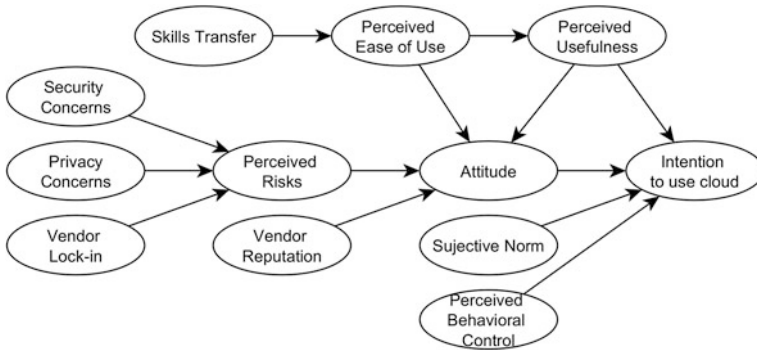


Fig. 2.3 “Laundry-List”: explains cloud acceptance (Li and Chang 2012)

are related and “why” (Whetten 1989). In falsificationism, the whole theoretical perspective should be evaluated by the empirical observations and not just each success factors individually (Bacharach 1989; Whetten 1989). While from a practical point of view the “Laundry-List” can be used to derive recommendations for cloud providers, the potential of the “Laundry-List” to advance theorizing about emerging IT innovations remains very limited.

2.3.2.3 Making an Assumption

With the help of the “Making an Assumption” heuristic new insights about cloud phenomena can be gained by making an assumption that a new aspect plays a significant role in the cloud context. There are two characteristics of this heuristic in research on cloud services. On the one hand, there are studies about cloud guarantees (Lansing et al. 2013), user risk perceptions (Benlian and Hess 2010) or trust in cloud (Walterbusch et al. 2013), which assume, without empirical verification, that these aspects influence the behavior of actors (suppliers, customers) and elaborate on this aspect in detail. On the other hand, there are studies which attempt to integrate this “new aspect” into the nomological network of previous research to highlight the importance of this “new aspect” empirically (Benlian and Hess 2010; Trenz et al. 2013).

E.g., cloud computing eliminates an up-front commitment by cloud users allowing them to start small and increase or reduce computing resources as needed (Armbrust et al. 2010). This also implies that market success for cloud providers depends on consumers’ post-adoption rather than adoption behavior. Therefore, many cloud studies focus on continuance as a dependent variable (Benlian et al. 2010, 2011; Trenz et al. 2013; Walther et al. 2013a, b). Moreover, cloud users are highly dependent on the provider over the whole-life cycle of the business relationship. Therefore, the characteristics of the cloud provider-user relationship (e.g., goal conflict, fears of opportunism, information asymmetry, cf. Jensen and

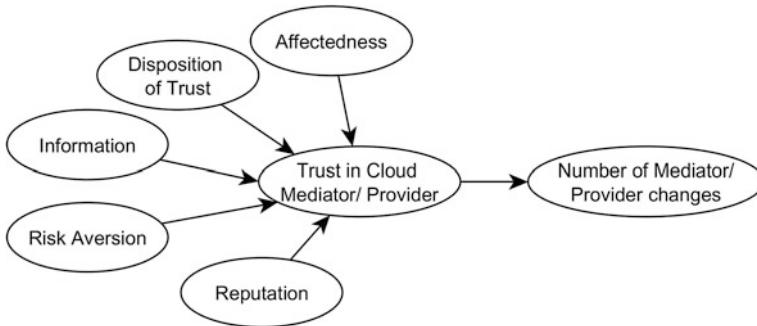


Fig. 2.4 “Making an assumption”: trust in cloud (Walterbusch et al. 2013)

Meckling 1976) have to be incorporated when studying user-related issues of cloud computing. Therefore, several studies focus on relational aspects between provider and user (cf. example in Fig. 2.4). As the special characteristics of cloud services are made exogenous in research models, the “Making an Assumption” heuristic has the potential to advance theorizing about emerging IT innovation and produce scientific progress.

2.3.2.4 Making an Analogy

The “Making an Analogy” heuristic describes a technique that advances theorizing about cloud phenomena by using theoretical perspectives of distinct research areas for theory development. A convincing application of this heuristic is the study of Bhattacharjee and Park (2013), who make an analogy between the migration from hosted to cloud solutions and the migration of people into new geographic locations. Based on the theory of migration (“A Theory of Migration”) different “pull”-, “push”—and “mooring”—mechanisms are identified (cf. also example in Fig. 2.5). The “Making an Analogy” heuristic has its advantage in the fact that theorizing can utilize the ideas of researchers who have been thinking about a similar problem in a completely different context. The “Making an Analogy” heuristic should not be confused with the “Instantiation” heuristic. The “Making an Analogy” heuristic borrows only the theoretical perspective from another (IS) research field. In comparison, the “Instantiation” heuristic directly applies well-established hypotheses that do not go beyond what was known before in the field of IT innovation research.

2.3.2.5 Challenge the Obvious

The “Challenge the Obvious” heuristic describes a technique that advances theorizing about cloud phenomena by showing that well-established hypotheses do not apply in the context of cloud services. A number of cloud studies show that

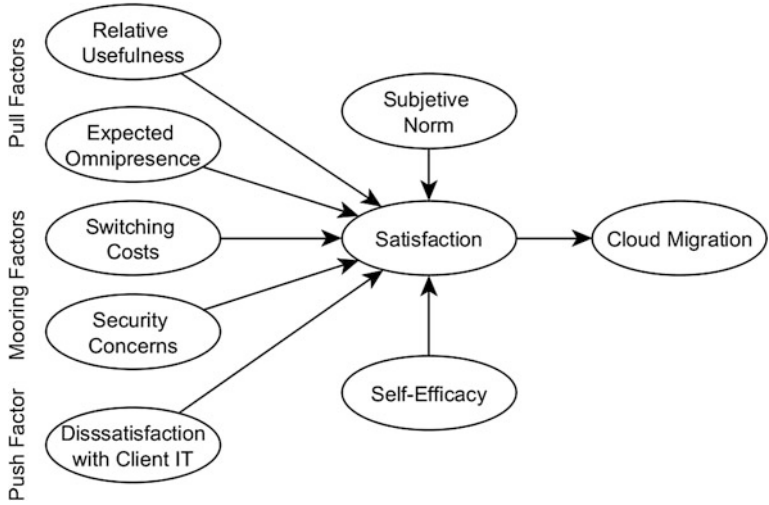
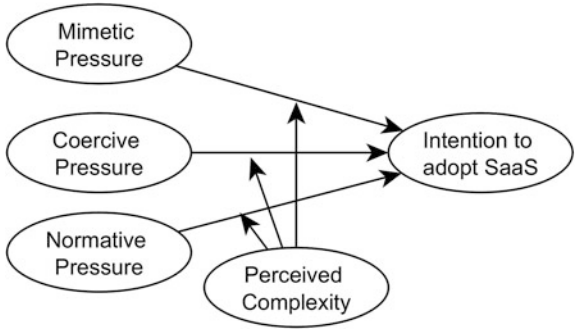


Fig. 2.5 “Making an analogy”: migration (Bhattacharjee and Park 2013)

well-established explanatory models, such as institutional theory (Kung et al. 2013), IS success model (Walther et al. 2013a) or transaction cost theory (Benlian 2009) do not apply for explaining behavior for certain groups (cf. also example in Fig. 2.6). They demonstrate this empirically by using group comparisons in the empirical evaluation and show that the validity of the model is contingent on contextual factors. E.g., Winkler et al. (2011) show that successful governance of cloud services is dependent on various application-specific contingency factors (Dibbern et al. 2008). The weak point of the previous applications of this heuristic in the cloud area is the lack of reference to cloud-specific contingency factors (Kung et al. 2013; Walther et al. 2013b). Since contingency factors describe the degree to which the research model can be generalized (cf. boundary assumptions, Sect. 2.2.2), contingency factors should describe the user context or the perceived characteristics of the cloud service.

Fig. 2.6 “Challenge the obvious”: institutional theory (Kung et al. 2013)



2.3.3 Discussion

In falsificationism, scientific progress arises through the confirmation of bold conjectures and the rejection of central theories and assumptions of the research paradigm (cf. Sect. 2.2.2). For the heuristics introduced, one can tendentially say which heuristics have the highest potential to advance theorizing about emerging IT innovations and create scientific progress (Table 2.3). The “Instantiation” and “Laundry-List” heuristics essentially use well-established knowledge about IS and test this knowledge in a new empirical context. The potential of these heuristics to create new insights is thus very limited. “Challenge the Obvious” has principally the potential to put existing knowledge about IS into question. The challenge of this heuristic is that the findings must be considered in relation to established theories. A weakness of the previous applications of this heuristic in cloud research is a lack of explanation why established theories do not apply in the context of cloud services. The heuristics “Making an Assumption” and “Making an Analogy” probably offer the greatest potential for research on new and innovative IT artefacts because they take the characteristics of cloud services into account and provide new perspectives on cloud phenomena. Even if Karl Popper wrote in his early works of falsificationism that a rejection of a bold conjecture represents scientific progress (“naive falsificationism”, see Chalmers 1999), this perspective has not established itself with a good reason. As Chalmers (1999, p. 80) already remarked “[...] ... if a bold conjecture is falsified, then all that is learned is that yet another crazy idea has been proven wrong”.

A number of remarks have to be made regarding the presented research framework for theorizing about emerging IT innovations (Table 2.3). The framework is developed on the basis of post-positivist assumptions: ontological realism, possibility of an objective truth, and creating new insights based on the hypothetical-deductive method (Chen and Hirschheim 2004). The framework was developed exploratory on the basis of 36 articles, Abbot’s (2004) heuristics of social sciences, and the relevant literature on positivist theory construction and their evaluation (Bacharach 1989; Eisenhardt 1989b; Gregor 2006; Whetten 1989). More work is needed to understand if there are additional heuristics that are commonly used for the examination of emerging IT innovations and these additional heuristics have to be evaluated based on epistemological considerations. Also more sub-dimensions of the heuristics should be included to strengthen the practical use of the

Table 2.3 A research framework for theorizing

		Theoretical level	
		Bold conjecture	Cautious conjecture
Empirical level	Confirmed	“Making an assumption”	“Instantiation”
		“Making an analogy”	“Laundry-list”
	Falsified	–	“Challenge the obvious”

framework for researchers. Each researcher uses implicitly (by experience) heuristics. This work represents a first attempt to make a systematization of heuristics that can be used for theorizing about emerging IT innovations.

2.4 Summary

While IS research provides good standards to evaluate what constitutes a theory (Bacharach 1989; Gregor 2006; Whetten 1989), there is only little guidance on the process of theorizing about emerging IT innovations if at all. Every IS researcher applies implicitly heuristics to advance theorizing about the adoption, the utilization and the success of emerging IT innovations. This chapter has reviewed theory-building practices in cloud innovation research and has—based on epistemological assumptions—developed a framework for theorizing about emerging IT innovations out of it (Table 2.3). The framework will be leveraged in the following chapter to develop a cloud service relationship theory.

Developing and Evaluating a Cloud Service Relationship
Theory

Huntgeburth, J.

2015, XI, 114 p. 14 illus., Hardcover

ISBN: 978-3-319-10279-5