HOW DOES IT-BASED SERVICE DEGRADATION INFLUENCE CONSUMERS' USE OF SERVICES? AN IT-BASED SERVICE DEGRADATION DECISION THEORY

Abstract

Information Technology (IT) is crucial for modern services. Service delivery may include a complex mix of IT and telecommunication providers, global networks and customers' IT devices. This research focuses on service failures that are caused by IT problems, which we conceptualize as IT-based service degradation (ITSD). When ITSD occurs in a modern service the IT problem may originate from the service provider, another partner or any IT equipment involved. But the customer may not be able pinpoint the source of the problem immediately. We argue that existing research can only partially explain customers' behavior following ITSD; current research cannot account for the way in which IT characteristics in ITSD influence customers' decisions to continue using or reject the service.

To fulfil this gap, we interviewed IT-based services' customers. Our interviews suggest that the reasons affecting customers' behavior may change and have differing importance during the ITSD experience. We theorized the ITSD experience into five stages: blaming, bypassing, tolerating, abandoning and overcoming. The first two stages contain stage specific factors influencing the progression of service usage and the final three stages contain stage specific factors that matter in the decision to use or quit the service. As a new contribution, we propose a stage theory for explaining customers' behavior following ITSD. Our results outline new research directions in ITSD, including further testing and refinement of our proposed theory in the case of different services. For service providers, our findings provide new information for improving service recovery strategies to keep customers engaged.

Keywords: Service failure, IT-based service degradation, stage theory, online service quality

1. INTRODUCTION

The role of information technology (IT) in our society has increased dramatically and most of our modern services are increasingly reliant on IT. Also, the provision of a modern service may include the involvement of several IT providers, global networks and a mix of IT devices and telecommunication service providers (i.e., the service is delivered to customers through their own IT devices and their own telecommunication service providers). This involvement of customers' IT in the provision of services, in addition to the blending of personal and sometimes professional IT equipment, is characterized as the consumerization era (Gannon, 2013; Harris et al., 2012; Niehaves et al., 2012; Ortbach et al., 2013; Yoo, 2010). When there is a problem in such a service (IT-based service degradation; ITSD[1]), the problem may not be due to the company that sold the service to the customer, but it may be the fault of any of the above associated partners. Moreover, it is difficult for the customers to pinpoint the source of the problem immediately. They do not know if the reason originates in their own IT devices, or their telecommunication provider, or global networks, or if the reason relates to the company who sold the service and their IT-providers. The complex nature of IT in services led us to pose the research question: "*what explains customers' decisions to continue using or to quit their IT-based service following ITSD*?" We identify two disciplines that have examined related questions: namely, information systems (IS) and service research (SR). IS literature has examined how online service quality affects a user's behavior and how IT failures may affect online services (e.g., Tan et al., 2013). Further, studies on pervasive computing and advanced IS roles today, provide insights of the way that users perceive technology (e.g., Yoo et al., 2013). Although these works are very insightful for our research objective, they do not explain the behavior of IT-based services following ITSD. First, these

[1] We refer to these IT problems as IT degradation, and we denote service failures as IT-based service degradation (ITSD).

studies had been highly influenced by service quality theories, which do not take into account the characteristics of the 'consumerization' era. For example, Sun et al. (2012) criticize existing IS service quality theories because they consider the consumer as external to the service delivery, although IS researchers should start by regarding consumers as endogenous to the IT service delivery. Second, these models only study online services, which means that they cannot explain IT-based services where IT is not directly visible to the customer (e.g., back office systems).

In the second literature stream, existing SR literature explains how customers of traditional (non IT-based) services react to service failures. Studies such as Bougie et al., 2003; Strizhakova et al., 2012; DeWitt & Brady, 2003; Grégoire et al., 2009 explore the antecedents of customer satisfaction after service failures. Such antecedents include emotions (e.g., anger), customer-provider relationship aspects (e.g., trust, loyalty), and service failure attributes (e.g., failure types). Previous service failure research has not accounted the role of IT in customers' behaviors following service failures. Instead it attempts to explain customers' reactions to service failures in IT-based services with generic service failure explanations (e.g., trust towards the seller) that do not account for the specific role of IT in such service failures. For example, previous research cannot account for a case where a customer blames his own IT equipment for the service failure. We argue that the IT context and the IT characteristics are crucial in determining a customer's behavior when using IT-based services. Moreover, previous SR literature suggests that static reasons (but modelled as a continuum) such as customer's loyalty, explain a customer's behavior after a failure. We argue that different reasons may have differing importance during the customer's service failure experience. Previous research, assuming static explanations, cannot explain situations where the role of different factors, such as trust or failure type, change during the service failure experience. We argue that a customer's decision to quit or continue using a service can involve complex dynamic causality (Thagard 1998) which involves multiple, interacting factors where their causal role is subject to change.

All in all, the existing SR and IS literatures offers only a partial explanation of the question: *what explains customers' decisions to continue using or to quit their IT-based services following ITSD*? We examined the phenomenon empirically through interviews and a theory development approach. Our empirical investigation led us to propose a new stage theory - the IT-based Service Degradation decision theory (ITSD Decision Theory). The ITSD Decision Theory suggests that customers' ITSD experience involves five phases which we theorize as stages: *blaming*, *bypassing*, *tolerating*, *abandoning* and *overcoming (i.e., remain*ing or *rejecting)*. The theory suggests stage specific factors, such as *service attributes* (e.g., price) and *user attributes* (e.g., IT expectations). The proposed stage theory suggests that within a stage, users dynamically combine service and user attributes resulting in stage outcomes that include a) the decisions to remain with or quit the service and b) their behavioral development leading to behavioral evolution.

The rest of the paper proceeds as follows: Section 2 defines the concepts used in the paper and discusses the phenomenon of ITSD. Section 3 analyses existing literature that provides insights for ITSD phenomena and identifies research and practice gaps. Section 4 introduces the research method and the context of our study. In section 5, we present the analysis of our findings and the new stage theory, explaining user behavior following ITSD. In section 6, we discuss the contributions, the implications of our findings, and the limitations of our research. Section 7 concludes the paper.

2. SERVICES, SERVICE FAILURES, AND IT-BASED SERVICE DEGRADATION

In this section, we provide the conceptual foundation for the terms we use. First, we present literature definitions for the basic terms and then we focus on service failures caused by IT problems and we introduce the term ITSD to describe this phenomenon.

Many service experts define a service based on the value that it creates and emphasize the value in use as experienced by customers (Edvarsson et al., 2005; Vargo et al., 2008). A "*service failure"* in SR literature denotes situations in which the customers' perceptions of the service delivery fall below their expectations (Holloway & Beatty, 2003; Hess et al., 2003;

Hoffman & Bateson, 1997). In this paper, we focus on a) a subset of services, and b) a subset of the service failures. On the first point, we examine a specific type of services, namely, IT-based services. IT-based services include any service which is highly dependent on IT for its provision; the service could be provided to the customer either online or services in which IT is not directly visible to the customer (e.g., a service that relies on back office systems). Examples of IT-based services include the provision of online shopping, mobile applications, home Internet, provision of certificates by a public agency supported by IT, provision of reservations by an organization (e.g., a hospital) supported by IT. On the second point, we focus on how actual IT problems influence service use. Therefore, we target a specific type of service failure in which an IT problem occurs which leads to a disruption of the normal service delivery. The term 'service failures' in the SR literature is much broader than the area we are studying. In the SR literature, failures include cases in which the service runs normally, but because it does not meet the consumers' expectations, it is regarded as a failure. To conceptualize the type of failure that we want to examine, we introduce the term *degradation*. Hence, an *IT-based service degradation* (ITSD) refers to a service failure in which the IT-based service is not provided as expected to the customer and this occurs due to an IT problem. Table I presents the differences between the terms "service failures" and "IT-based service degradation."

Table I: Distinguishing general service failures from IT-based service degradation

Element	Scope of the Service Failures Term (as defined in SR literature)	Scope of the ITSD Term
Nature of the Service	Any service Service failures in the service research literature, refer to any type of service, e.g., airlines (Bejou & Palmer, 1998), banks (Lewis & Spyrakopoulos, 2001), e-commerce (Forbes et al., 2005), restaurants (Hoffman et al., 1995), etc.	IT-based service
Scope of the Problem	Any situation that falls below a customer's expectations (Holloway & Beatty 2003; Hess et al., 2003; Hoffman & Bateson, 1997), including: Problems at the core product (e.g., slow service), unprompted and unsolicited employee	Situations in which there is an actual disruption to the normal service

	behavior, customer errors	delivery
Cause of the Problem	Nothing particular. The cause of problems range from human mistakes and unsolicited behavior to unavailable service (Forbes et al., 2005; Bitner et al., 1990)	IT problems

An example of an ITSD might be the inability to send an e-mail, the unavailability of mobile phone calls due to a network problem, the inability to pay by card due to unavailability of the payment system, and so on.

We argue that ITSD is different from other service failures because the delivery of IT-based services requires the involvement of the customer's personal IT equipment. For example, for the delivery of an online chat service through a mobile application, it is required that the customer engages with the service using their own personal mobile device. If we compare this with a traditional service, such as food services, commonly there is no involvement of the customer in the service delivery, and thus any failure (e.g., a meal below customer's expectations) is evidently attributable to the service provider. On the contrary, for IT-based services, part of the delivery may involve the participation of a customer's equipment. Therefore, an ITSD would not always be attributed to the provider. Second, the delivery of IT-based services depends on a supply chain that can be more complex and less known to most customers compared to traditional services. For example, in a delayed delivery of a product purchased from an online shop, the supply chain includes the shop's internet service provider, the website management company, the product supplier, the postal delivery partner, etc. Thus, the explanation for the failure would involve more complicated responses, such as website failures, or blaming associated partners (e.g., the mail delivery company). This complexity increases even more for modern IT-based services such as online chat mobile applications that involve partners such as the customer's internet service provider, the mobile application provider, the device's operating system's provider, and so on. Finally, another reason is that traditional services are associated with specific target customer values compared to IT-based services that are associated with more complex customer values. To

illustrate: the provision of a restaurant service is associated with values such as a pleasant environment, tasteful food, etc. Thus a service failure would affect those specific values and limit customer satisfaction. In contrast, IT-based services are associated with a great range of services. For example, let us imagine the provision of an internet service. This service can be associated with many different forms of value that are "created collaboratively in interactive configurations of mutual exchange", in accordance with the definition by Vargo et al. (2009). Further, IT-based services continually involve offering personalized content to the customers (e.g., personalized advertisement, location-based services). For these reasons, ITSD might lead to less easy-to-predict and more complex customer dissatisfaction since each customer associates the service with different forms of personal value.

3. PREVIOUS WORK ASSOCIATED WITH IT-BASED SERVICE DEGRADATION

We have found two disciplines that include related work: 1) service research that has studied the factors which affect customer behavior following a service failure, and 2) information systems, which have examined the factors that affect the behavior of online services' users. Our aim was to find explanations of the factors affecting individuals' decisions when confronted with ITSD for a service they are consuming. Researchers writing in the SR literature have examined the antecedents of customer behavior following a service failure (e.g., Bougie et al., 2003; Strizhakova et al., 2012; DeWitt & Brady, 2003). In this section we analyze these studies and we conclude that they can only partially explain ITSD behavior for two reasons: 1) they do not account for the specific role of IT in the service failure, and 2) they assume that a set of predefined factors or their combination determines a customer's behavior following a failure (straightforward static causality; see Thagard 1998). Our examination of the phenomenon and our proposed stage theory provides new contributions in light of these gaps by exploring IT-specific antecedents of customer behavior in the context of IT-based services. Also we reveal new insights by showing that users' decisions to quit or continue using a service after ITSD can follow complex dynamic causalities, which involves multiple interacting factors whose causal role can change.

The research studies in the IS discipline can also partially shed light on ITSD. Researchers developed several theories explaining individuals' behavior when using online services and how service quality is perceived (e.g., Sun et al., 2012). These studies offer insights on the specific IT factors that determine customer behavior, such as functionality, privacy, and so on. However they explain behavior only for when the service is running normally and not when there is a failure. In this section we elaborate on all these studies and we explain our arguments that existing literature is not sufficient to explain the phenomenon in question and all of its aspects.

3.1. Previous Work on Information Systems Literature

3.1.1. Online Service Quality

In this study we are interested in how literature on e-service quality (Table II) can inform our research study. The SERVQUAL model (Parasuraman et al., 1995) and SERVPERF model (Parasuraman et al., 1991) have been widely adapted by IS scholars for measuring IS quality, but also for explaining electronic services (e-service) quality. To start with, Xu et al. (2013) present a model integrating IS acceptance theories with service quality (the SERVQUAL model) and they identified a set of factors related to information quality, system quality and service quality influencing an e-service user's behavior. Sun et al. (2012) also discuss IT service delivery and the factors affecting user satisfaction using the SERVPERF model. Chuang et al. (2016), compare the SERVQUAL model with the quality of electronic service (QES) model and website performance index (WPI) model for measuring service quality of websites. Tan et al. (2013) and Connolly et al. (2010) propose an adaptation of the SERVQUAL model particularly for governmental e-services quality. Papadomichelaki and Mentzas (2012) developed an e-GovQual model for e-government service quality. Luo et al. (2012) focussed on e-commerce service quality. Similarly, Gefen (2002), Cenfetelli et al. (2008) and Xu et al. (2011) examined e-commerce customer loyalty through service quality using SERVQUAL adapted models or new models. Kim et al. (2004) also examined customer behaviours and trust taking into account online service quality in the e-commerce, using the SERVQUAL. Yang et al. (2005) examined the factors that affect user satisfaction from Web

portals that present information about products or services. Zhang et al. (2015) discuss e-service quality in the retail industry.

Table II: Previous Research on e-Service Quality with respect to IT-based Service Degradation and Customer Behavior

Study	**Antecedents of User Behavior and e-Service Quality**
Tan et al. (2013)	Accessibility, navigability, interactivity, interoperability, adaptability and security
Xu et al. (2013)	Completeness, accuracy, format, currency, reliability, flexibility, accessibility, timeliness, tangibles, responsiveness, empathy, service reliability, assurance, enjoyment, ease of use, usefulness
Luo et al. (2012)	Product uncertainty, retailer visibility, website design (e.g., clarity of product information), customer service (e.g., on time delivery, customer support), pricing (e.g., shipping charges)
Yang et al. (2005)	Usefulness of content, adequacy of information, usability, accessibility, privacy and security, interaction
Gefen (2002)	Tangibles, empathy, assurance, responsiveness, reliability, customer trust, cost to switch vendor, perceived risk with vendor
Kim et al. (2004)	Vendor reputation, structural assurance (e.g., legal structures in the Internet), website quality, information quality, service level (e.g., on time delivery), empathy, trust to the vendor
Xu et al. (2011)	Perceived sacrifice, service quality, perceived service outcome, live help technology, product knowledge
Conolly et al. (2010)	Efficiency, system availability, privacy, responsiveness, contact, perceived value
Papadomichelaki and Mentzas (2012)	Ease of use, trust, functionalities, reliability, content, appearance, user support
Zhang et al. (2015)	Convenience, information accuracy, security, functionality, delivery accuracy, failure prevention, failure recovery, service guarantee
Chuang et al. (2016)	Reliability, responsiveness, assurance, empathy, tangible, environment quality, delivery quality, outcome quality
Sun et al. (2012)	Cognitive capital (i.e., shared language), relational capital (i.e., interpersonal relationships and trust), structural capital (i.e., social interaction), service quality
Cenfetelli et al. (2008)	Perceived service functionality, perceived website usefulness, satisfaction with website, service quality

Existing work on online service quality provides us with an understanding of the IT factors that determine customers' perception about service quality. For example, research shows that customers consider website appearance, usability, and accessibility to assess the quality of an online service. They also consider customer service responsiveness and live help technology when assessing online service quality. It is implied that if one or more of these factors are

degraded then customers' perception for the quality of the service will be negatively affected and therefore these factors can inform our study. Nonetheless, the above studies study customer behavior only for when the service is running normally and not when there is a failure.

3.1.2. Other streams of IS research

In our analysis of IS literature we also found one paper that examined customer behavior following electronic service failure. Tan et al. (2013) examined the factors influencing customer's behavior following a failure of electronic service, including failures of information (e.g., incomplete information) as well as functional and system failures. Furthermore, studies discussing a consumer's experience of IT services provide us with insights on the characteristics that affect a user's satisfaction. For example, Yoo et al. (2013) examined characteristics of digital artifacts that are desirable; e.g., addressability, communicability, memorability, traceability. Ortbach et al. (2013) investigated the antecedents of IT consumerisation behaviour, including subjective norms, normative (e.g., perceived risks of corporate data) and control beliefs (e.g., IT knowledge and compatibility). Although these studies enhance our understanding, our research objective is broader and it includes services that are IT-based but may not be online services. Also these studies focus on the phenomena in which IT worked as expected, while we focus on cases of IT problems that affect IT-based services.

3.2. Previous Work on Service Research Literature

The second related work is service research, and specifically, service failures research. Several service studies have focused on identifying types of service failures that customers might experience and categorizing them into classification schemes for traditional services (Bitner et al., 1990; Forbes et al., 2005; Lewis & Spyrakopoulos, 2001) or for IT-based services (Holloway & Betty, 2003; Meuter et al., 2000; Parasuraman et al., 2005).

Besides service failure typologies, service research literature has devoted extensive work to explore the factors that determine customers' behavior and satisfaction and repurchase

intentions after a service failure occurs, including anger, loyalty, trust, commitment (Bougie et al., 2003; Strizhakova et al., 2012; DeWitt & Brady, 2003; Sajtos et al., 2010; Gabbott et al., 2011; Bejou and Palmer, 1998; Funches et al., 2009; Grégoire et al., 2009). Other service research studies examine the antecedents of customers' behaviors related to service failures and the different recovery strategies and compensation options offered by the provider after the failure (Smith and Bolton, 1998; McCollough et al., 2000; Hess et al., 2003; Smith et al., 1999; Maxham & Netemeyer, 2002; McColl-Kennedy & Sparks, 2003; Vaerenbergh et al., 2012; Karande et al., 2007; De Matos et al., 2007; Parasuraman et al., 2005).

By analyzing the service failures literature (see Appendices A and B), we can conclude that only five studies (Forbes et al., 2005; Holloway & Betty, 2003; Meuter et al., 2000; Lewis and Spyrakopoulos, 2001; Parasuraman et al., 2005) examined IT-based service failures. However, four of these studies develop classification schemes for IT-based service failures and thus they do not explain customer behavior. The fifth study reveals factors that affect customer satisfaction from a service quality perspective focusing, however, solely on online services. Therefore, existing work in service failures literature does not focus on explaining customers' reactions to ITSD.

Further, we were also interested in the determinant factors that these studies identified for customer behavior. The detailed factors that have been found important for customer behavior are presented in Table III.

Table III: Previous Research on service failure with respect to Customer Behavior

Study	**Antecedents of Customer Behavior following Service Failures**
Funches et al. (2009)	Type of failure, perceived injustice, situational factors (e.g., waiting), recovery failure
Bejou & Palmer(1998)	Severity of failure, duration of relationship with the provider, commitment and trust
Grégoire et al. (2009)	Public complaining, duration of relationship with the provider, quality of the relationship with the provider
McColl-Kennedy & Sparks (2003)	Type of failure, recovery action, emotions, perceived fairness
McColl-Kennedy et al. (2003)	Gender, voice in recovery process, compensation
Smith &Bolton (1998)	Prior service satisfaction, type of service failure, magnitude of

	service failure
McCollough et al. (2000)	Service performance, failure expectation, recovery expectation, recovery performance
Hess et al. (2003)	Number of past encounters with provider, quality of service, failures by stable causes, service recovery expectations
DeWitt &Brady (2003)	Customer satisfaction, level of rapport, word of mouth
Smith et al. (1999)	Type of failure, magnitude of failure, compensation, recovery speed, recovery initiation, perceived justice
Bougie et al. (2003)	Anger, dissatisfaction, word of mouth, switching costs
De Matos et al. (2007)	Failure severity, prior failure experience, recovery, expectations of failure repetition, perceived control of failure by the provider
Vaerenbergh et al. (2012)	Process recovery communication
Strizhakova et al. (2012)	Anger, customer coping strategies, rumination response
Karande et al. (2007)	Gender, recovery voice, perceived justice, past encounters with provider
Maxham & Netemeyer (2002)	Perceived justice, satisfaction with recovery, overall satisfaction
Gabbott et al. (2011)	Severity of failure, problem-focused coping, emotion-focused coping
Sajtos et al. (2010)	Severity of failure, cause of service failure, satisfaction with recovery, trust to the provider, perceived image of the provider, customer value of the service
Parasuraman et al. (2005)	E-S-QUAL Service quality: efficiency, fulfillment, system availability, privacy E-R-QUAL Service recovery: responsiveness, comprehension, contact

Table III summarizes several factors that affect customer behavior following service failures. The studies of Forbes et al. (2005), Holloway & Betty (2003), Meuter et al. (2000) Lewis and Spyrakopoulos, (2001) and Parasuraman et al. (2005) examined IT-based services. Only Parasuraman et al. (2005) present antecedents of customer behavior, since the other studies develop service failure taxonomies.

4. RESEARCH APPROACH AND DATA COLLECTION

4.1. Research Strategy

A common research method used in studies examining service failures is the critical incident technique (Gremler, 2004). Although the critical incident technique can support gaining understanding of an incident from the perspective of the individual who experienced it, typically it is used for developing classification schemes for service failures. Our research objective is not to develop such a classification scheme; rather it is to provide explanations of

users' decisions following ITSD. For that purpose, we use a theory development approach, which is phenomenon-driven (without having a predefined theory that limits the theorizing). A similar approach is the prevailing approach for stage theories and process theories in the IS literature (Damsgaard & Scheepers, 2000; Fan et al. 2014; Lederer & Mendelow, 1990; Lyytinen and Newman, 2008; Schwartz et al., 2014). Qualitative interviews allow phenomenon-driven theorizing that has a possibility to obtain the explanations that also capture the IT characteristics involved in ITSD, and which may not be covered by existing theories.

4.2. Stage Theories and Stage Theorizing

The history of theories of change is pretty much as long as is the history of philosophy and science. Theories from the theory of evolution to developmental psychology are about change and development. In IS, the discussion about theories of change is highly influenced by Mohr's (1982) separation between the "variance models/theories" and "process theories" (Burton-Jones et al. 2015; Lyytinen & Newman, 2008; Sabherwal & Robey, 1995). Other sciences have used different terminology. For example, in development psychology, health psychology, psychiatry or moral psychology, change theories are often referred to as *stage theories.* Theories without stages are referred to as *continuum theories* (Weinstein et al. 1988) or *non-stage theories* (Velicer and Prochaska 2008). The lack of influence of Mohr (1982) is understandable. For example, Mohr (1982) only recognized event-based process theories. However, a number of process and stage theories in psychology are not fundamentally event-based (Weinstein et al. 1998). Therefore, the important distinction between continuum/non-stage/variance and stage/process theories is not necessarily the existence of events. Also, variance models can have events that may even cause change. For example, protection motivation theory is used as a classical example of stage-less theory (a continuum model) in health psychology (Weinstein et al. 1998). According to the protection motivation theory, fear contributes to the recognition of threats and protective behaviors (Rogers 1975). Fear is raised by some event, so implicitly, protection motivation theory has an event. But why protection motivation theory is regarded as stage-less theory or a continuum model (Weinstein et al.

1998) has nothing to do with events: it is because the reasons for change, namely fear, do not change, but always remains the same. Putting it differently, for continuum (non-stage) theories, the factors/explanations/independent variables are expected/ theorised to remain unchanged during the life cycle of the phenomenon. In turn, stage or process theories are needed when the same factors are believed not to motivate people during the entire life cycle of a phenomenon. In other words, stage theories suggest that the factors/explanations/independent variables may change during the lifespan of a phenomenon. Stage theories suggests that a development is linked to stages. Therefore, stage theory endeavors to explain the development path of a specific phenomenon by dividing the development into distinct stages (Weinstein et al. 1998). Each stage should have at least some qualitatively different processes, factors, attributes, or behaviors (Weinstein et al. 1998). This qualitative different factor is a fundamental criterion because if no stage-specific processes or factors are involved, then having stages is not needed. Stage theorizing can be used to understand how or why things emerge, develop, grow, and terminate over time (Langley et al. 2013).

4.3. Meta-Stage Theory Components

Although there is no single definition about stage theories, there exist generally accepted terms and components. For stages, we use the definition of Lippke et al. (2005) "*A stage model actually exists if, in different variables, discontinuity patterns are observable. This would mean that there is a discontinuity in the degree to which variables act upon different stages. Individuals at a particular stage should have different characteristics in comparison to those individuals located in other stages*." (p. 587). The basic idea is that individuals experience a shift of mind-set when moving from one stage to another Lippke et al. (2005). Debate exists whether stage theories capture truth in a realism sense or whether the stage is a theoretical concept. Schwarzer (2008b) claims that stages in health psychology have nothing to do with scientific truth. Rather, stages are theoretical constructs, they describe ideal types for a specific purpose (Weinstein et al., 1998; Schwarzer, 2008b). To give a concrete

example, IT users are intentional and, theoretically speaking, they can change their behavior several times a day. A stage theory trying to capture all the changes as they happen would result in a huge number of stages, even one for each user, which would result a number of hugely complicated models. Such models could be empirically highly accurate, but hard to comprehend. We also assume that stages are theoretical concepts. Another question is what elements (ideally) the stage theories could have. We say "ideally" because two of the elements we outline next are not covered by classical theories. For example, relapse triggers and conditions for stage omitting (Table IV) are not described by Kohlberg's original theory and Weinstein's (et al. 1989) stage theory requirements. Prochaska and Clemente added relapse to the trans-theoretical model theory later (Prochaska & Clemente 1982). We regard the existence of relapse as an empirical issue, which future research will reveal or otherwise refute.

Every stage theory has two or more *ordered stages* with different elements that explain an individual's behavior and movement between the stages (Weinstein et al., 1998). Stages can be theoretically or empirically ordered. We seek to order our stages empirically ("inductively" in terms of Gregor 2006) rather than theoretically (e.g., as Kohlberg did). However, we assume (like Kolhberg, 1959) that persons can be also be between the stages, so it is not expected theoretically that every person can be placed into a stage (Weinstein et al. 1989). Also, stages can be in the order of maturity. For example, Kohlberg's theory (1981) and software engineering and secure systems design (stage) maturity models (Siponen 2002) both assume that the stages are in order of their maturity. We do not have such a maturity assumption. For many stage theories, the behavior of most people can be described by one stage at a time, but individuals can change their behavior or reasoning, moving them to a different stage (Weinstein et al., 1998). However, all people do not necessarily go through all (theoretical) stages (Kohlberg, 1981), and people may stay in one stage forever (Weinstein et al., 1998). Often, the precise length of time a person stays in one stage cannot be known and it may not even be important (Weinstein et al., 1998). Stage-specific processes or factors are

important for stage theories (Weinstein et al., 1998), because without them, the whole point of developing the stage theory is lost. Stage theory could also have stage-independent factors or processes. Moreover, the definition of the stages, as well as the conditions for proceeding from one stage to another, is a useful part of stage model formulation (Weinstein and Sandman 1992). Kohlberg (1959; 1981) assumed that his stages are invariant in terms of their sequence, hence he does not have concept such as stage omission. We, however, regard this as an empirical question; thus we consider the possibility of having *conditions for stage omitting* (can one omit a stage; e.g., move from stage 1 to stage 3. Also, if we can move from stage n to stage n+1, could we also move from stage n to stage n-1 (i.e. a relapse)? While specific theories do not drive theorising, such meta-concepts influence our theorizing.

Table IV: Stage theory requirements, based on Weinstein et al. (1998), Schwarzer (2008b), and Velicer and Prochaska (2008)

Requirement	Description
Ordered Stages	Stage theory uses stages to understand the development path of a phenomenon (i.e., how behavior evolves over time). A stage is a theoretical construct, and while it does not exist in nature, its usefulness lies in understanding and simplifying a complex phenomenon.
Moving Triggers	These triggers influence people at the same stage to move forward from one stage to another.
Relapse Triggers	These triggers influence people at the same stage to relapse to a previous stage.
Stage-Specific Factors	Some factors must be more important at certain stages than others. If stage-specific factors do not exist, then there is simply no need for stage theories.
Stage-Independent Factors	These factors provide an understanding of which factors are relevant, if any, to all stages.
Conditions for Stage Omitting	These are conditions that influence people to omit one or more stages.

As we present in detail in Appendix B, previous work in service failures research or IS research has not adopted a stage theory perspective on explaining customer's behavior. Next, we will describe the research setting and methods used to develop our stage models.

4.4. Interview Method

The interviews were conducted in Greece between February 2014 and January 2015 by one of the authors, and each interview lasted from a half an hour to one hour. The interviews were

conducted in the Greek language and the interview transcripts were translated before analysis into English. We used a *theoretical sampling* strategy for our data collection, targeting individuals who were users of IT-based services and had experienced at least one IT-based service degradation incident. The goal of theoretical sampling is to select data sources based on the needs of the emerging theory and the generation of theoretical understanding (Bryman, 2008; Ransbotham and Mitra, 2009; Seale, 1999). We selected the interviewees randomly; the participants are individuals who were eating lunch at a restaurant or taking drinks at a cafeteria or were reading in a library and were randomly invited to participate to the study. Thirty-six individuals agreed to participate, but four of them could not recall any significant IT-based service degradation and two of them could only associate service degradation with IT products' failure experiences instead of IT service ones, therefore, they were excluded from the sample. In particular, the two participants that were excluded from the sample referred to a) incomprehensible manual on creating a recovery DVD for a purchased laptop and b) their own computer malfunctions while using the national tax system which did not allow the creation of a tax report. All participants had experienced at least one ITSD incident. However, three of them recalled two IT degradation incidents. Therefore, our sample includes thirty participants and thirty-three ITSD incidents. The participants discussed twelve different types of IT-based services and in particular: a telecommunication package (landline, Internet), mobile Internet, home Internet, mobile applications, e-shopping, e-banking, public services (i.e., renewing a car license), bonus points awarding service via credit card, automatic tolls, mobile phone value added services, online medicine prescription, and bank services. Appendix C presents descriptive information of the participants and the associated services and degradation incidents.

The interviews were semi-structured, using an interview protocol (see Appendix D). Semi-structured interviews use incomplete scripts, allowing for flexibility, improvisation, and openness. We agreed with the interviewees that personal information would not be disclosed. All interviews were recorded using a digital recorder and then transcribed; however, two

participants felt uncomfortable with the tape recorder and hence field notes were taken. We used mirroring as a questioning approach in our semi-structured interviews (Myers &Newman, 2007). In mirroring, the interviewer uses the interviewees' words and phrases to construct subsequent questions. This is to ensure that both interviewees and interviewers use the same language ("their world in their words"), and it reduces the chance of using leading questions. For example, if a subject mentioned that they had experienced a degradation in service ("I went to my bank but *their computers didn't work*") the interviewer could probe the event in greater depth using the subject's own words (e.g. "What did the bank staff say when you discovered *their computers didn't work*?). This dialog exemplifies the concept of mirroring as well as showing how we explore an event in greater detail (sometimes referred to as drilling down into the data).

Theoretical saturation deals with the sufficiency of qualitative research (Denzin & Lincoln, 2005). A saturation point is reached when the same statements are repeated or no new information is gathered. We reached the saturation point after about twenty interviews, when we observed that the same information recurred in the answers. In the next section we provide detailed information on the data analysis and coding[2].

5. TOWARDS A STAGE THEORY OF USERS' DECISIONS FOLLOWING IT-BASED SERVICE DEGRADATION

Based on our interviews, we found that users' behavior and the related decision-making following an ITSD involved a developmental progression. We analyzed the empirical data seeking to identify developmental progression. The interviews indicated that all customers presented a similar developmental path. In order to recognize the stages of this developmental path we coded the empirical data looking for common stage theory elements, such as common behaviors and common behavior changes (indicating a stage), factors influencing behavior, factors affecting the individuals. Our coding process involved breaking down, examining, comparing, conceptualizing the data and identifying categories of data, in a similar fashion to

[2] Space limitations do not permit us to explore here the audit trace from how data was created (i.e., research method associated with data collection), the creation of stages, the use of stages (that is, the analysis in appendix E), through to the theory creation (i.e. "An IT-based service degradation decision theory").

open coding. The categories of data in our case were stage theory elements (i.e., stages, factors, conditions for omitting stages, relapse triggers) and we present descriptions for the data coding in the respective Tables (i.e., Tables V-X). We included a sample of coding in Appendix E (Coding results for interviewee #1, and for every other sixth interviewee) .

Our findings indicate that users' decision-making follows a developmental path, making different factors that determine individual behavior each time (i.e., the stage-specific factors). Some determinant factors, however, influence users' behavior at all stages (i.e., the stage independent factors). It is also important to notice that users focus on different decisions associated with the final decision to remain or reject the service during each stage. For example, in the early stages, the user focuses on identifying the sources of the ITSD – which means that they are not likely to reject the service while experiencing them - while in the final stages the user focuses on identifying alternative service providers. In order to depict this focus shift, we enriched the stage theories concepts (described in Table IV), with two extra concepts: the concept of the *stage decision*. Empirically, we found two types of stage decisions. The first stage decision is a *development decision* which makes the user a) move to next stages (i.e., a moving trigger or condition for stage omitting) or b) move to a previous stage (i.e., a relapse trigger). The second stage decision is the *service remaining/rejecting decision*. The individual combines his/ her own attributes with service attributes which results in a remaining/rejecting decision; that is, to continue using it or to reject it. Our findings indicate that at all stages the users combine the perceived value of the service with the associated costs to determine their decisions. We note that the perceived value of the service changes during the ITSD experience, depending on the type of ITSD, its duration, the IT context, etc. In particular, the user makes decisions based on the dynamically calculated value based on the benefit that the service offers to them and the cost that they bear. This is in line with the recommendations of the service research literature (Vargo & Lusch, 2004, 2006; Spohrer et al., 2008), which suggests portraying services based on the customers' experienced and perceived value.

Next, we describe our stage theory that was developed based on the interviews. Figure I depicts the IT-based Service Degradation decision theory (ITSD Decision Theory), which emerged from analyzing the data. Each one of the stage theory elements was identified by discovering common behaviors and patterns in the participants' behavior towards a service after ITSD occurred. The data indicated that there were significant behavioral changes, such as when the participant starts a search for alternative providers. We indicated these significant behavioral changes as different stages. The factors that led to the behavioral changes were indicated as moving triggers. The factors that were determining participant's decisions and reactions were indicated as stage-specific factors (if they existed only in specific stages) or stage-independent factors (if they influenced behavior throughout the ITSD experience). There were times when factors made the participant to return to previous attitudes, which we indicated as relapse triggers. Also, sometimes the participants skipped behaviors that were observed in other participants due to certain factors, which we represented as conditions for stage omitting. When an element results in developing users' behavior (i.e., a moving trigger, relapse trigger, and condition for stage omitting), we categorize it as a development decision. When an element represents users' decisions towards remaining or rejecting the service we classify it as a service decision. Next we describe each element of the stage theory, in accordance to the element types.

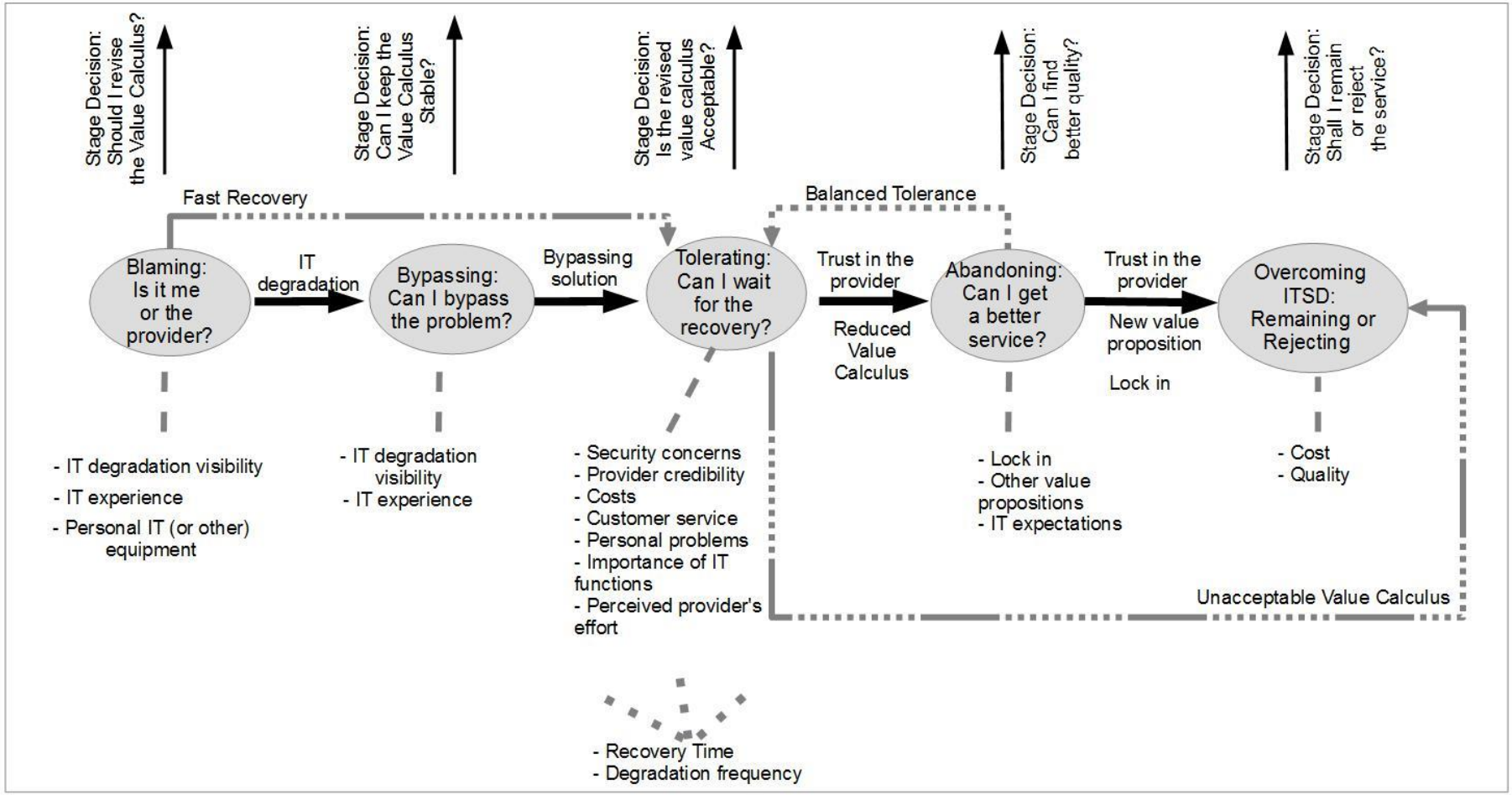

Figure I.: The IT-based Service Degradation Decision Theory (ITSD Decision Theory)

5.1. Ordered Stages

Based on our analysis of the interviews, five stages of users' behavior follow an ITSD that leads to a disruption of the normal service delivery. As already described, stages are theoretical constructs which, although non-existent in nature, can be useful in enhancing the understanding of a complex phenomenon. Users belonging to the same stage are expected to share similar behavior and be affected by similar factors. The five stages are depicted in Table V.

Table V: The Stages of the ITSD Decision Theory

Stage		Description
Blaming		In stage 1 the users focus on who should be blamed for disruption of the normal service delivery that they are experiencing. Users' decision-making in this stage is concentrated around the question of whether they or the service provider is to be blamed for the service degradation.
Bypassing		Users in stage 2 decide if they can find a way to avoid the service value reduction. Therefore, they find workarounds to overcome the service degradation by either attempting technical tricks or alternative paths when the service is degraded.
Tolerating		Users in stage 3 may have found a bypassing solution or may not have found one. Regardless of whether the user utilizes the service via a bypassing solution or keeps utilizing the degraded service in stage 3, she focuses on calculating what the impact of this new situation is for her and what is the new service value for her being impacted by the ITSD. Users in this stage have not yet considered switching to another provider.
Abandoning		Users in this stage perceive that the value calculus has been reduced to an unacceptable level, or they do not trust the service provider any longer. The main characteristic in this stage is the exploration of alternative offers/providers for the same service.
Overcoming	Remaining	Users in this stage decide that they will remain with the same provider for the service despite the ITSD experience and its impact to the service value.
	Rejecting	In this stage the users decide that they will switch to another provider for the service.

Next, we provide evidence from the interviews for each one of the identified stages.

5.1.1.ITSD Stage 1: The Blaming Stage

During Stage 1 of the ITSD process the users focus on deciding: "Is the service provider or I responsible for the disruption?". All participants in the interviews mentioned that when the service problem occurred they became confused about the source of the problem at first and did not know if it was their fault, the provider's fault, or even a provider's partner's fault:

> *"While using my mobile Internet, many times the Webpages appear to load very slowly or even fail to load even when there is good signal. At first, I thought that my own mobile device caused this." Interviewee 3, 15.02.2014*

IT-based services commonly rely on a series of interconnected devices and providers, making it hard to recognize immediately the source of the problem (e.g., when an application fails to connect, it could be the fault of the application provider or the internet provider or the device). Thus, a user at this stage does not know who to blame:

> *"Our new telecommunication package for landline phone and Internet many times creates noise when talking on the phone and using the Internet at the same time, or even worse, the Internet connection drops when someone is calling the landline. For many days, we couldn't know what was happening. I thought that there was a problem with my modem, and I lived with the problem until it was confirmed from the provider that there is a problem with our connection." Interviewee 5, 16.02.2014*

5.1.2. ITSD Stage 2: The Bypassing Stage

During Stage 2 of the ITSD process users focus on answering the question: "Can I find a solution to overcome the problem?". Users attempt to find technical workaround solutions in order to continue receiving the service (at the same or even reduced quality):

> *"The Internet connection was active and failing constantly. I used to visit cafeterias in other neighborhoods with my laptop to complete my tasks about the restaurant." Interviewee 1, 24.01.2014*

Users remain in this stage as long as they keep trying for new workarounds. They could move to the next stage either because they found a workaround or because they become fed up trying to find a workaround solution: *"By trying many things we realized that the only way that it works is if only one cable is connected. So when we want to use internet we plug the one cable and when we want to make a call the other." Interviewee 5, 16.02.2014*

5.1.3. ITSD Stage 3: The Tolerating Stage

During Stage 3 of the ITSD process users focus on the question: "Can I tolerate the situation until the full recovery of the service?". Users evaluate the new situation that they encounter, which is either the necessity to apply a workaround solution or the experience of a degraded service. Both situations affect the user who assesses whether she is willing to wait for the service provider to resolve the ITSD permanently:

"I talked to the technical service and they said they would fix it in 2 days…. It has been 1 month from that time, so I don't trust them anymore." Interviewee 5, 16.02.2014

At stage 3 the users have not yet considered switching to another provider:

"If the problem happens again when I am in the middle of something urgent or important to me…then yes I would start considering to change provider", Interviewee 6, 16.02.2014

5.1.4. ITSD Stage 4: The Abandoning Stage

During stage 4, users focus on answering the question: "Can I find a better service provision?". The users at stage 4 have decided that they cannot tolerate the existing service provision situation because the value calculus has been significantly reduced. During this stage users' decisions focus on the identification of alternative providers and service offers:

"I gave two months to the provider to resolve the problem, but I no longer believe them. I am searching for an alternative provider." Interviewee 5, 16.02.2014

During this stage the users consider various service propositions and establish the criteria that are important for their evaluation:

> *"Of course, the cost is important, but I don't care if the new provider will be more expensive, as long as I get the quality I want." Interviewee 5, 16.02.2014*

The quality of the service becomes the most important factor for assessing the value propositions by alternative providers:

> *"I will wait 3 more weeks and then I will assume that the problem is unresolved. [In that case] I would stop using this provider. I want to use providers who find the solutions to the problems and don't expect me to search what the problem is and how it can be resolved", Interviewee 10, 19.08.2014*

5.1.5. ITSD Stage 5: The Overcoming Stage

During stage 5 users will decide if they want to Remain at the service, despite the service degradation, or if they want to eventually Reject the service.

5.1.5.1. Remaining

Users might get to stage 5 either after considering alternative providers (via stage 4) or after tolerating the situation until it was resolved (via stage 3). In this stage they might decide to remain at the same service for several reasons, defined by the stage-specific factors (e.g., lock-in) and the stage independent factors:

> *"Well, I am registered as a pay-as-you-go customer, so I feel that I can tolerate this issue as many times as it may happen. It would be different if I was a contract-based customer", Interviewee 2, 15.02.2015*

> *"I did not consider any alternative options. If it happens again frequently then I will", Interviewee 12, 26.08.2014*

5.1.5.2. Rejecting

During stage 5 the users may make the decision to discontinue their collaboration with the service provider and enroll with a new service provider. The service cost and expectations for quality mainly influence their decision-making during this stage:

> *"A friend works at this provider and made me feel that I won't have the same problems." Interviewee 1, 24.01.2014*

> *"I negotiated with the new provider on the Internet speed and explicitly told them that I would leave if they don't offer fast Internet", Interviewee 16, 08.12.2014*

5.2. Stage Specific Factors

Stage specific factors are the ones that determine individual behavior only in certain stage(s). The presence of stage specific factors is a prerequisite for a stage theory; if there are no stage-specific factors then there is simply no need for a stage theory. Table VI presents the stage specific factors and their description, the stages in which they determine customer behavior and the relevant factors that we identified in the previous work in e-service quality and service failures research.

Table VI: Stage Specific Factors of the ITSD Decision Theory

Stage Specific Factor	Description	Present in these Stages	Relevant factors in existing literature
IT experience	The user commonly refers directly to her/ his own ability to deal with IT problems, such as "I don't know many things", or "I know how it should be."	Blaming Bypassing	-
IT degradation visibility	The user implies if it was easy or not to identify the IT degradation causing the service failure. Commonly, he/she extensively describes the different sources of the problem that he/she imagined or uses expressions like "I couldn't tell what it was.", or "I was sure it was . . ."	Blaming Bypassing	-
Personal IT equipment	The users mentioned that they could not know what the service failure is and especially if the problem is caused by their	Blaming	-

	own devices, such as "I still don't know if it was because of my modem or my internet connection."		
Importance of IT functions	The service creates value for the user. The user associates the value he/she receives from the service with the IT-enabled function that is impacted by the ITSD. IT functions include applications (e.g., Skype), software (e.g., online game), or broader task descriptions (e.g., chatting, working).	Tolerating	Severity/magnitude of failure (Bejou & Palmer, 1998; Smith & Bolton,1998; Smith et al., 1999; De Matos et al., 2007) Type of failure (McColl-Kennedy & Sparks, 2003; Smith & Bolton,1998) Customer value of the service (Sajtos et al., 2010)
Provider's perceived effort	This is indicated by discussion about the actions of the provider for service recovery. It is indicated by expressions such as "They were doing . . . doing . . . doing things . . .", or "They said they would fix it."	Tolerating	Recovery failure (Funches et al., 2009) Recovery action (McColl-Kennedy & Sparks, 2003; Smith et al., 1999) Recovery expectations and performance (McCollough et al., 2000; Hess et al., 2003) Failure recovery (Zhang et al. 2015)
Customer service	Customer service as a factor is evident by discussions concerning the politeness, but also efficiency of the customer service, such as "The employees were very polite regardless that they did not find any solution.", or "It was not worth calling the customer service anymore: they would not find a solution and I would simply lose time."	Tolerating	Customer Service (Luo et al., 2012; Papadomichelaki and Mentzas , 2012) Contact (Parasuraman et al., 2005; Conolly et al., 2010)
Provider credibility	Degradation incidents challenge the user's perception of the provider credibility and whether the provider is reliable. This was indicated by the participants with direct reference, such as "their inability to fix the problem made think that they are overall	Tolerating	Vendor reputation (Kim et al., 2004), Perceived risk with vendor (Gefen, 2002)

	unreliable."		
Security Concerns	When users consume IT-based services, they usually have some security and privacy concerns that are increased when degradation incidents happen. This was indicated by the participants with expressions like "When there is a problem with the service, I am immediately concerned about my credit card information that was sent.", or "My biggest fear when shopping online is the protection of my data, and the incident added up to this fear."	Tolerating	Information security (Tan et al., 2013) Security and Privacy (Yang et al., 2005) Privacy (Conolly et al., (2010; Parasuraman et al., 2005)
Personal Problems	The reaction of the user to the ITSD might be influenced by the personal issues that trouble the user at the times of the ITSD impact. The user refers to this factor by mentioning "It also depends on…", "If it happened in a weird day…"	Tolerating	-
Costs	Users mention that cost is a secondary criterion compared to quality, but still affects the choice of new provider. Costs refer to any pricing, compensation or bypassing costs they undergo, such as "They gave me a month's fixed cost as compensation"	Tolerating Overcoming	Customer value (Sajtos et al. 2010) Pricing (Luo et al., 2012) Compensation (McColl-Kennedy & Sparks, 2003; Smith et al., 1999)
IT expectations	The user's expectations about how IT should function in general nowadays emerge, such as "Supposedly, we are in the era of 4G.", "It is tragic and comical at the same time to have such problems in 2014.", or "My expectations are rather low for Internet in the area that I live, because it is an isolated area and the infrastructure is not good."	Abandoning	-
Other value propositions	When a user searches for alternative providers, he/she assesses their offers. It involves discussions around "I want really better bandwidth.", or "The combination of	Abandoning	-

	price with quality matters."		
Lock in	The user implies a sense of entrapment. Expressions like "I would have to pay for the IT equipment.", "There is no better choice.", or "There is no alternative application that is compatible for both MAC and Windows" indicate such a locked-in actual reality or perception.	Abandoning	Cost to switch vendor (Gefen, 2002; Bougie et al., 2003, De Matos et al., 2007)
Quality	Users explicitly state that a core criterion for choosing a new provider is the service quality they expect to receive.	Overcoming	Service quality (Sajtos et al. 2010; Parasuraman et al. (2005)

5.3. Stage Independent Factors

Stage independent factors are the ones that determine individual behavior at all stages. Two factors surfaced from the analysis of our interviews to affect individual behavior at all stages: Recovery time and Degradation Frequency, as depicted in Table VII.

Table VII: Stage Independent Factors of the ITSD Decision Theory

Stage Specific Factor	Description	Relevant factors in existing literature
Recovery time	The user refers to the recovery time directly, such as "It's been two months now . . ."	Recovery speed (Smith et al., 1999) Satisfaction with recovery (Maxham & Netemeyer, 2002)
Degradation Frequency	The participants mentioned degradation frequency directly as a factor that affects them, such as "It depends how often it happens...", or "I considered changing providers when the incidents were repeating frequently."	Prior failure experience (De Matos et al., 2007) Failures by stable causes (Hess et al., 2003)

5.4. Development Decisions: Moving Triggers

Moving triggers refer to the factors that influence people to move from one stage to the next one, and therefore trigger users' behavior change and development, which means that the user

changes his/her stance against the service. Table VIII summarizes the moving triggers in our stage theory.

IT degradation

Users move from the stage of "Blaming" to the stage of "Bypassing" when they identify the source of the *IT degradation* causing the ITSD. Recognizing the source of the ITSD might occur based on the interaction between the users' IT experience (*user attribute*) and the IT degradation visibility (*service attribute*). Alternatively, the provider himself could confirm the IT problem.

> *"While using my personal computer to surf the Internet, suddenly the connection was lost. I don't know many things about computers. The computer indicated that there was Internet connection as normal. At first, I thought it was my own computer, so I restarted it, but nothing changed. I kept refreshing the Webpages for 20 minutes until I called customer service and they guided me to resolve the problem." Interviewee 6, 16.02.2014*

Bypassing Solution

Users will move from the "Blaming" to the "Tolerating" stage when they find a *bypassing solution* to maintain the value calculus or when significant recovery time elapses (see Alter, 2014). This depends on the IT experience (a *user attribute*) and the visibility of the IT degradation (a *service attribute*).

> *"I tried to disconnect the phone or the Internet, and it worked! I had to have one of them disconnected so that the other would work fine. I ended up moving around the house, holding a cable all the time, but it has been two months now. Sometimes, when the landline is occupied and I need the Internet, I have to use my mobile Internet, which costs a lot." Interviewee 5, 16.02.2014*

Trust in the provider

Users might move from the "Tolerating" to the "Abandoning" stage if they lose *trust in their provider*. Our findings indicate that a user loses trust in their provider but this depends on the interaction between his/her perception that the provider actually makes an effort to resolve the issue (a *user attribute*), his/her perception about customer service (*a user attribute*), his/her perception about the provider's credibility (*a user attribute*), or his/her perception of the final recovery time (a *service attribute*). The user might also lose trust in the provider if the degradation triggers significant concerns about the information security and privacy protection capability of the provider (*a user attribute*).

> *"Throughout the times that I used this provider I had built a trust towards him, which is slowly breaking down…If the provider is not capable of fixing the problem, it makes me wonder about the overall capabilities and whether my confidential data are actually in good hands." Interviewee 10, 19.08.2014*

Reduced value calculus

Users might move from the "Tolerating" to the "Abandoning" stage or from the "Tolerating" to the "Overcoming" stage (i.e., rejecting) if the value calculus is significantly reduced. Users in this stage recalculate the costs and benefits of the service, by combining the benefits from the supported functions—in use (a *user attribute*), the recovery time (a *service attribute*), the degradation frequency (*a service attribute*), and the total cost (including bypassing costs, such as time and effort, price, and compensation) (*service and user attributes*). This will result in an *assessment of the value calculus* as tolerable, significantly reduced, or unacceptable.

> *"I use Viber only for fun. For me, it is a fun way of communicating because it integrates multiple channels, such as chat, voice, mms, and emoticons. I don't use it when I need to contact someone urgently so I can wait when there is a problem...But if I paid for it, I would be more demanding, of course." Interviewee 8, 19.08.2014*

> *"The bonus system was an add-on service. It was not the most important part for me, but it was an additional benefit to consider." Interviewee 16, 08.12.2014*

"It became a problem only when I was lost on the street and I needed the GPS application. When the problem affected the GPS application and I was lost while driving my car, I couldn't tolerate it." Interviewee 2, 24.01.2014

Lock In

Users might move from the "Tolerating" or the "Abandoning" stage to the "Overcoming" stage in the presence of lock-in parameters (a *service attribute*). Particularly when lock-in parameters are combined with low IT expectations (a *user attribute*), the user will choose to remain at the service provider, after balancing his/ her own expectations and available options. Lock-in parameters might include the lack of an alternative provider (due to living in rural areas or due to IT compatibility issues) or high switching costs. For example, the participants mention:

"I live with my parents, but if it was only my decision I would have changed providers." Interviewee 11, 20.08.2014

"I haven't changed providers only because I am bound to a two-year contract. I am waiting for the contract to end, so that I can change providers." Interviewee 16, 08.12.2014

Table VIII: Moving Triggers of the ITSD Decision Theory

Moving Trigger	Description	Relevant factors in existing literature
IT degradation	The users move from the Blaming to the Bypassing stage after they clarify what is the IT problem that causes the ITSD and specifically whether the IT problem occurs on their IT equipment or the provider's IT systems. The user discusses what causes the IT-based service degradation: "What causes the problem?", "I thought that there was a problem with . . .", and "The actual problem was . . ." The user also typically refers to a change in behavior, such as "At first I thought . . .but . . ."	-

Bypassing solution	The users may move from the Bypassing to the Tolerating stage when they discover a technical or nontechnical workaround solution to overcome the ITSD. The user discusses tasks that he/she would not otherwise do. Common expressions are “I had to . . .”, “I only do that by. . .”,or “I ended up doing . . .”	-
Trust in the provider	When the users are in the tolerating stage they do not consider abandoning the service provider. Events or extended recovery time might make the customer gradually lose her trust in the provider. The user expresses his/her belief regarding the provider’s handling of the IT degradation as well as the change in behavior. Trust is mentioned mostly directly, such as “I do not trust the customer service anymore.”, or “I stopped thinking it would be resolved.” It is also implied, such as: “It makes me feel that the provider is generally unreliable.”	Trust to the provider (Bejou & Palmer, 1998; Sajtos et al., 2010) Duration and quality of relationship with the provider (Grégoire et al., 2009)
Reduced value calculus	When the users are in the tolerating stage they do not consider abandoning the service provider. Events however can make them move to the abandoning stage, such as extended recovery time, or the ITSD impacting an important to the customer IT-based context (while before this context was not affected). If this is considered significantly reduced (but not unacceptable) the user moves to the abandoning stage in which she searches for alternative propositions, while still being contracted to the provider. The user discusses the impact of the bypassing solution in combination with the time he/she tolerated it: “I ended up [bypassing solution], but it has been [recovery time] now” or discusses the new impact: “It became a problem only when …”	Dissatisfaction (Bougie et al., 2003)
Lock in	The user implies a sense of entrapment. Expressions like “I would have to pay for the IT equipment.”, “There is no better choice.”, or “There is no alternative application that is compatible for both MAC and Windows” indicate	Cost to switch vendor (Gefen, 2002; Bougie et al., 2003)

	such a locked-in actual reality or perception.	

5.5. Development Outcomes: Relapse Triggers

Balanced tolerance

Users might relapse to a previous stage under certain conditions. Users might return from the stage of "Abandoning" the service to the stage of "Tolerating" if the revised value calculus is acceptable (see Table IX). This is influenced by the interaction between the user attributes and the service attributes. Lock-in parameters (service attribute) influence a relapse, combined with users' IT expectations (user attribute). Below, there are two examples in which IT expectations determined how the users process the compensations offered by the providers to overcome the problems.

> *"Internet should be quicker by now. Technology has advanced. If a provider offered guaranteed better quality, I would move, regardless of the cost or offers."*
> *Interviewee 4, 15.02.2014*

> *"I would remain with the same provider if there is a good price reduction or compensation. But only if I know that the problem is completely resolved and it won't happen again." Interviewee 5, 16.02.2014*

Table IX: Relapse Triggers of the ITSD Decision Theory

Relapse Trigger	Description	Relevant factors in existing literature
Balanced tolerance	The user expresses an entrapment in the service, given certain constraints, such as "There is no better service", "It would take significant cost to switch to an alternative provider."	-

5.6. Development Decisions: Conditions for Stage Omitting

Certain conditions might influence people to omit one or more stages, such as fast recovery and unacceptable value calculus (Table X).

Fast Recovery

When users encounter an ITSD but the solution or an alternative option is given quickly to them (usually by the service provider) they tend to move to the "Tolerating" stage.

> *"Customer service immediately confirmed the problem and guided me to the solution, so I didn't have to worry about what to do", Interviewee 6, 16.02.2014*

Unacceptable value calculus

When users experience an ITSD while using the service in a function with high value for the users, then they are likely to skip the "Abandoning" stage because they assess the *value calculus as unacceptable* (in contrast to being significantly reduced that would lead them to the abandoning stage). In this case the user does not want to collaborate with the service provider anymore and thus moves directly to rejecting completely the service. This stage outcome is derived by the user's combination of the benefits from the supported IT functions (a *user attribute*), the recovery time (a *service attribute*), and the total cost (including bypassing costs, such as time and effort, price, and compensation) (*service and user attributes*).

> *"Especially after the last call to customer service, I would change in no time. I find their excuse unacceptable." Interviewee 11, 26.08.2014*

> *"…the situation became completely unacceptable to me when I really needed to communicate via Skype and my friends and family couldn't hear any of what I was saying", Interviewee 27, 26.01.2015*

> *"It is very big trouble for a service like this. After all I can still pay in cash and get over with it". Interviewee 9, 19.08.2014*

Table X: Conditions for Stage Omitting in ITSD Decision Theory

Relapse Trigger	Description	Relevant factors in existing literature
Fast Recovery	The user explains usually the reasons why he/she didn't have to bother for long time with the problem, such as "Customer service immediately confirmed the problem and guided me to the solution, so I didn't have to worry about what to do"	Recovery speed (Smith et al., 1999)

Unacceptable value calculus	The user discusses what impact he/she wouldn't tolerate, commonly in association with the IT function that it would affect, such as "It is okay for [context A], but not for [context B]."	-

5.7. Service Decisions

Users' IT experience, personal IT equipment, and the IT problem' visibility mainly determine users' behavior in the "Blaming" stage. In this stage, users focus on the question "Should I revise the value calculus?" Users' decisions in this stage commonly refer to the source of the problem and users typically do not reject the service in this stage. In the "Bypassing" stage, users' IT experience and the IT problems' visibility determine the users' behavior. The question surrounding users' decision is "Can I keep the value calculus stable?" Users' decisions at this stage focus on keeping the value calculus stable by maintaining the benefits of the service. Users in this stage also do not reject the service, but instead they remain in the service until it is recovered or until they move to the next stages. In the "Tolerating" stage, trust in the service provider, chosen IT-enabled functions, and cost-related factors (compensation, price, and cost of bypassing solutions), raised concerns (i.e., security) and these factors influenced users' behavior. Users in this stage decide the value calculus based on the revised benefits and costs in answer to the question, "Is the revised value calculus acceptable?" Here, users decide to remain in the service or consider abandoning the service based on their trust in the provider resolving the issue or based on how much the value of the service has been reduced for them. The benefits are recalculated based on the impact of the degradation of the particular IT-enabled functions that are damaged. Costs can also be recalculated if the provider offers compensation for the degradation. In the "Abandoning" stage, the users' behavior is determined mainly by service quality in order to decide if they will remain at the service or reject it. Users' decision-making considers the question "Can I find better quality?" Users would be willing to remain at the service only if they trust that the problem will not occur again, and they would sign up to a new service provider only if they offer guaranteed quality. Table XI summarizes the decision outcomes in our theory.

Table XI: Service Decisions in the ITSD Decision Theory

Decision Focus	Description
Should I revise the value calculus?	In the Blaming stage the user does not consider abandoning the service or the provider. A user in this stage decides if she should re-evaluate the service, but does not do so until she makes sure that the IT-based service degradation is actually the service provider's fault: "Now that we know it is their fault . . ."
Can I keep the value calculus stable?	In the Bypassing stage the user attempts IT tricks or other types of workarounds in order to resolve the ITSD or minimize its impact. The user makes decisions to avoid reducing the benefits that she receives. For example: "It prevents my communication, so I tried plugging and unplugging the cables to see.", or "I kept trying things . . . restarting, refreshing the Webpage . . ."
Is the revised value calculus acceptable?	In the Tolerating stage the users' decisions typically surround the constant question of whether the new situation is acceptable to them. The ITSD keeps affecting them constantly which means that new IT-based contexts could be impacted anytime (e.g., a user might need to use the GPS on the street when she loses her way, although she hasn't confronted this particular impact from the ITSD initiation because she hasn't lost her way). The user re-evaluates the service, considering the new status, such as "*It ties my hands*" or "*I pay for having a connection, and I don't have it*". This evaluation is constant while the ITSD remains. The user dynamically questions if the service is acceptable at all times while the ITSD remains. As long as the answer is that the service is acceptable, the user remains in the Tolerating stage. If an impact happens that the user doesn't tolerate then the revised value calculus becomes unacceptable or significantly reduced. If the revised calculus is significantly reduced, then the user moves to the abandoning stage and searches for alternative propositions in the market while still being contracted with the provider. In this case the provider still has the chance to keep the customer engaged (i.e., see relapse triggers). However, if the revised calculus is judged as unacceptable then the user firmly decides that the she will abandon the provider and rejects the service immediately without going through the Abandoning stage, regardless of the other propositions (e.g., if they are more expensive).
Can I find better quality?	Guaranteed service quality becomes the primary factor for evaluating alternative service offers. The user discusses this as "I prefer to pay double price" or "I wouldn't care about offers . . . if I need the service, I want it to be recovered."
Shall I remain at or reject the service?	In the Overcoming stage the users decide whether they will remain or reject the service. This is the final decision following ITSD, and different users might be brought to this stage following a different course (even if they experienced the same ITSD. The users might undergo this stage either via the Abandoning stage or via the Tolerating stage. The users discuss this decision as their final outcome of this process, such as "…I couldn't tolerate it" or "I didn't have an option so I had to stay with the provider, but I would

	change immediately if a better option appears"

6. DISCUSSION

We developed the ITSD Decision Theory, which we would classify as TYPE II in terms of Gregor's (2006) classification; the theory provides explanations but does not aim to predict with any precision. Our research objective is to address the question "what explains customers' decision to continue using or to abandon their IT-based service following ITSD" Our stage theory indicates that customers' behavior undergoes five stages during the experience of ITSD: blaming, bypassing, tolerating, abandoning and overcoming (i.e., remaining or rejecting). During each one of these five stages the customers make different decisions related to their ITSD experience, but only during the last three stages do they make decisions related to continue using the IT-based service or to abandoning it based on different factors. For example, personal IT experience affects customers during the beginning of an ITSD, while cost or security affect customer behavior in later stages, and trust towards the provider or lock-in parameters affect their behavior at the last stage. Table VI summarizes the factors that affect customer behavior per stage, while Table VII describes the factors that are influential throughout the ITSD. During the first two stages customers do not abandon the service, but instead their decisions are centered on finding the problem and finding a solution themselves. Next, we elaborate further on the new contributions that derive from this study.

6.1. New Contributions

Theoretical contributions usually offer answers to the questions of what, how and why (Whetten, 1989). In terms of factors that are involved in the explanations (the 'what' part), our ITSD Decision Theory offers newly identified constructs that have been neglected from the SR literature because they do not account for the IT role in IT-based services. Tables V-X present the new factors (e.g., IT expectations, cost of bypassing, personal IT equipment).

In terms of the factors' interrelations (the 'How' question) we argue that customers' decisions to quit or continue using a service can be a complex dynamic causality (Thagard 1998) which

involves multiple interacting factors and their causal role can change. Existing SR studies offer explanations for the determinants of customer behavior following service failures, using continuum models. This means that a set of static factors (e.g. failure magnitude, anger, trust) or their combination determine customer behavior. Our ITSD Decision Theory proposes that customer behavior following ITSD is a change process. The importance of any determinant factor that contributes to customer behavior has varying importance during the ITSD process. For example, IT experience affects customer behavior a great deal in the beginning of the ITSD experience, but does not have an effect after the user decides to wait for the provider to offer a solution or the user searches for an alternative provider. Also, the same factor, IT experience, in Stage 1, affects customer behavior more in the case when personal IT equipment is involved in service delivery, compared to the case in which personal IT equipment was not involved.

Regarding the rationale behind the theoretical explanations (the 'Why' part), the ITSD Decision Theory was developed inductively by empirical data and analyzed through qualitative coding. Detailed analysis of the coding process, including sample interviews, are given in Appendix E.

Next, we discuss our key contributions in more detail. First, our findings indicate that *IT-based services differ significantly* from other types of services (traditional, non-IT-based services), as well as their failures. Customers in traditional services, which are not IT-based, become immediately aware of the source of a service failure, such as a purchased product defect, unprompted and unsolicited employee actions, mistakes, slow procedures, packaging errors, or incorrect pricing and actions against fair trade (Bitner, 1990; Lewis & Spyrakopoulos, 2001). However, in the presence of ITSD, customers become confused regarding the actual source of the service failure. Typically, they are not certain if it is the service provider's fault or their own. This confusion is amplified if the service delivery involves customers' personal IT equipment (e.g., a mobile phone), which is now a common situation. We found that users tend to first blame themselves or their own IT equipment

before blaming the service provider. Additionally, this confusion is amplified considering today's complex supply chain that involves multiple providers and is less transparent to the customers, such as the customer's internet service provider, the mobile application provider, the provider's internet service provider, the delivery service provider, and so on. This situation is evident in our empirical study, such as Interviewee 10 who said, "*The provider seems to blame the delivery service without taking any responsibility or making any corrective actions… I want for the providers to have the end-to-end responsibility instead of blaming their partners*".

Furthermore, when an IT-based service is degraded, the users might find ways to temporarily resolve the failure. Due to its technical nature, users might overcome an IT degradation using technical tricks or using workaround solutions. We found examples of all of these. In addition, although we discover that users have high IT expectations and expect that technology should function with high reliability, we found evidence that the users still evaluate an ITSD as more acceptable than a service failure caused by human mistake or providers' negligence. In the case of ITSD, our participants even created excuses themselves for the provider, such as "*Considering where I live, I don't expect information technology to function very well*", Interviewee 21 or "*What can they do? It's not really their fault, and it can happen*," Interviewee 25 or "*It was Sunday, which is a day off, so maybe this is why it happened*." Interviewee 28 etc. The previous work in service management literature that deals with IT-based services (Forbes et al., 2005; Holloway & Betty, 2003; Meuter et al., 2000; Lewis and Spyrakopoulos, 2001) does not cover this phenomenon, because they identify service failure typologies (e.g., web navigation problems, insufficient information provided at the website, poor technology design, technical failures) and thus they do not examine how customer's behavior is influenced following ITSD and which factors are important.

Second, our findings indicate that *modern IT-based services differ significantly* from previous services (traditional or IT-based), in terms of their failures. Today's service market is different from the past due to the increased reliance on IT and in the separate role of IT for

service delivery. Additionally, customers themselves are different in the 'consumerization' era that we are experiencing due to the increased diffusion and availability of personal IT (i.e., light netbooks, smartphones, tablets) that makes individuals more experienced and familiar with IT. This is evident in our stage theory and the elements that are entirely new to the service failures/e-service quality literature. For example, Table VI presents the stage specific factors that influence customer behavior following a failure. Entirely new factors to the service failures/e-service quality literature include: a) personal IT experience which means that the user associates his/ her own IT knowledge and skills with the outcome of the ITSD; b) involvement of personal IT equipment for service delivery that means the customer wonders if the personal IT equipment creates a problem; c) IT degradation visibility that means how visible is the IT problem to the customer; d) IT expectations that means the user is now accustomed to fast and reliable technology and she might be less tolerant of ITSDs and IT problems; e) workaround solutions which sometimes include IT tricks with which the user attempts to resolve or overcome the IT problem of the provider. Therefore, our stage theory captures IT specific factors that influence customer behavior towards IT-based services that are unique to today's modern service market.

Third, IT-based services may enable a broad range of contexts that provide value to the user. Therefore, each service is, in a way, personalized to the user and the contexts with which he/she decides to associate. Thus, users' behaviors following ITSD depend on the personally determined *IT-enabled contexts* that are impacted. In particular, traditional services create a specific value for the customer, predefined by the service provider. For example, banks might offer bank accounts, loans, currencies, payment of bills, etc. With IT-based services, on the other hand, banks have the capacity to enable a broader range of value to the customer and support the delivery of multiple IT-enabled contexts. Therefore, the way in which the customer chooses to use the service influences what value it creates for him/her.

Fourth, existing service research literature assumes a concurrent effect of the determinant factors to users' decisions. For example, McCollough et al. (2000) provided findings that four

factors (failure expectation, service performance, recovery expectation, and recovery performance) determine customers' satisfaction without explaining how the customers' behavior develops and how failure expectations and recovery expectations develop. Similarly, Smith and Bolton (1998) validated the effects of service failure (type and magnitude) and service recovery on customer satisfaction, assuming that those factors concurrently affect the customers' beliefs and attitudes. Our empirical investigation, however, suggests that users' behaviors develop during the service delivery and degradation, and this makes different factors important through the *development path*. There are limited studies (Bejou & Palmer, 1998) that identified this developmental process, and they do not specify in detail the factors that are associated throughout the development process. IS literature comprises theories that include such a developmental approach but do not examine continued IS use after IT degradation.

Fifth, our results suggest that a user's decision to remain with an IT-based service or reject it following ITSD is dynamically shaped depending on the factors relating to the service itself and its attributes and the user him/herself and his/her attributes. Existing service research literature mostly employed factor models and account for their effect on customer behavior. Previous service research literature has revealed the effect of service attributes and user attributes, such as failure severity (De Matos et al., 2007; Smith &Bolton, 1998), number of past failures (Hess et al., 2003), recovery performance (Hess et al., 2003), emotions (McColl-Kennedy & Sparks, 2003; Bougie et al., 2003), service expectations (Hess et al., 2003), and trust (Bejou & Palmer, 1998). However, these studies examine the effect of each factor on user behavior, but they do not examine the effect of their interaction on user behavior. Our stage theory shows that although the effect of the antecedents is very important knowledge for understanding customer behavior, it is also important to examine how the antecedent factors interact with each other and how this dynamic interaction affects the customers' intermediate behaviors and decisions. In our stage theory, we formulated these intermediate behaviors as development outcomes and decision outcomes, and these components provide an important

understanding for the reasons behind customers' overall behavior following ITSD. Our findings indicate that during each stage the user dynamically combines service attributes and his/her own attributes to construct his/her decisions and subsequent behaviors. Further, previous studies can provide only a partial explanation for IT-based services, because they do not examine at all the IT-specific factors triggering the different customer decisions. Our empirical investigation reveals that several IT-specific factors determine customers' decisions to remain at or quit the service, including IT experience, personal IT equipment, IT expectations, visibility of the IT degradation to the user, and the importance of the functions that the user associates the IT-based service. Therefore, our study contributes to both service research and IS literatures.

6.2. Implications for Research and Practice

First, our empirical results suggest that users' decisions after an ITSD are associated with the IT-enabled contexts that are impacted by the degradation. This is an interesting avenue for future research that would investigate the association between types of IT functions and users' behaviors. Second, we call for qualitative theory development research in the area of IT acceptance and IT services, especially by examining the specific phenomenon and context of IT use. Such theories would focus on what is specific to the phenomenon of IT use. Third, stage theories have provided insightful explanations in other disciplines, such as health behavior, as well as IT acceptance (Schwarz et al., 2014), and therefore, future IS research should investigate their utilization for explanations of IT users' behaviors. Our stage theory requirements work as a model for developing stage theory requirements and stage theories for other IS contexts.

Our findings confirm the role of several factors that are identified by existing service research studies, such as recovery time or trust in the provider. Nonetheless, our stage theory implies that those factors have different importance for the users' behaviors, depending on the stage that the users belong to. This provides significant implications for service providers and their service recovery strategies. First, according to our stage theory, users undergo two stages in

which they do not yet even consider abandoning the service (i.e., Blaming, Bypassing). This has important implications for service providers since it allows them extra time to react to the IT degradation and the service recovery without losing their loyal customers. Second, proactive strategies of the provider could enhance users' decisions to remain with the service. In particular, service providers can proactively contact the users and provide a bypassing solution while waiting for service recovery and such effort would help users remain in the first stages of the developmental path and gain time for service recovery. This was even mentioned by our participants, some of whom expressed that they would be more willing to remain at the service if a temporary or alternative solution had been given to them by the provider, instead of users trying technical tricks to get the service working while waiting for the degradation to pass. Third, our stage theory implies that popular recovery strategies, such as compensation or offers, can have an influence only at certain stages of users' behavior: compensation is not effective if the users have moved to the "Abandoning" stage, in which their only aim is for guaranteed quality.

6.3. Limitations and boundary conditions

Although we do not have statistical generalization, we argue that our sample is representative of IT-based service users and their reactions to ITSD, based on the criterion of theoretical saturation. Nonetheless, we should note that our empirical investigation was located in Greece, which is not a leading technological country. This is one potential boundary condition of our theory. It is possible that certain factors appeared more important or have different roles given this context (e.g., IT expectations or lock-in parameters due to living in rural areas). Further, at the time of the investigation, Greece was undergoing a financial crisis, which may have influenced participants into being more agitated by and more mistrustful of governmental IT-based services.

Additionally, we examined a broad range of IT-based services, which have different capacities to support multiple functions for the users. For example, home Internet may support multiple functions for one user (e.g., e-shopping, e-banking, online chatting). These

also set up another potential boundary condition. An exploration of certain specific IT-based services (e.g., ITSD on mobile chatting applications) might reveal richer information about users' development paths, specific to that service. Also, like Kohlberg's theory of cognitive moral development (1981), our stages do not unfold based on certain genetic blueprint, but result from thinking in a social environment. Keeping this in mind, time is another potential boundary condition of our theory. Further research will show how it will change in the future.

7. CONCLUSIONS

To explain why users' continue or quit following ITSD, we build a stage theory inductively, called ITSD Decision Theory. The theory suggests that a user's decision to remain with or abandon a service after ITSD is not always affected by the same factors, and thus a non-stage factor model cannot capture the users' dynamic behaviors. According to ITSD Decision Theory, users' behaviors evolves in stages and different factors influence their behavior depending on the stage they belong to. The factors involved include aspects of the given service (which we label service attributes, such as price) and aspects of the user (which we label user attributes, such as IT expectations). The proposed stage theory suggests that users combine the two categories of factors dynamically resulting in stage outcomes that include a) the decisions to remain with or abandon the service and b) their behavioral development leading to behavioral evolution. Further research can test and further revise the ITSD Decision Theory in the context of different services and different countries.

References

Ahmad, A., Lyytinen, K., and Newman, M. (2011). The Evolution of Process Models in IS Research: From a Punctuated Social Process Model to a Socio-Technical Process Model, in *Proceedings of the 19th European Conference on Information Systems*, Tuunainen, V., Nandhakumar, J., Rossi, M., and Soliman, W. (eds.), Helsinki, Finland, June 9-11, pp.1993-2004.

Alter, S. (2014). Theory of Workarounds. *Communications of the Association for Information Systems*, 34 (55) pp. 1041-1066.

Bejou, D., and Palmer A. (1998), Service failure and loyalty: an exploratory empirical study of airline customers, *Journal of Services Marketing*, (12: 1), pp.7-20.

Bitner, M.J., Booms, B.H., and Tetreault, M.S. (19900, The service encounter: Diagnosing favorable and unfavorable incidents. *Journal of Marketing*, (54:1), pp. 71-84.

Bougie, R., Pieters, R. and Zeelenberg M., (2003), Angry customers don't come back, they get back: The experience and behavioral implications of anger and dissatisfaction in services, *Journal of the Academy of Marketing Science*, (31:4), pp. 377-393.

Bridle, C., Riemsma, R.P., Pattenden, J., Sowden, A.J., Mather, L., Watt, I.S. and Walker, A. (2005), Systematic review of the effectiveness of health behavior interventions based on the transtheoretical model. Psychology and Health,(20:3), pp. 283-301.

Bryman, A. (2008), *Social Research Methods*, 3rd Edition, Oxford University Press, Oxford

Burton-Jones, A., McLean, E. R. and Monod, E., (2015), Theoretical perspectives in IS research: from variance and process to conceptual latitude and conceptual fit, *European Journal of Information Systems* (24: 6), pp 664–679

Cenfetelli, T.R., Benbasat, I. and Al-Natour, S. (2008) Addressing the What and How of Online Services: Positioning Supporting-Services Functionality and Service Quality for Business-to-Consumer Success, *Information Systems Research*, 19(2), pp. 161-181

Chuang, H., Chen, Y., Lin, C. and Yu, P. (2016). Featuring the e-service quality of online website from a varied perspective. *Human-centric Computing and Information Sciences*, (6:1), Article No. 58

Connolly, R., Bannister, F. and Kearney, A. (2010). Government website service quality: A study of the Irish revenue online service, *European Journal of Information Systems*, (19: 6), pp. 649–667.

Crain, W. (2011), *Theories of development: concepts and applications*. Routledge.

Damsgaard, J. and Scheepers, R., (2000), Managing the crises in intranet implementation: a stage model, *Information Systems Journal*, (10:2), pp. 131–149

De Matos, C.A., Henrique J.L., and Rossi C.A. (2007). Service Recovery Paradox: A Meta-Analysis, *Journal of Service Research*, (10:1), pp. 60-77.

Denzin, N.K. and Lincoln, Y.S. (eds.) (2005). *The Sage Handbook of Qualitative Research*, Thousand Oaks, CA: Sage Publications.

DeWitt T. and Brady K.M. (2003). Rethinking Service Recovery Strategies: The Effect of Rapport on Consumer Responses to Service Failure, *Journal of Service Research*, (6:2), pp. 193-207.

Edvardsson, B., Gustafsson, A. and Roos I., (2005). Service portraits in service research: a critical review *International journal of service industry management (*16: 1), pp. 107-121

Edvardsson, B., Gustafsson, A., and Roos, I. (2005). Service portraits in service research: a critical review, *International Journal of Service Industry Management*, (16: 1), pp.107 - 121

Einstein, A. (1929). *An Interview by George Sylvester Viereck*, Saturday Evening Post Society, Indianapolis, Indiana.

Eisenhardt, K and Graebner, M. (2007). Theory Building from Cases: Opportunities and Challenges. *Academy of Management Journal*, (50:1), pp. 25–32.

Fan, H., Lederman, R., Smith S.P. and Chang, S. (2014). How Trust Is Formed in Online Health Communities: A Process Perspective, *Communications of the Association for Information Systems*, (34:28), pp. 531-560

Feyerabend P.K. (1975). *Against Method.* New Left books.

Feynman. R. (1965). *The character of physical law*. Cambridge, MIT press, US.

Forbes, P.L., Kelley, W.S., Hoffman, K.D. (2005). Typologies of e-commerce retail failures and recovery strategies, *Journal of Services Marketing*, (19:5), pp.280 – 292

Funches, V., Markley, M. and Davis, L. (2009), Reprisal, retribution and requital: Investigating customer retaliation, *Journal of Business Research*, 62(2), pp.231-238

Gabbott, M., Tsarenko, Y. and Mok, H.W. (2011). Emotional Intelligence as a Moderator of Coping Strategies and Service Outcomes in Circumstances of Service Failure, *Journal of Service Research*, (14:2), pp. 234-248.

Gannon, B. (2013). Outsiders: An Exploratory History of IS in Corporations, *Journal of Information Technology* (28:1), pp. 50-62

Gefen, D. (2002) Customer Loyalty in E-Commerce, *Journal of the Association for Information Systems*, (3: 1), pp. 27-51

Grégoire, Y., Tripp M.T., Legoux R. (2009). When Customer Love Turns into Lasting Hate: The Effects of Relationship Strength and Time on Customer Revenge and Avoidance. *Journal of Marketing*, (73:6), pp. 18-32

Gregor, S. (2006). The Nature of Theory in Information Systems, *MIS Quarterly*, (30: 3), pp. 611-642

Gremler, D.D. (2004). The Critical Incident Technique in Service Research. ,*Journal of Service Research*, (7:1),pp. 65-89.

Hanson N.R. (1958). *Patterns of Discovery: An Inquiry into the Conceptual Foundations of Science*. Cambridge University Press.

Harris, J., Ives, B. and Junglas, I. (2012) IT Consumerization: When Gadgets Turn Into Enterprise IT Tools, *MIS Quarterly Executive*, (11: 3), pp. 99-112

Hempel, C.G. (2001). *The Philosophy of Carl G. Hempel: Studies in Science, Explanation, and Rationality*. Oxford University Press.

Hess, R L, Ganesan, S., Klein, N. M, (2003), Service failure and recovery: the impact of relationship factors on customer satisfaction, Journal of the Academy of Marketing Science,(31:2), pp.127-145.

Hoffman, K. D. and Bateson, J. E. G. (1997). *Essentials of Services Marketing Fort Worth*, TX. The Dryden Press.

Hoffman, K.D., Kelley, W.S., Rotalsky, M.H., (1995) Tracking service failures and employee recovery efforts, *Journal of Services Marketing*, (9: 2), pp.49 – 61

Holloway, B.B. and Sharon, E.B. (2003). Service Failure in Online Retailing A Recovery Opportunity *Journal of Service Research* (6:1), pp. 92-105

Kaila, E. 1939. *Ihmimilinen tieto*. Otava, Helsinki, Finland.

Karande, K, Magnini, P.V. and Tam, L., (2007), Recovery Voice and Satisfaction after Service Failure: An Experimental Investigation of Mediating and Moderating Factors, *Journal of Service Research*, (10:2), pp. 187-203

Kim, H., Xu, Y. and Koh, J. (2004) A Comparison of Online Trust Building Factors between Potential Customers and Repeat Customers, *Journal of the Association for Information Systems*, (5: 10), pp. 392-420

Kohlberg, (1981). *Essays on Moral Development* (vol 1), New york. Harper & Row.

Kohlberg, L. (1969). Stage and sequence: The cognitive development approach to socialization. In D. A. Goslin (Ed.). *Handbook of socialization theory* (pp. 347-480). Chicago, IL.

Kohlberg, L. (1981). Essays on Moral Development, Vol. I: The Philosophy of Moral Development. Harper & Row, San Francisco, CA.

Langley, A.N.N., Smallman, C., Tsoukas, H., and Van de Ven, A. H. (2013). Process studies of change in organization and management: unveiling temporality, activity, and flow, *Academy of Management Journal* (56:1), pp. 1–13.

Laudan L. (1983). The Demise of the Demarcation Problem. In Physics, Philosophy and Psychoanalysis: Essays in Honour of Adolf Grünbaum (Cohen R.S., Ed.), *Boston Studies in the Philosophy of Science*, pp. 111–127, Kluwer, Dordrecht.

Laudan, L. (1977). The Sources of Modern Methodology. Historical and Philosophical Dimensions of Logic, Methodology and Philosophy of Science, *The series of the University of Western Ontario Series in Philosophy of Science*, 12, pp. 3-19

Laudan, L. (1980). Why was the Logic of Discovery Abandonded? In *Scientific Discovery, Logic, and Rationality*, Nickles T. (Ed.), pp. 173-183, Reidel Dordrecht Publishing Company

Laudan, L. (1996). *Beyond Positivism and Relativism: Theory, method, and evidence*, Boulder, CO, Westview Press

Lederer, L.A. and Mendelow, L.A. (1990), The Impact of the Environment on the Management of Information Systems, *Information Systems Research*, (1:2), pp. 205-222

Lewis, R.B. and Spyrakopoulos, S., (2001). Service failures and recovery in retail banking: the customers' perspective, *International Journal of Bank Marketing*, (19:1), pp.37 – 48

Lippke, S., Ziegelmann, P. J. and Schwarzer, R. (2005), Stage-specific adoption and maintenance of physical activity: testing a three-stage model *Psychology of Sport and Exercise*, (6: 5), pp. 585–603

Luo, J., Ba, S. and Zhang, H. (2012) The Effectiveness of Online Shopping Characteristics and Well-Designed Websites on Satisfaction, *MIS Quarterly* (36: 4), pp.1131-1144.

Lyytinen, K. and Newman, M. (2008). Explaining information systems change: a punctuated socio-technical change model, *European Journal of Information Systems*, 17 (6), pp. 589–613.

McColl-Kennedy, R.J., Daus, S.C. and Sparks, A.B., (2003), The Role of Gender in Reactions to Service Failure and Recovery, *Journal of Service Research*, (6:1), pp. 66-82.

McCollough, A.M., Berry L.L., and Yadav, M.S., (2000). An Empirical Investigation of Customer Satisfaction after Service Failure and Recovery, *Journal of Service Research* (3:2), pp. 121-137.

McMullin, E. (1970). The history and philosophy of science: A taxonomy. In *Minnesota Studies in the philosophy of science* (Stuewer, R., eds), VOL V: Historical and Philosophical Perspective of Science. University of Minnesota Press.

Meuter, L.M., Ostrom, L.A., Roundtree, I.R. and Bitner, J.M., (2000), Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters, *Journal of Marketing*, (64:3), pp. 50-64

Mohr, L. B. (1982). *Explaining Organizational Behavior*, San Francisco, CA: Jossey-Bass.

Myers, M.D., and Newman, M. (2007). The Qualitative Interview in IS Research: Examining the Craft, *Information and Organization* (17:1), pp. 2-26.

Myyry, L., Siponen, M., Pahnila, S., Vartiainen, T., & Vance, T. (2009). What Levels of Moral Reasoning and Values Explain Adherence to Information Security Policies? An Empirical Study. *European Journal of Information Systems* (18:2), pp. 126–139

Niehaves, B., Köfer, S. and Ortbach, K. (2012), "IT Consumerization – A Theory and Practice Review", In Proceedings of AMCIS, Seattle, Washington August 2012

Noar, S.M., Benac, C.N., and Harris, M.S. (2007) "Does tailoring matter? Meta-analytic review of tailored print health behavior change interventions", *Psychological Bulletin*, 4, pp. 673-693.

Noar, S.M., Benac, C.N., and Harris, M.S. 2007. “Does tailoring matter? Meta-analytic review of tailored print health behavior change interventions”, *Psychological Bulletin*, 4, pp. 673-693.

Ortbach, K., Koeffer, S., Bode, M. and Niehaves, B. (2013) “Individualization of Information Systems - Analyzing Antecedents of IT Consumerization Behavior”, In Proceedings of the International Conference on Information Systems, Milan, Italy December 2013

Parasuraman A., Zeithaml V.A. and Berry L.L. (1985) “A conceptual model of service quality and its implications for future research”, *Journal of marketing*, 49, pp. 41-50.

Parasuraman A., Zeithaml V.A. and Malhotra A. (2005), “E-S-QUAL A Multiple-Item Scale for Assessing Electronic Service Quality”, *Journal of Service Research*, (7:3), pp. 213-233

Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1991) “Refinement and Reassessment of the SERVQUAL Scale”, *Journal of Retailing* (67:4), pp. 420-450

Popper, K. 1934. “Logik der Forschung”, (English Translation “The Logic of Scientific Discovery”, 1959), Mohr Siebeck

Prochaska, J. & DiClemente, C. 1983. “Transtheoretical therapy: Toward a more integrative model of change”. *Psychotherapy: Theory, research & practice*, (19:3), pp. 276-288.

Prochaska, J.O. &DiClemente, C.C. 1983. “Stages and Processes of Self-Change of Smoking: Toward an Integrative Model of Change”. *Journal of Consulting and Clinical Psychology*, (5:13), 390 – 395.

Prochaska, J.O., DiClemente, C.C., and Norcross, J.C. (1992). In Search of How People Change. Applications to Addictive Behaviors, *American Psychologist,* (47: 9), pp. 1102 – 1114.

Ransbotham S and Mitra S, (2009) Choice and Chance: A Conceptual Model of Paths to Information Security Compromise, *Information Systems Research*, (20:1), pp.121-139

Reichenbach H (1938) *Experience and prediction: an analysis of the foundations and the structure of knowledge*. University of Chicago Press.

Rogers, E.M. (1962). *Diffusion of Innovations*, New York, NY: The Free Press.

Rogers, E.M., and Shoemaker, F.F. (1971). *Communication of Innovations: A Cross-Cultural Approach*, New York, NY: The Free Press.

Rogers, R.W. (1975). A protection motivation theory of fear appeals and attitude change, *Journal of Psychology*, 91, pp. 93-114

Sabherwal, R. and Robey, D. (1995). Reconciling Variance and Process Strategies for Studying Information System Development, *Information Systems Research*, (6:4),pp. 303-327.

Sajtos, L., Brodie, J.R. and Whittome, J., (2010). Impact of Service Failure: The Protective Layer of Customer Relationships, *Journal of Service Research*, (13:2), pp. 216-229

Schwarzer, R. (2008a). Modeling Health Behavior Change: How to Predict and Modify the Adoption and Maintenance of Health Behaviors. *Applied Psychology*, (57:1), pp. 1–29.

Schwarzer, R. (2008b). Some Burning Issues in Research on Health behavior Change. *Applied Psychology*, (57:1), pp. 84-93.

Schwarz, A., Chin, W., Hirschheim, R. and Schwarz C. (2014). Toward a process-based view of information technology acceptance, *Journal of Information Technology*, (29:1), pp. 73–96.

Seale, C. (1999). *The Quality of Qualitative Research*, Sage Publications, London, UK.

Siponen, M. and Vartiainen, T. (2002). Teaching End-User Ethics: Issues and a Solution Based on Universalizability, *Communications of the Association for Information Systems*, 8, pp. 422-443

Smith K.A., Bolton, N.R., and Wagner J., (1999). A Model of Customer Satisfaction with Service Encounters Involving Failure and Recovery. *Journal of Marketing Research*, (36: 3), pp. 356-372.

Smith, K.A., and Bolton, N.R., (1998). An Experimental Investigation of Customer Reactions to Service Failure and Recovery Encounters Paradox or Peril?, ,*Journal of Service Research*,(1:1), pp. 65-81.

Spohrer, J., S. Vargo, N. Caswell, P. Maglio. (2008). The Service System is the Basic Abstraction of Service Science, *In Proceedings of 41st Annual Hawaii International Conference on System Sciences (HICSS)*, January 2008, Waikoloa, Big Island, Hawaii

Strizhakova Y, Tsarenko Y and Ruth J, (2012). I'm Mad and I Can't Get That Service Failure off My Mind: Customer Coping and Rumination as Mediators of Anger Effects on Customer Intentions, *Journal of Service Research*, (15:4), pp. 414-429

Sun, Y., Fang, Y., Lim, H.K. and Straub, D. (2012) User Satisfaction with Information Technology Service Delivery: A Social Capital Perspective, *Information Systems Research* 23(4), pp. 1195-1211

Tan, C., Benbasat, I. and Cenfetelli, R. T. (2013), IT-Mediated Customer Service Content and Delivery in Electronic Governments: An Empirical Investigation of the Antecedents of Service Quality, *MIS Quarterly* (37: 1), pp. 77-109

Tan, C., Benbasat, I. and Cenfetelli, R. T. (2016), An Exploratory Study of the Formation and Impact of Electronic Service Failures, MIS Quarterly, (40: 1) pp.1-29.

Thagard P (1998) Explaining Disease: Correlations, Causes, and Mechanisms. *Minds and Machines* (8), pp. 61–78

Vaerenbergh, V.Y., Larivière, B. and Vermeir, I., (2012). The Impact of Process Recovery Communication on Customer Satisfaction, Repurchase Intentions, and Word-of-Mouth Intentions, *Journal of Service Research*, (15: 3), pp. 262-279.

Vargo, L.S. and Lusch, F.R. (2004). Evolving to a New Dominant Logic for Marketing, *Journal of Marketing*, (68:1), pp. 1-17

Vargo, L.S., Maglio, P.P. and Akaka M.A., (2008). On value and value co-creation: A service systems and service logic perspective, *European Management Journal*, (26 :3), pp. 145–152

Velicer, W.F. and Prochaska, O.J. (2008). Stage and Non-stage Theories of Behavior and Behavior Change: A Comment on Schwarzer. *Applied Psychology*, (57:1), pp. 75-83.

Weick, K.E. (1989). Theory construction as disciplined imagination. *Academy of Management Review*, (14:4), pp. 516-531.

Weinstein and Sandman (1992). A Model of the Precaution Adoption Process: Evidence from Home Radon Testing, *Health Psychology*, (11:3), 170–180

Weinstein, N. D., Rothman, A. J., and Sutton, S. R. (1998). Stage Theories of Health Behavior: Conceptual and Methodological Issues, *Health Psychology* (17:3), pp. 290-299.

Weinstein, N.D. (1988). The precaution adoption process. *Health Psychology*, 7:4, pp. 355-386.

Whetten, A. D. (1989), What Constitutes a Theoretical Contribution?, *Academy of Management Review*, (14:4), pp. 490-495

Xu, D., Benbasat, I. and Cenfetelli, R. T. (2013) Integrating Service Quality with System and Information Quality: An Empirical Test in the E-Service Context, *MIS Quarterly*, (37: 3), pp.777-794.

Xu, J., Benbasat, I. and Cenfetelli, R. (2011) The Effects of Service and Consumer Product Knowledge on Online Customer Loyalty, *Journal of the Association for Information Systems*, (12: 11), pp. 741-766

Yang, Z., Cai, S., Zhou, Z. and Zhou, N. (2005), Development and validation of an instrument to measure user perceived service quality of information presenting Web portals, *Information & Management*, (42: 4), pp. 575–589

Yoo, Y. (2010). Computing in Everyday Life: A Call for Research on Experiential Computing, *MIS Quarterly* (34:2), pp. 213-231

Zhang, M., Huang, L., He, Z. and Wang, A. (2015). E-service quality perceptions: an empirical analysis of the Chinese e-retailing industry, Total Quality Management, (26: 12), pp. 1357 – 1372