

Customers' reactions to self-service technology failure: attributions of blame and coping strategies

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Abstract

Self-service technologies (SSTs) are transforming the way a service is produced and delivered to its customers. The role of the customer changes from a passive receiver to an active producer of his own service. When a SST fails, there are no service employees around to immediately recover the service outcome. This paper seeks to understand how customers react when they experience SST failure and who they hold accountable for the failure, considering their high involvement in the co-creation process.

The current research is based on an online experimental design, where 3 types of SST failure: technology, process and design, from 2 industries: airlines and active footwear, were manipulated. The scenarios were followed by a web survey that measured customers' attributions of blame for the failure as well as their coping strategies. A sample of 374 responses was gathered and analyzed using PLS-SEM.

The research findings show that customers hold the company responsible when they experience technology failure or design failure. When the attribution is external, SST users tend to confront the company or disengage with the service. In the case of a process failure, customers tend to take on more responsibility for the faulty outcome than in the other 2 SST failure types. Internal attribution links with coping mechanisms such as playful problem solving, acceptance and disengagement.

The findings have important implications for service managers. First of all, companies need to understand the different phases where a SST can fail and plan for more thorough and complete design of their services. Also, relevant recovery strategies should be implemented according to the attribution type and to the coping mechanisms applied by customers.

The originality of the current research stays in the novel approach of investigating failure in a new and emerging service context: self-service technologies. Moreover, customers' reactions to 3 types of SST failure (technology, process, design) is researched with the help of attribution theory and coping strategies, taken from the theory of stress and coping.

Keywords service failure, self-service technologies, SSTs, SST failure, technology failure, service design failure, service process failure, attribution theory, locus of attribution, coping strategies, stress management, PLS SEM

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1. Introduction

Today's business environment has seen dramatic changes with the rise of new technologies and the world wide web. More and more companies are changing their business models in order to adapt and stay relevant in the new market environment or gain a competitive edge. At the same time, new businesses emerge as a response to technology adoption by customers. Many products and most services in today's world have experienced technology infusion as a way to deliver superior benefits to end users. Service encounters are gradually being supplemented by technology or even completely redesigned into self-service technologies (SSTs).

Studies on SSTs trends estimate that the size of the market will grow from 16.06 billion USD in 2015 to over 42 billion USD by 2023 (Global Market Insights, 2016). This accounts for more than 160% increase in less than 10 years. The main industries accounting for this increase are retail, banking and healthcare. The decision to invest in this market doesn't come only from the desire to lower operational costs, but also from customers' preferences to use self-services. NCR, the world leader in customer transaction technologies, found that customers favor brands that provide them with several options for self-service (The Economist, 2009). However, just by offering a multitude of SST choices to customers is not enough to win their loyalty. Driven by technology, one of the major drawbacks of SSTs is their susceptibility to technical failure or design inconvenience. Since the customers are usually alone in the SST process, the failure causes them frustration and encourages them to abandon the service.

Due to their increased popularity in the service market as well as strong influence on service transformation, SSTs have also drawn a lot of attention among scholars. A large body of research revolves around the antecedents of SST adoption by consumers. Researchers such as Meuter, Bitner, Dabholkar and Curran devoted a large part of their studies to understanding the attitude of consumers towards technology infused services. Their findings suggest that customers adopt SSTs when they are easy to use, when they offer better and faster service than the interpersonal encounters or when they provide users with increased flexibility (Bitner, Ostrom, & Meuter, 2002; Curran & Meuter, 2005; Dabholkar, 1996). Besides the multitude of benefits that technology infused services can provide to its users, technology can also cause anxiety and stress (Mick & Fournier, 1998). These negative

feelings emerge when customers find it difficult to navigate their way to reach their service goal due to poor design, for technological reasons or due to user's own mistakes (Meuter, Ostrom, Roundtree, & Bitner, 2000).

Little research has been directed to a better understanding of self-service technology failure, although many previous studies have investigated interpersonal service failure. Since this topic is still new among academics, many researchers tried to lay down the foundation of this research area, by understanding what causes in the first place failure in a self-service technology, online or offline (Holloway & Beatty, 2003; Meuter et al., 2000). Causes of SST failure are linked to the technology itself or to the service design, which, in turn, might affect other parts of the service process. Service failure is also caused by the human element and, in the case of SSTs, the responsibility is transferred from employees to customers.

Once the basis for comprehending the types of SST failure is set, there is a need to understand how customers cope with these types of failure in this emerging service channel. Since the service is mainly performed by customers themselves through a technological transaction, how do customers feel when these services fail and what action steps do they take to improve their circumstances? Research shows that customers who use online services take on more responsibility for the service failure than users of interpersonal services (Harris, Mohr, & Bernhardt, 2006). What is not known yet is how do customers react when it is them who caused the failure compared to the incidents caused by the company.

Moreover, there is no previous knowledge to whether there is any difference in attribution of blame based on the different types of SST failure encountered. The current study aims to close this research gap by taking a closer look at the dark sides of SSTs as perceived by consumers. The study explores 3 types of SST failure as proposed by Meuter et al. (2000) and tries to predict attributions of blame according to failure type, as well as coping strategies employed by customers to minimize the perceived stress. Hence, the research questions explored in the current paper are:

Who do customers blame when they experience failure in the technology of a self-service, in its design or in its process?

How do SST customers cope with service failure that is caused by themselves or by the service provider?

The current study draws on literature from service business and psychology with the aim to find answers to the questions above and to bring new insights into the self-service technologies research. This study will contribute to existing literature by revealing new findings about the impact of SSTs when not performing as expected and customers' coping mechanisms with SST failure. This is researched in a context where the service encounter is happening only through a technological interface with no alternative channels offered.

The current research paper is structured as follows. First, an elaborated overview of self-service technologies, attribution theory and coping mechanisms is presented in order to lay out the most relevant literature for the research questions to be explored. Based on the previous literature, the conceptual model is presented, together with the corresponding hypotheses. This is followed by the description of methodology used to investigate the research questions, data collection and characterization of the data gathered. The next chapter focuses on the analysis of the conceptual model using PLS-SEM as well as on the results of the hypotheses. Finally, the results are discussed and the findings are translated into managerial implications. The study concludes with limitations and avenues for further research.

2. Self-service technology failure

2.1. Defining self-service technologies

Self-service technologies (SSTs) are described by Meuter and colleagues (2000) as “technological interfaces that enable customers to produce a service independent of direct service employee involvement” (p. 50). Examples of SSTs are internet banking, ATMs, supermarket self-checkout kiosks, online shopping, online food ordering, package tracking, online hotel or car booking, airport self-check-in. Researchers have used different ways for categorizing SSTs. For example, Meuter and colleagues (2000) provide a categorization by purpose (Customer service, Transactions, Self-help) and by interface (Telephone/Interactive voice response, Online/Internet, Interactive Kiosks, Video/CD). Other studies have defined SSTs by their location and level of interaction: “private” and “public” (Collier, Sherrell, Babakus, & Horky, 2014), “onsite” and “offsite” (Dabholkar & Bagozzi, 2002) or “internet” and “non-internet” (Forbes, 2008).

More and more companies adopt an increased share of SST usage as a strategy to improve profitability (Lovelock & Young, 1979). They either supplement traditional interpersonal services or even replace them in totality (Wang, Harris, & Patterson, 2013). There are several reasons why companies decide to implement SSTs as a way to improve profitability: they see opportunities in increased productivity and cost savings (Dabholkar, 1996), they maintain constant service atmosphere, since there are no employees involved, and have the ability to handle extended service delivery hours (Curran, Meuter, & Surprenant, 2003). Through SSTs, companies can provide to their customers benefits such as customization and flexibility and they have the capability to reach a wider audience (Bitner, Brown, & Meuter, 2000; Bitner et al., 2002). SSTs are adopted by service providers also because they are less prone to failure. Technologies have demonstrated to generate less errors than employees. All these features provided by SSTs are proven to increase customer satisfaction and commitment to the service (Beatson, Coote, & Rudd, 2006; Makarem, Mudambi, & Podoshen, 2009; Meuter et al., 2000).

From the customers' point of view, adopting a self-service technology is influenced by the type of service and by the technology itself (Curran & Meuter, 2005). However, previous research finds certain common attributes that influence consumers in using SSTs. Most of the times, customers decide to use technology-based self-services when they offer better outcomes than the conventional interpersonal alternative (Bitner et al., 2002). SSTs provide more convenience than traditional services through ease of access, ease of use and reduced effort (Collier & Kimes, 2012; Meuter et al., 2000; Zhao, Mattila, & Tao, 2008). They also add more efficiency to a transaction through a faster speed and less contact with service employees, something that is desirable by some customers (Dabholkar, 1996).

When consumers perform the service themselves, they also perceive a greater control over the situation, which in turn enhances their experience (Bateson, 1985; Lee & Allaway, 2002). On top of the utilitarian aspects of SSTs, customers also display hedonic motivations to use these modes of service delivery, as they are perceived as more enjoyable and fun than traditional services (Bruner & Kumar, 2005; Dabholkar, Bobbitt, & Lee, 2003). However, all the benefits that can be derived from the usage of SSTs are based on the customers' ability to effectively operate these technologies.

Self-service technologies are often seen as co-created services, where the company's tangibles resources, such as platform and technology, are integrated with the customer's

intangible resources, such as skills and information, in order to create value (Hilton, Hughes, Little, & Marandi, 2011). The company is providing the tool, the technology, the platform that the customer can interact with and, through his skills and knowledge, he achieves the desired output. Previous research classified service production in 3 stages: input (specification of service characteristics), throughput (creation of the service) and output (service outcome) (Raaij & Pruyn, 1998). By using SSTs, customers actively engage in the co-production of the service they receive, becoming an “operant resource” (co-producer) for the service provider (Vargo & Lusch, 2004). Depending on the type of SST, customers can influence each stage of the service, from the input they bring in to the outcome they receive.

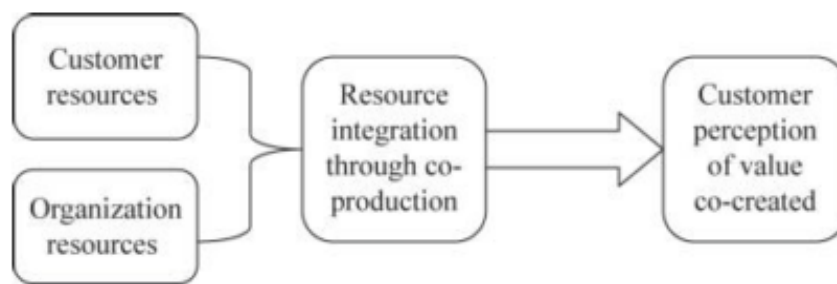


Figure 1. *Model of value co-creation (Hilton et al., 2011)*

As mentioned previously, customers are motivated to be co-producers and to use self-service technologies when they possess a certain level of expertise to complete the required tasks (Lusch, Vargo, & O’Brien, 2007). Previous research found perceived self-efficacy as an important contributor to using technology-based self-services successfully by customers (Dabholkar & Bagozzi, 2002). Perceived self-efficacy is described by Bandura (1982) as the belief in someone’s skills required to accomplish a goal. Therefore, people are more involved in activities they are confident they can manage and tend to stay away from the ones that exceed their level of competence (Wang et al., 2013). Meuter, Bitner, Ostrom, & Brown (2005) defined the concept of consumer readiness to use self-service technologies, which encompasses ability, role clarity and motivation. By having the required set of skills, as well as understanding their role in the production of the service, customers will have more confidence to perform the task.

Customers get engaged in co-creation for several reasons, including financial rewards, social benefits, desire to acquire technology knowledge or for psychological reasons, such as self-expression (Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010). Desire for control is also an

important factor that encourages co-creation (Lusch, Brown, & Brunswick, 1992). Users who want to have the power to influence the process and the outcome of their service will be more likely to engage in co-creation. Hence, self-service technologies offer to their users a high level of perceived control. Since customers take an active role in the production of their own service, their input during the process leads to the benefit of customization (Etgar, 2008). The resources that customers use to achieve service customization are usually effort and information sharing (Heidenreich, Wittkowski, Handrich, & Falk, 2015). By dedicating their time to the production of the service through a SST and selecting which information to be inputted throughout the process, customers gain the advantage to tailor the outcome to their own needs.

2.2. Service failure

In the case of co-created services such as SSTs, the company provides the environment of the service, being the tool, the technology, the interface and its design, and the user brings in his own resources to achieve the desired output. This new service architecture makes companies rely on the knowledge, skills and expertise provided by the consumers to deliver an outstanding experience. Since companies transfer the task-performance from its employees to its customers, who become part-time employees, the company loses control over the performance of the service (Hilton & Hughes, 2013). In the situations where customers lack the ability to perform in their new role, by not possessing the required level of expertise or tacit knowledge or not knowing what it is expected from them, service failure is a common outcome (Heidenreich et al., 2015).

Service failure is not caused only by the lack of expertise or self-efficacy of customers who perform the service themselves. Failure, especially in the case of SSTs, can be caused as well by technology related outbreaks. Research shows that failure happens even when customers are trained and know their role (Hilton et al., 2011). Service failure is viewed by Smith, Bolton, & Wagner (1999) as an encounter where “the customer experiences a loss due to the failure” (p. 357). Customer losses in an episode of service failure can be economic, such as money loss, or social: status, relationships, self-confidence. In SSTs, such as e-commerce retail, failure has been regarded as the lack of technological capability of a website, which prevents its users from achieving their service goal (Tan, Benbasat, & Cenfetelli, 2016). From this perspective, SST failure is highly associated with the technology of the service.

There is very little research that concentrates on failures in the context of technology based self-services, where employees are not the ones responsible for the service failure. Most of the previous studies on service failure focuses on interpersonal services, where the cause of failure is related to the the human element represented by employees (Forbes, Kelley, & Hoffman, 2005). By moving from a “low-tech, high touch” paradigm to one that is “high-tech and low touch” (Bitner et al., 2000), companies try to eliminate the human element (employees) from their services, making SSTs less exposed to failures. However, the human element is still present in the co-production process, where customers are highly involved, or even owners, in their own service. Additionally, no matter how well developed the SSTs are, they are susceptible to unexpected failures due to technology outbreaks.

2.3. Typologies of SST failure

Many previous studies on service failure, in both offline and online context, have tried to unveil many dimensions of service failure. Among the offline service failure studies, the most popular classification, among many others, has been identified by Bitner, Booms, & Tetreault (1990) and it consists of three groups of factors that influence the negative evaluations of services in different environments: airlines, hotels, restaurants, traditional retail. Group 1 consists of “Employee response to service delivery system failure” and includes failures in the core service. Group 2, “Employee Response to customer needs and requests” include events related to requests for customization services. Finally, group 3, “Unprompted and unsolicited employee actions” involve unexpected events and employee behaviors, such as rudeness, ignorance. Another popular classification of service failure studied in an offline context is based on outcome and process (Smith et al., 1999). Smith et al. (1999) find in their study of service failure episodes in hotels and restaurants that customers are less satisfied after a process failure than after an outcome failure. In their research, the process failure is attributed to service employees and their behavior that can cause inattentive service.

The failure dimensions found by previous studies in the offline context have been applied by researchers in the online environment. Most of the failure typologies have been researched in the e-commerce retail setting. Forbes et al. (2005) built their study on previous research (Bitner et al., 1990; Kelley, Hoffman, & Davis, 1993) and developed a typology of service failure in the context of e-commerce retail, or e-tail. Starting from the classification provided by Bitner et al. (1990) and using the method of critical incident technique (CIT),

Forbes et al. (2005) found similar groups of failures in e-tail services. Group 1 (Response to service delivery system/product failure) includes incidents such as: slow or unavailable service, system pricing issues, packaging errors, out of stock, product defect, bad information, website system failure. In group 2 (Response to customer needs and requests) there are only 3 types of incidents: special order or request issue, customer error and size variation. The authors find that the most important failures for customers in e-tail are slow service, mostly related to delays in merchandise delivery and customization issues, such as receiving incorrect airlines tickets.

Author(s)	Context	Dimensions of failure
Bitner et al., 1990	Interpersonal services	(1) Employee response to service delivery system failure - failures in the core service. (2) Employee Response to customer needs and requests - events related to requests for customization services. (3) Unprompted and unsolicited employee actions - unexpected events and employee behaviors, such as rudeness, ignorance.
Smith et al., 1999	Interpersonal services	(1) Process (2) Outcome
Forbes et al., 2005	e-commerce retail	(1) Response to service delivery system/product failure - slow or unavailable service, system pricing issues, packaging errors, out of stock, product defect, bad information, website system failure (2) Response to customer needs and requests - special order or request issue, customer error and size variation
Tan et al., 2016	e-commerce retail	(1) Information: inaccurate, incomplete, irrelevant or untimely (2) Functional: deficits in the functions of the website such as needs recognition, product alternatives identification and evaluation, product acquisition and lack of post-purchase support (3) System failure: inaccessible, non-adaptable to diverse content and usage patterns, not easy to navigate, slow or insecure
Holloway & Beatty, 2003	e-commerce retail	(1) Delivery Problems: purchase arrived later than promised, purchase never delivered, wrong item delivered, wrong size product delivered, and purchase damaged during delivery (2) Website Design Problems: navigational problems at site, product poorly presented at site, insufficient information provided at site, products incorrectly listed at site as in stock, and incorrect information provided at site (3) Customer Service Problems: poor customer service support, poor communication with the company, unfair return policies, and unclear return policies

		(4) Payment Problems: credit card overcharged, website purchasing process confusing, difficulties experienced while paying, problems with product quality, and consumer dissatisfied with product quality
		(5) Security Problems: credit card fraud, misrepresented merchandise, and email address released to e-marketers
		(6) Miscellaneous: failure to address unintentional customer mistakes, retailer charged some customers more than others, and lack of personalized information at site
Meuter et al., 2000	SSTs	(1) Technology failure - ATM system breakdown, (2) Process failure - transaction not being successfully completed (3) Poor design - slow or unclear system interface or inconvenient service design (4) Customer-driven failure

Table 1. *Typologies of service failure*

Other researchers found different ways to categorize service failures in the context of e-commerce. Coming from the field of information systems research, the study of Tan et al. (2016) explores previous research on e-service and system success in order to build a new classification of service failure that would be entirely applicable to e-commerce. By reviewing the attributes of service success from past studies, the authors consider that the absence of these attributes, which constitute “standards of service performance” (p. 5), would lead to service failure. Consequently, they establish three dimensions of e-commerce failure: (1) information, (2) functional and (3) system failure.

Information failure takes place when the e-commerce website provides incorrect instructions or data, which brings the user to generate a faulty output. To cause failures, the information can be inaccurate, incomplete, irrelevant or untimely. Functional failures are related to the lack of features and support that would bring value to the transaction. The website might lack functions such as needs recognition, product alternatives identification and evaluation, product acquisition and even lack of post-purchase support. System failures are linked to the way the service content is delivered to the customer. In the case of e-commerce, the website causes failure when it is inaccessible, non-adaptable to diverse content and usage modes, not easy to navigate, slow or insecure.

Another study in the context of online retailing found similar types of failures experienced by customers when shopping online (Holloway & Beatty, 2003). Using the CIT, the authors found that the most common failures in e-commerce take place in the delivery process, such as delayed merchandise, wrong product, wrong address. These failures are followed by

website design problems, when customers have difficulties with navigating the website, which provides poor or incorrect information. Other failures include customer service problems, payment and security issues and miscellaneous, such as lack of personalized information on the website.

Although the findings from the three studies (Forbes et al., 2005; Holloway & Beatty, 2003; Tan et al., 2016) offer a good and extensive overview of potential failures in online services, the classification is highly concerned with e-commerce retail and has some limitations when applied to other types of self-service technologies. One study that focuses on satisfying and dissatisfying incidents related to self-service technologies has been conducted by Meuter et al. (2000). Through their exploratory study, using also the critical incident technique (CIT), the researchers uncover a series of unfavorable incidents in the context of SSTs, when a customer creates his own service with the help of a technological interface. The study investigates a broad range of SSTs (ATMs, Internet shopping, pay-at-the-pump terminals, automated telephone services, automated hotel check, out, package tracking, automated car rental pickup and return, online brokerage services, among others) and classifies the dissatisfying incidents into four groups: Technology failure, Process failure, Poor design (technology design and service design) and Customer-driven failure.

The largest group of dissatisfying encounters revolves around the technology failure, where customers were prevented from using the service to achieve the desired outcome. Examples of failure in this group include: ATM system breakdown, login webpage malfunctioning. The second largest group is comprised of incidents related to poor design of the service experience (both technology and service design were included). In this group, customers experienced incidents such as slow or unclear system interface, limits on ATM money withdrawal or constraints in the online shopping process. The process failure includes incidents that usually take place after the interaction with technology, most of the times resulting in the transaction not being successfully completed. Finally, the customer-driven failures account only for a small share in all types of failure. The failures in this group are caused by mistakes made by customers, such as forgetting the personal identification number or demagnetizing their card.

The benefit of the failure typology found by Meuter et al. (2000) is that it can be applied to most of the SSTs, internet and non-internet based, to the ones that include intermediaries or to services where the customer is the only actor participating in the service encounter.

Although previous studies along the years found several ways of classifying service failures, they do display common characteristics. For example, the model proposed by Tan et al. (2016), which classifies failures in information, functional and system is similar to the findings of Meuter et al. (2000). The information failure can be associated with design, the flawed functionality with process, and system failure with technology breakdown. Additionally, the outcome dimension proposed by Smith et al. (1999), where the customer cannot fulfill the service need, can be correlated to technology and design failure. The findings revealed by Holloway & Beatty (2003) are also closely related to the classification found by Meuter et al. (2000). Technology failure and poor design are similar to website design problems, while process failure can be associated with delivery problems.

3. Theoretical background

3.1. Service failure and attribution theory

When customers experience service failure, they tend to analyze their environment in order to find causal explanations that lead to the failure (Van Vaerenbergh, Orsingher, Vermeir, & Lariviere, 2014). Wolosin, Sherman, & Till (1973) found that outcomes that deviate from the expectation drive the actors who receive that outcome to assign causality for the unexpected result. In this case, service failure is a deviant outcome and customers seek for internal or external causes of the incident and make attributions of blame.

Attribution theory has been originally studied in social psychology in the years 1950-1960 in order to better understand the causes related to social perception (Kelley, 1973). Attribution theory, defined by Kelley (1973), is “a theory about how people make causal explanations, about how they answer questions beginning with ‘why?’” (p. 107). Attribution is concerned with drawing causal inferences of certain events, which, in turn, determine behavior and attitudes. People are thought to make attributions in order to better understand the context of the event and to have a higher control over it (Harvey & Weary, 1984).

Kelley & Michela (1980) propose a general model of the attribution field, which consists of both antecedents and consequences of attributions that influence someone’s responding behavior. Attributions are made by making assessments of antecedents through evaluations of the environment and conditions that lead to the event. The antecedents can be information,

beliefs or motivation. Once the causes are deduced, people are expected to manifest reactions associated with the attribution. The consequences can be related to behavior (complaint), affect (self-esteem, pride, anger, disappointment) or expectancy.

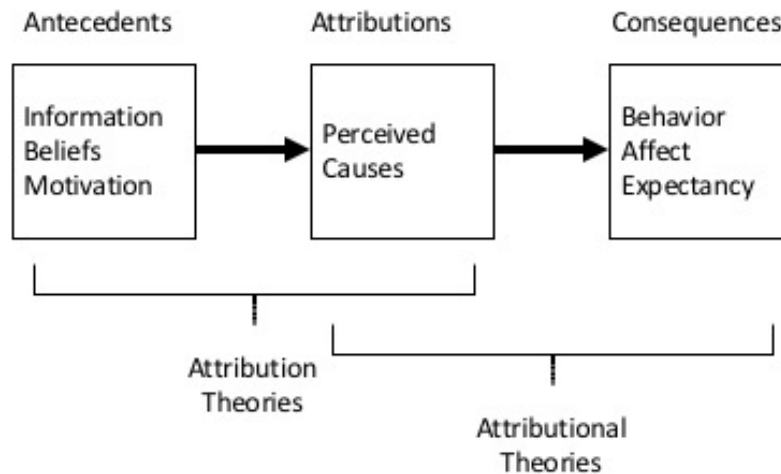


Figure 2. *General model of the attribution field (Kelley & Michela, 1980)*

Weiner (1985) defines three dimensions for attributions: locus, stability and controllability. Locus is concerned with whether the attribution is internal or external: are the factors coming from within the person and his decisions or it is bound to the environment? Stability relates to the fact that the causes can be either constant or temporary. The last dimension, controllability, is identified as the perception of control over the event. A simpler way to view the three dimensions of attribution is provided by Bitner (1990), who proposes an explanatory question for each dimension: locus can be defined by ‘Who is responsible?’, stability by the question ‘Is the cause likely to recur?’ and controllability can be understood through ‘Did the responsible party have control over the cause?’ (p. 70).

Attribution theory has been adopted in different fields of study, besides psychology, due to its universal applicability. It has been popular along the years thanks to its explanation power of why certain events occur and what people make out of this causality. The theory has been used in several studies by marketing scholars who aimed at investigating how customers assign blame in product or service failures (Bitner, 1990; Dong, Sivakumar, Evans, & Zou, 2016; Folkes, 1984; Meuter et al., 2000), how attribution impacts service recovery (Harris et al., 2006; Heidenreich et al., 2015; Swanson & Kelley, 2001) and the role of attribution

in customer behavior and satisfaction (Iglesias, 2009). Attribution theory has been widely used in service failure research as it has been found that people are more inclined to search for attributions in the case of dissatisfactory events than in the case of successes (Weiner, 2000).

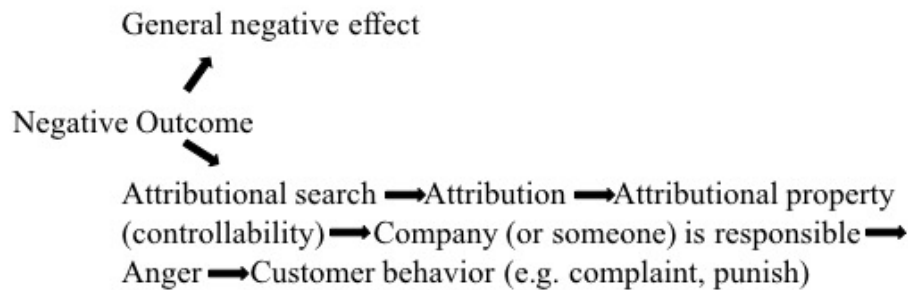


Figure 3. *Attributional process linking responsibility to consumer behavior (Weiner, 2000)*

Many studies that have used attribution theory focus on interpersonal services. For example, Maxham III & Netemeyer (2002) study attribution in the context of two or more consecutive failures and find that customers who have experienced multiple failures and poor recoveries tend to blame more the company for the outcome and perceive the failures as a stable characteristic to the firm. Similar findings, but from a different angle, were discovered by Swanson & Kelley (2001) who observed that customers have higher purchase intentions and positive WOM if the recovery after a service failure is successful and it is perceived as consistent in time.

Research has also looked at the impact of customer relationship with the firm on attribution and satisfaction after a service failure episode. Customers who intend to continue their relationship with the firm believe that the failure is only temporary and they express higher satisfaction with the service after the recovery takes place (Hess, Ganesan, & Klein, 2003). Attribution studies also show the potential magnitude of a failure on the company's perceived image. When the cause of the failure lies within the firm and its employees, the negative effects perceived by the customers transform into a halo effect and influence the quality aspects of all services provided by the firm (Iglesias, 2009).

Outside of the service research studies, Folkes (1984) reveals how attributions influence customers' reactions to product failure. The author researches all three dimensions of

attribution (locus, stability and controllability) and finds that customers are more likely to be angry and have a desire for revenge when the failure is caused by the company and could have been controlled or prevented by the firm. Moreover, customers feel entitled to refunds and apologies more when the cause is external. These findings have been supported by several studies, which found that the less control customers feel they have in a service, the more responsibility they assign to the company (Hui & Toffoli, 2002; Pittman & Pittman, 1980). External attributions that are controllable are more dangerous as customers who experienced the failure are less passive and are more likely to have strong negative reactions and to take actions against the company (Raaij & Pruyn, 1998; Van Vaerenbergh et al., 2014).

Most of previous studies share the fact that external attribution, especially within the realm of the firm, lowers customer satisfaction and leads to negative emotions and behaviors, such as anger and avoidance (Weiner, 2000). External attribution also leads to lower satisfaction with the service and with the service provider (Dabholkar & Spaid, 2012; Dong, Evans, & Zou, 2008). According to Dabholkar & Spaid (2012), firms could opt for immediate recovery strategies in order to reduce the negative attributions by the customer and improve the firm-consumer relationship.

As discussed in the previous chapter, SSTs are seen as co-created services, where customers put in energy and time to derive value. Therefore, attribution is something that customers usually seek in the case of service failure. Since customers are co-producers of the service, they become a potential source for service failure. Previous research shows that customers using online services blame themselves more for a service failure than do customers who chose interpersonal encounters (Harris et al., 2006). Studying satisfactory and dissatisfactory incidents with SSTs, Meuter et al. (2000) find that customers recognize that their input added into an SST has an effect over the service. However, as opposed to the findings from Harris et al. (2006), customers are more likely to attribute successful encounters to themselves than unsuccessful ones (Meuter et al., 2000). The unsatisfactory outcomes are most often blamed to external factors, such as the company or the technology (Meuter, Ostrom, Bitner, & Roundtree, 2003).

This concept has been referred to in previous literature as the self-serving bias. The self-serving bias introduces the notion that a person is more likely to demand recognition for a successful event and blame someone else for a failure that is produced in cooperation

(Wolosin et al., 1973). Research has shown that the self-serving bias is reduced and customers accept responsibility for failed outcomes when they perceive autonomy in a service and they are highly involved in the production of their outcome (Bendapudi & Leone, 2003; Harvey & Arkin, 1974; Knee & Zuckerman, 1996). Hence, it can be interpreted that co-created services, especially SSTs, where customers' input is essential in order to achieve a service outcome, are expected to receive more internal attribution.

When the failure is considered internal, where customers acknowledged that they are the cause for the negative incidents in the service outcome, they don't consider the failure to be too serious (Forbes, 2008). When the cause is internal, customers also expect to participate in the recovery process and are more satisfied with the service after a co-created recovery (Dong et al., 2016; Zhu, Nakata, Sivakumar, & Grewal, 2013). Participation in the recovery process is especially enhanced in highly co-created services, where customers are more willing to take responsibility for the failure and feel guilty for the flawed outcome (Heidenreich et al., 2015).

3.2. Coping with service failure

As it was introduced by attribution theory, in the unfavorable case of a failure in the transaction between a firm and its clients, customers tend to look for attributions in order to better understand the circumstances of the negative incident. Experiencing failure is usually perceived as a stressful event where the customer encounters a loss (Smith et al., 1999). As a consequence, the customer experiences negative emotions and engages in behavioral reactions that will lower the stress. People use different coping strategies to respond to the challenges they face in an episode of service failure.

The concept of coping has been widely researched in psychology for decades as thoughts and acts that people use to manage stressful events. In their cognitive theory of stress, Lazarus and Folkman (1984) argue that stress consists of several mediating processes: primary appraisal, secondary appraisal, reappraisal and coping. Primary appraisal consists of judging an encounter as being a threat, harm/loss or challenge. What can influence an event to be perceived as harmful or stressful is its novelty, uncertainty, ambiguity, urgency among many others. Secondary appraisal relates to the judgement of what can be done to respond to the threat. The response to the threat is identified as coping.

Coping is defined by the authors as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus and Folkman, 1984, p.141). The way a person copes with a certain situation is influenced by the resources available in that specific case, such as health and energy, beliefs, material resources, personal skills or social support. On the other hand, there are also many constraints that restrict how a person interacts with a stressful situation. These can be personal constraints, such as cultural values, beliefs, environmental constraints or the level of threat.

The researchers argue that coping serves two overriding functions: managing the problem in the environment that causes the stress, which results in problem-focused coping strategies, and managing the emotions concerned with the problem, which results in emotion-focused coping. Strategies that are part of the problem-focused coping dimension are: trying to come up with several solutions to the problem, gathering information, and making a plan of action and following it.

Emotion-focused coping relates to seeking emotional social support, distancing, avoiding, emphasizing the positive aspects of the situation, and self-blame. Emotion and problem-focused coping are not two opposite dimensions that are employed one at a time, but can occur concurrently (Nielsen & Knardahl, 2014). In a stressful situation where it is believed that the source of stress can be altered, people usually tend to use problem-focused coping strategies. However, when there are few possibilities of beneficial change, the person is more likely to use emotion-focused forms of coping such as distancing, escape or avoidance (Folkman & Lazarus, 1980; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986).

<i>Authors</i>	<i>Construct Definitions</i>
Two-dimensional models Lazarus and Folkman (1984) Krohne (1993); Roth & Cohen (1986) Brandstadter & Renner (1990)	Problem-focused: Coping aimed at managing the problem causing the stress Emotion-focused: Coping aimed at regulating emotional responses to the stress Approach: Cognitive and emotional activity oriented toward the source of stress Avoidance: Cognitive and emotional activity oriented away from the source of stress Assimilation: Transforming circumstances in accordance with preferences Helplessness: Adjusting personal preferences to situational constraints Voluntary: Responses to stress that involve volition and conscious effort Involuntary: Responses to stress that are automatized
Compas, Connor, Osowiecki, & Welch (1997)	
Three-dimensional models Moos & Billings (1982)	Problem-focused: Seeks to modify or eliminate the source of stress Emotion-focused: Manage the emotions caused by source of stress Appraisal-focused: Involves attempts to define meaning of a stressful situation
Heckhausen & Schulz (1995)	Primary control: Effort to influence objective events Secondary control: Efforts to maximize one's fit with the current situation Relinquishment of control: Forfeiture of control
E. A. Skinner, Edge, Altman, & Sherwood (2003)	Autonomy: Coping efforts directed at coordinating actions directly within the environment Competence: Coping efforts directed at coordinating one's own preferences, flexibly adjusting preferences to match available options and situational constraints. Others: Coping efforts that coordinate individual's reliance on others with the social resources available in the environment
Four-dimensional models Carver, Scheier, & Weintraub (1989)	Problem-focused: Coping aimed at directly changing the stressful condition Distraction: Coping aimed at avoiding the stressor by engaging in alternate activities Avoidant: Coping aimed at avoiding the stressor by physically or mentally distancing oneself Support: Seeking instrumental aid or emotional comfort from others
Five-dimensional models Ayers, Sandler, West, & Roosa (1996)	Problem solving: Active efforts aimed directly toward the source of stress, including all behavioral or cognitive efforts directed at instrumentally changing environmental conditions Seeking support: Soliciting emotional comfort, instrumental assistance, or spiritual guidance from outside parties Avoidance: Attempts to escape stressful conditions by physically or mentally withdrawing from the source of stress Distraction: Active attempts to deal with a stressful situation by engaging in alternative, more pleasurable activities Cognitive restructuring: Active attempts to change one's view of a stressful situation to view it in a more positive light

Table 2. *Higher Order systems Construct Definitions (Duhachek & Oakley, 2007)*

To measure coping, Lazarus and Folkman (1984) propose a checklist of 68 items called “Ways of coping” that include a wide range of coping strategies, both problem-focused and emotion-focused, that individuals use in a stressful encounter. Their two-dimensional model of coping has been one of most influential theories used in researching stress management in psychology. However, coping researchers found limitations in differentiating processes that are problem-focused from those that are emotion-focused in a way that all coping processes are directed at managing emotions (Duhachek & Oakley, 2007). Along the years, multiple competing models have emerged in the coping literature, some still using two dimensions (approach-avoidance coping, assimilation-helplessness coping, voluntary-involuntary) or extended to three (problem-focused, emotion-focused, appraisal-focused) (Table 2. Duhachek & Oakley, 2007). Carver, Scheier, & Weintraub (1989) have also developed, based on previous research, the COPE inventory to assess coping strategies, which incorporates 14 distinct scales as shown in Table 3.

-
1. Active coping
 2. Planning
 3. Suppression of competing activities
 4. Restraint coping
 5. Seeking social support-instrumental
 6. Seeking social support-emotional
 7. Positive reinterpretation & growth
 8. Acceptance
 9. Turning to religion
 10. Focus on venting emotions
 11. Denial
 12. Behavioral disengagement
 13. Mental disengagement
 14. Alcohol-drug disengagement
-

Table 3. *COPE Scales (Carver et al., 1989)*

Coping mechanisms have received a lot of attention also in consumer research as a way to understand the manner in which consumers cope with stress in a variety of consumption episodes (Duhachek & Kelting, 2009). Many studies in consumer research have used the existing dimensions and instruments used in psychology literature, in order to assess and measure coping. For example, Gabbott, Tsarenko, & Mok (2011) study the effect of emotional intelligence on coping strategies used by consumers in an event of service failure. The authors employ in their study the two-dimensional model of problem-focused and emotion-focused coping strategies, as most of the consumer behavior coping literature.

However, this model has been found to oversimplify the coping phenomena. Other consumer researchers have decided to formulate new models of coping that would be more adaptable to the context of stress in consumption episodes. Based on Carver's COPE model, Duhachek (2005) constructed a better model suited to consumer behavior and consists of three factors: active coping (action coping, rational thinking, positive thinking), expressive support seeking (emotional venting, instrumental support, emotional support) and avoidance (avoidance, denial). The model covers 3 different reactions that customers might take in order to reduce the stress: they either use rational thinking and try to improve the situation, they voice out their problem and try to get external support or they avoid the situation that causes them stress (Duhachek, 2005). This same scale has been adopted by Sengupta, Balaji, & Krishnan (2015) in their study of service failure in the context of airline services. The authors find that the coping strategies vary depending on the severity of the failure. Therefore, for highly severe service failure, customers tend to use more problem-focused

coping strategies, such as action coping and instrumental support seeking. When the failure is perceived as less severe, users apply more emotion-focused coping strategies, such as rational thinking, avoidance and denial.

Similar division of coping strategies (problem-focused and emotion-focused) has been found by Mick & Fournier (1998), who studied coping mechanisms for the anxiety and stress caused by technological products. The authors build on the arguments that technology is paradoxical. Using technology products, customers expose contradictory attitudes and feelings that lead to internal conflicts. The study has codified a series of 16 paradoxes that customers experience when using technology. They have been classified as: control/chaos, freedom/enslavement, new/obsolete, competence/incompetence, efficiency/inefficiency, fulfills/creates needs, assimilation/isolation, engaging/disengaging. As an example, technology can help customers fulfill a knowledge gap or provide the ability to perform something that wasn't possible before. At the same time, the same technology causes new needs for knowledge and ability to perform certain tasks. That is a paradox of fulfills and creates needs.

These paradoxes of technology cause internal conflicts for the user, which, in turn, increase stress. In order to deal with the stress caused by these paradoxes, consumers tend to engage in strategies that would reduce the internal tension. These strategies have been researched using the methods of phenomenological interview and have been later categorized by the researchers into avoidance and confrontative coping strategies. A subdivision found in avoidance strategies includes: ignore, refuse, delay, neglect, abandon, distance. On the confrontative side, the study found strategies such as: pretest, buying heuristics, extended decision making, extended warranty/maintenance contract, accommodation, partnering, mastering.

Avoidance	Confrontative
Pre-acquisition	
Ignore	Pretest
Refuse	Buying heuristics
Delay	Extended decision making
	Extended warranty/ maintenance contract
Consumption	
Neglect	Accommodation
Abandonment	Partnering
Distancing	Mastering

Table 4. *Coping mechanisms to technology paradoxes (Mick & Fournier, 1998)*

The division of coping mechanisms used by Mick & Fournier (1998), avoidance and confrontative, is very similar to the problem-focused and emotion-focused classification of Lazarus and Folkman (1984). The avoidance coping strategies are more likely to reduce the negative emotions caused by technology products, while confrontative coping is applied when the users want to take the problem in their hands and try to solve the paradoxes that technology brings to their daily life. The coping mechanisms found by (Mick & Fournier, 1998) have several limitations when used in service failure due to their context of research. The strategies are tightly connected to the usage of products and they don't depict the complex approach that customers take in the case of a service failure.

Coping strategies have been researched as well in the context of managing negative emotions in purchase-related situations. In their study, Yi & Baumgartner (2004) developed, based on previously researched scales, a new classification of coping strategies. The benefit of the new scale is that it is adaptable to the consumer behavior setting. The authors found how consumers cope with purchase-related incidents involving different negative emotions, such as anger, disappointment, regret, and worry. The eight strategies found are: planful problem-solving, confrontative coping, seeking social support, mental disengagement, behavioral disengagement, positive reinterpretation, self-control or acceptance.

-
1. Planful problem-solving
 2. Confrontative coping
 3. Seeking social support
 4. Mental disengagement
 5. Behavioral disengagement
 6. Positive reinterpretation
 7. Self-control
 8. Acceptance
-

Table 5. *Coping scale (Yi & Baumgartner, 2004)*

The study finds that when customers experience emotions such as worry they tend to use coping strategies such as planful problem solving, self-control, mental disengagement or seeking social support. Angry customers prefer to engage in confrontative coping by complaining and arguing their case. This strategy has been found to be adopted when customers blame the company or other external factors for the product failure. When customers are disappointed, they use behavioral and mental disengagement or confrontative coping in order to minimize the stress caused by the failure. Regret has been identified to stimulate acceptance and positive reinterpretation. The scale proposed by Yi & Baumgartner (2004) includes both emotion-focused as well as problem-focused strategies.

Although many ways of measuring coping have emerged from social psychology literature as well as consumer research, there is no universally agreed upon coping model. Most of the scales used in previous research reflect similar aspects, the most important one being the usage of both emotion-focused and problem-focused strategies. Each scale has been altered to adapt to certain research contexts, from measuring coping with stressful events related to work, family, health in social psychology (Lazarus, 1980) to coping with product or service failures in business research (Sengupta et al., 2015; Yi & Baumgartner, 2004).

4. Hypotheses

In this chapter, the conceptual model for the study is presented and the hypotheses that indicate the coping mechanisms based on the type of SST failure and attributions are set.

The hypotheses are built on the literature review presented in the previous chapters. The conceptual model is based on the general model of the attribution field of Kelley & Michela (1980), which includes the antecedents and consequences of attributions. In the current research, the antecedent of attribution is service failure type, which is adopted from Meuter et al. (2000) and divided into: technology, process and design. The dimension of attribution utilized in this model is locus: internal and external (Weiner, 1985). The consequences of service failure are the coping mechanisms adapted from Yi & Baumgartner (2004).

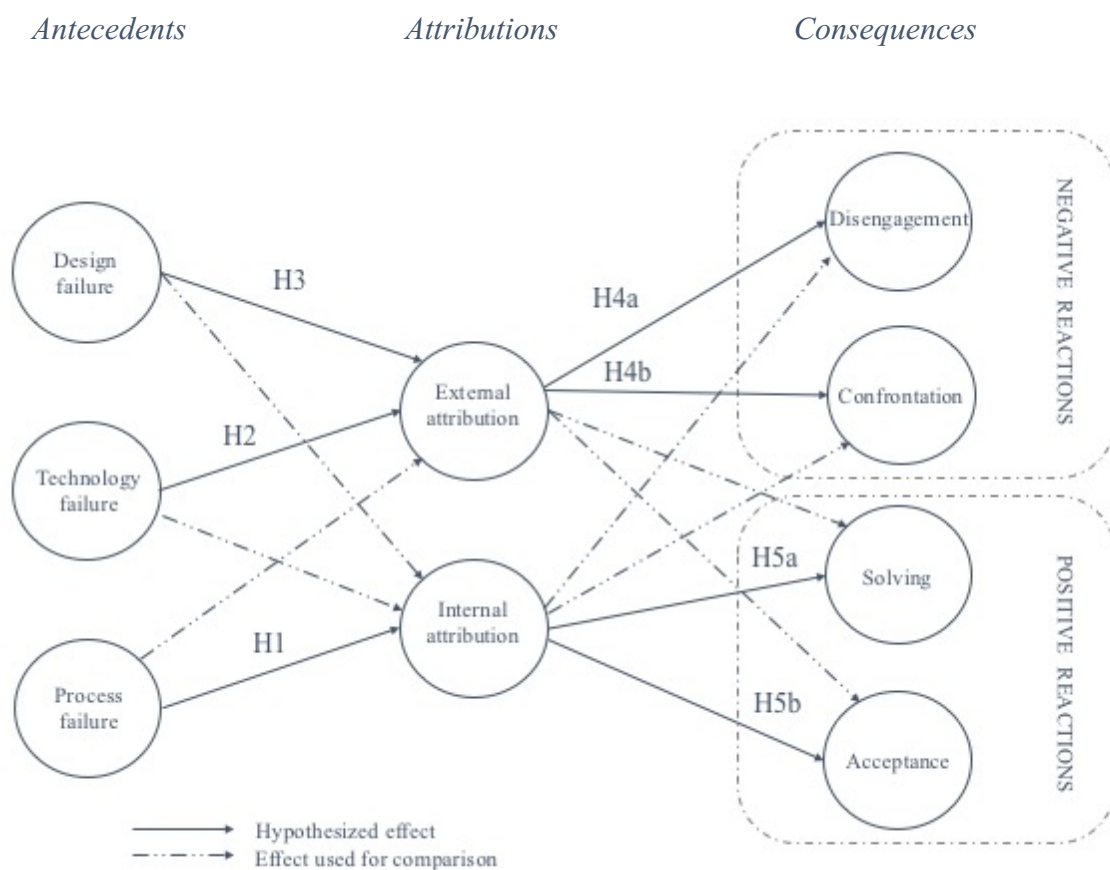


Figure 4. *Conceptual model*

4.1. Failure type and attributions

The classification of SST failure provided by Meuter et al. (2000) has been chosen for the model due to its high relevance and applicability to all types of self-service technologies,

both online and offline. Since most of the modern services involve customer interaction with technology, a process that delivers the final outcome as well as a service design, this classification is ideal to represent the present-day self-service technologies. Moreover, this failure division hasn't been used in previous studies to research how customers perceive different types of failure. Most of the previous studies regarding service failure have adopted the typology of process and outcome found in Smith et al. (1999). Therefore, there is a need to understand how customers perceive a failure at different stages in the self-service process. In order to explore this, attribution theory is employed, as it has proven to be important in explaining how customers respond to service failures (Van Vaerenbergh et al., 2014).

As discussed in the previous chapters, SSTs are co-created services, where customers utilize their own resources in order to achieve the desired outcome. One reason why consumers prefer to use self-service technologies over interpersonal encounters is the perceived control that technologies offer (Bateson, 1985). Perceived control over SST is determined by the judgement of a customer that he has the ability to influence the service in order to receive the desired experience and outcome (Zhu et al., 2013). In this matter, in the absence of service employees that usually guide the actions in a service encounter, customers have more control over the way the service takes place as well as the outcome. Hence, customers have the power to dictate how the service is built, the input, as well as how the service is delivered and the output.

Perceived controllability of a situation links to inferences of responsibility (Weiner, 2000). Since customers are highly involved in the co-production of a service, by using SSTs, the self-serving bias is reduced and users are willing to take more responsibility for a failed outcome. This concept has been supported by several previous studies that found customers to be willing to blame themselves more when using self-service technologies (Harris et al., 2006; Heidenreich et al., 2015; Meuter et al., 2000). Therefore, we can assume that self-service failure will have a stronger impact on internal attributions when customers feel in control of the situation.

On the opposite side, when customers feel less control over the service and don't feel able to influence its delivery or outcome, they shift the responsibility from themselves to external factors. In many cases of service failure, customers tend to overestimate the control of the service provider and they develop strong negative reactions against the party who caused the failure and who could have prevented it (Raaij & Pruyn, 1998; Van Vaerenbergh et al.,

2014). Although many studies support the idea of internal attribution in the case of co-created services, most of the times, customers still blame the company for a negative outcome when they have no control over the cause.

As described by Meuter et al. (2000), process failure relates to incidents that take place after the interaction with the technology. These are mainly associated to the processing phase of the transaction. In SSTs, the transaction is usually performed by the customer himself. He brings his own resources, such as information and effort in the co-creation process in order to achieve the desired outcome. A variation in input can cause variations in output (Wolosin et al., 1973). In other words, a flawed outcome is caused by flawed inputs. Since the input is brought in by the user through his own information, a failure in the process of the service will create attributional uncertainty, when the customer doesn't possess enough knowledge to identify the cause of the failure. Confusion in the failure as well as increased control over the service will lead the customer to blame himself for the dissatisfactory outcome. Hence, the following hypothesis can be derived:

H1: Process failure triggers stronger internal attribution than (a) technology failure and (b) design failure.

Although SSTs facilitate high customer co-creation, the firm is still responsible for the environment where the service takes place. This environment is usually defined by the operating technology and the design of the service and of the interface. A failure in the technology of the service refers to encounters where technology doesn't work as intended. In a situation of technical breakdown, the user has no control over the condition and cannot steer the service in a more favorable direction. This will lead the customer to believe that the company has control over the technology and could have prevented the failure. According to attribution studies, the less control, the more negative external attribution. For that reason, it is assumed that:

H2: Technology failure triggers stronger external attribution than process failure.

The service failure regarding the design of the service is seen more as a dissatisfactory incident and less as a failure. The customer can still process his transaction according to the design of the service, which can sometimes be slow, hard to navigate, inefficient (Meuter et

al., 2000). If the role of the customer as co-producer in the service is ambiguous and customers don't know what to do and what steps to follow, their perception of control will diminish (Collier & Barnes, 2015). Although these attributes don't entail an actual service breakdown, customers are frustrated with the way they need to experience the service. The design of a service is not something that can be controlled by customers and the power stays in the realm of the service provider. Through this rationale, the following hypothesis is presented:

H3: Design failure triggers stronger external attribution than process failure.

4.2. Attributions and coping strategies

In most situations, attributions are a key factor to understanding how customers respond to a service failure (Folkes, 1984). When they experience a problem in their service, customers usually try to either solve it or avoid it. As discussed in the previous chapters, when customers attribute the failure to themselves, their reactions are less negative and the complaint rates are lower. They also try to engage themselves in the recovery process in order to solve the problem they feel responsible for. When the attribution is external and the firm is perceived as responsible for the faulty outcome, customers tend to be angry, complain more and abandon the service. Most service failure research that measure attributions finds that customers experience several negative emotions due to the failure. Anger is the negative state that is found across all studies, followed by offense and disappointment (Van Vaerenbergh et al., 2014).

The coping mechanisms chosen for this model were adopted from Yi & Baumgartner (2004) as they have been researched and validated in the context of consumer behavior. Moreover, they have been studied based on the negative emotions experienced by customers in purchase related situations. Since service failure has been confirmed to trigger negative emotions in consumers, this coping scale is the most relevant to be applied in this context. 4 out of the 8 coping strategies proposed by the researchers were selected for the current study. The reasoning behind this selection came from a pre-study, where interviews were held in order to discover the top coping mechanisms in an episode of service failure. The four strategies (planful problem solving, confrontative coping, behavioral disengagement,

avoidance) have shown to be greatly used by the respondents in the case of service failure. They also cover the two coping dimensions found in previous research: problem focused coping through solving and confrontation and emotion based coping, through acceptance and disengagement. Moreover, these coping mechanisms are the most appropriate for the current research, where the different types of self-service technology failure (design, technology, process) require for immediate coping.

As mentioned previously, research shows that customers who experience a negative incident caused by a company tend to be angry and disappointed and they have a desire for revenge against the ones who produced the stressful outcome (Folkes, 1984; Hui & Toffoli, 2002; Mccoll-Kennedy & Sparks, 2003; Van Vaerenbergh et al., 2014). Disappointed customers that blame an external factor for the incident are more likely to avoid the service and stop using it, while switching to an alternative (Weiner, 2000; Yi & Baumgartner, 2004). Avoidance is equivalent to the coping strategy of behavioral disengagement. Considering these facts, the following is anticipated:

H4a: External attribution has a positive effect on behavioral disengagement.

Also, Yi & Baumgartner (2004) found that angry customers employ confrontative coping strategies when they experience a failure caused by the company. They decide to express their feelings of displeasure to the company and to others. Considering this, it is expected that:

H4b: External attribution has a positive effect on confrontive coping.

When customers experience a flawed outcome due to their own action, they are less likely to exhibit strong negative reactions as in the case of external attribution and they feel guilt for the failure. Instead of blaming the provider, they prefer to actively participate in the recovery process (Gelbrich, 2010; Heidenreich et al., 2015; Zhu et al., 2013). This leads to the following hypothesis:

H5a: Internal attribution has a positive effect on planful problem-solving coping.

Moreover, when the failure is considered internal, customers don't consider the failure to be too serious (Forbes, 2008). When customers experience regret about their performance in a

service, they cope with it emotionally, by accepting the failed outcome. These considerations lead to the additional hypothesis:

H5b: Internal attribution has a positive effect on acceptance.

Summary of hypotheses

H1a: Process failure triggers stronger internal attribution than technology failure
H1b: Process failure triggers stronger internal attribution than design failure.
H2: Technology failure triggers stronger external attribution than process failure.
H3: Design failure triggers stronger external attribution than process failure.
H4a: External attribution has a positive effect on behavioral disengagement.
H4b: External attribution has a positive effect on confrontive coping.
H5a: Internal attribution has a positive effect on planful problem-solving coping.
H5b: Internal attribution has a positive effect on acceptance.

Table 6. *Hypotheses*

5. Methodology

The study uses quantitative methods to investigate customers coping strategies to self-service technology failure as well as attributions of SST failure. In this chapter the design of the research is presented as well as the survey development. It concludes with data collection and sample characteristics.

5.1. Experimental design

The current study uses experimental scenarios to test the proposed attributions and coping mechanisms to the three different types of SST failure. Most of previous research in service failure has used scenario-based designs in order to assess customers' reactions to dissatisfactory service encounters and service recovery. Scenarios have been demonstrated to have ecological validity, which indicates that the results found in a laboratory setting research can be extended to real life context (Bateson & Hui, 1992). Scenarios-based designs have multiple advantages when used in consumer behavior research. First of all, they allow to operationalize difficult manipulations that would otherwise involve high financial and

time investments as well as ethical concerns (Bitner, 1990; Gabbott et al., 2011). Secondly, experimental designs deal with the memory problems that customers might have when trying to recall a consumption experience (Gabbott et al., 2011). When customers are asked to recall certain consumption episodes, such as service failure, they usually tend to remember situations that had a greater impact on them and those can't be generalized as typical responses to that type of incident (Smith & Bolton, 1998).

Considering the aforementioned benefits of scenario-based approach, the current study consists of a 3 x 2 between groups factorial design to depict the three types of dissatisfactory incidents that can occur while interacting with a self-service technology: technology failure, process failure, design failure. The type of service was also manipulated: one service was an airline tickets online booking system and the other one was an online retail platform that allows to purchase customized shoes. These two services have been widely researched in previous service failure studies and they are also frequently used services by customers in developed countries, which is the scope of this research. Moreover, these two internet based services are suitable for this study as they offer high co-creation features (Heidenreich et al., 2015).

Participants were randomly assigned to one of the 6 scenarios where they had to first read the description of the service failure. Customers' responses to a scenario situation are more realistic when they can identify with the experience described in the scenario (Dabholkar, 1996). Therefore, to ensure that the scenarios are as realistic as possible, the service failure manipulations were inspired from an online platform (ConsumerAffairs.com) where customers rate and review their experiences with several services, from online shopping websites to airlines. The selected service failures were later tested in 5 interviews in order to assess their authenticity. Certain details were eliminated so that the conditions would maintain a certain level of ambiguity regarding the cause of the failure.

In the online retail scenario, consumers had to imagine that they are trying to buy a pair of shoes that they can customize according to their lifestyle by selecting from a wide range of features. In the technology failure manipulation, as the respondents proceeded to filling in their credit card details, they got the message that the request can't be processed. The process failure involved wrong delivery of the merchandise to the respondent's previous address. Respondents who were exposed to the design failure scenario had to imagine that, after

spending a long time customizing their shoes, when they went back to change one feature, they lost all the information they inputted.

In the online flight-booking scenarios, respondents were in the situation of planning a trip to a friends' wedding. They go online to purchase their customizable flight tickets beforehand. This scenario was adapted from Harris et al. (2006), who studied consumer attributions of blame to service failure and expectancies of recovery. In the technology failure condition, users wanted to log in to their account and use their reward points to purchase the tickets when they received the notification that the request can't be processed. The participants who were allocated to the process failure found out one day before the flight that their tickets were issued for 7pm instead of 7am and if they don't change the tickets they would miss the wedding.

In the design failure condition respondents purchased the flexible tickets that would allow them to make changes in the departure dates. However, when they wanted to make those changes, they couldn't find any option that would allow that online, as initially promised. All of the 6 scenarios were worded in a way that the respondents had no concrete information of the cause of the failure. This way it was up to them to determine who (or what) caused the flawed outcome (Harris, Mohr, & Bernhardt, 2006). The experimental conditions were randomly assigned to participants. The six scenarios can be found in Appendix 1. After reading the scenario situation where they were exposed to one of the three types of service failure from one of the two services, respondents were presented with a self-administered online questionnaire.

5.2. Survey development

The survey following the scenario situation of service failure aims to measure the locus of attribution as well as coping strategies to service failure. All scales used in the current study were validated by previous empirical research. Locus of attribution construct was measured by six questions depicting both internal and external attribution. The scale was taken from Heidenreich et al. (2015) and Poon, Hui, & Au (2013) and slightly reworded to accommodate the research scenarios. The coping strategies scale was adopted from Yi & Baumgartner (2004) and applied to the current context of online service failure.

Besides the main constructs, realism and manipulation checks were also presented to the respondents. The realism check of the scenarios was measured based on two items proposed by Dabholkar & Spaid (2012). To ensure that the manipulations were effective, two newly developed questions were used as conditions check. The first question measured if the respondents perceived a service failure in the scenario situation, while the second question measured the type of service failure: technology, process or design. In the question measuring the design failure manipulation check the word failure was replaced by dissatisfactory incident. As described by Meuter et al. (2000), a problem in the design of the service is not always considered a failure by customers, hence the rewording to dissatisfactory incident. All the items were measured on a 7-point Likert scale (1 = Totally disagree, 7 = Totally agree). Also demographic questions such as age, gender, education, employment and nationality were asked in the end of the survey.

A pre-study that involved 7 interviews was conducted in order to validate the applicability and the relevance of the scales to the six service failure scenarios used in the experiment. Based on the respondents' feedback, certain sentences were reworded, some redundant questions were removed and a new item was supplemented to measure planful problem-solving coping scale. Final survey can be found in the Appendix 2.

<i>Construct</i>	<i>Survey items</i>	<i>Coding</i>	<i>Based on</i>
<i>Internal attribution</i>	I was responsible for this unpleasant experience.	IA1	Poon, Hui, & Au, 2013
	I did contribute to this unpleasant experience.	IA2	
	I should be blamed for the undesirable outcome.	IA3	
<i>External attribution</i>	In my view, the service provider is fully responsible for the experienced service failure.	EA1	Heidenreich et al., 2015
	The problem that led to the service failure was clearly caused by the service provider.	EA2	
	The service failure that I encountered was entirely service provider's fault.	EA3	
	I think about how I might best handle the problem.	S1	

<i>Coping – Planful problem solving</i>	I try to come up with a plan about what to do.	S2	Yi & Baumgartner, 2004
	I think about what steps to take to resolve the problem.	S3	
	I know what to do and I do it.	S4	
	<i>I contact the company to help me solve the problem.</i>	S5	<i>Researcher</i>
<i>Coping - Confrontative</i>	I let the company know how upset I am.	C1	Yi & Baumgartner, 2004
	I present my point of view and argue my case.	C2	
	I contact the company to complain about the situation.	C3	
	I email a service representative about the problem and ask him or her to correct it.	C4	
	I express my feelings of displeasure to the company without reservation.	C5	
<i>Coping – Disengagement</i>	I give up the attempt to get the product/service that I wanted.	D1	Yi & Baumgartner, 2004
	I acknowledge that getting the product/service is beyond my reach.	D2	
	I quit trying to use this service.	D3	
	I resign myself to the fact that further efforts to use this service are pointless.	D4	
<i>Coping - Acceptance</i>	I realize I brought the problem on myself.	A1	Yi & Baumgartner, 2004
	I accept that the incident happened and that it can't be changed.	A2	
	I will learn how to live with it.	A3	
	I decide there was nobody to blame but me.	A4	
	I realize I will have to accept the situation.	A5	

Note: 7-point Likert-scale was used in data collection (1 = Totally disagree, 7 = Totally agree)

Table 7. *Survey items*

5.3. Data collection and description of data

Data was collected through a web-based survey administered in March 2017. There were two ways for collecting the data: by using Amazon Mechanical Turk (MTurk) and by sharing the survey in social media. Of the total sample of 374 respondents, 320 were recruited via MTurk. MTurk is an online platform that provides a pool of workers who perform assignments, such as surveys, for financial incentives. This platform has been previously used in service failure and SST research as the main channel to collect data and has been proved to represent a viable source for high-quality data (Collier & Barnes, 2015; Dong et al., 2016; Gelbrich, Gathke, & Gregoire, 2016; Giebelhausen, Robinson, Sirianni, & Brady, 2014).

Participation in the survey for MTurk workers was limited to residents of the United States. Moreover, restrictions were set in Qualtrics that would prevent participants, based on their IP address, to take the survey more than once. For each completed survey, the participants were paid \$0.50, which is the recommended cost by the service community. The rest of 56 responses were collected by sharing the survey link on social media. Since there were no restrictions regarding the sample characteristics, everyone who had access to the link could fill in the survey. There were no missing values in the data. Responses who showed lack of engagement due to their random answering pattern (n=2) were omitted from the final sample. Therefore, the final data sample consists of 374 valid responses.

The distribution of respondents' gender is 46.3 % female and 53.7 % male. Respondents with the age between 26-34 represent 46.3 % of the final sample, followed by 16.8 % of respondents aged between 35-43 years old, 16.3 % with age between 17-25 years old, 7.5 % aged between 44 and 52, 6.4 % aged 53-61 and 6.7 % of respondents are older than 62 years old. The majority of respondents (86.1 %) live in the USA, while 14.9 % in other countries such as: Finland (7.5 %), Romania (1.3 %), Brazil and France (each counting for 0.8 %), Estonia (0.5 %), Belgium, China, Egypt, Hong Kong, Iceland, Netherlands, Norway, Portugal, Qatar, Asia, Singapore (each counting for 0.3 %). The characteristics of the sample can be found in Table 8.

N = 374		Frequency	
		n	Percent %
Gender	Male	201	53.7
	Female	173	46.3
Age	17-25	61	16.3
	26-34	173	46.3
	35-43	63	16.8
	44-52	28	7.5
	53-61	24	6.4
	> 62	25	6.7
Education	Less than bachelor degree	160	42.8
	Bachelor's degree	143	38.2
	Master's degree	63	16.8
	Doctoral degree	7	1.9
	Professional degree	1	.3
Employment	Working	317	84.8
	Not working	55	14.7
	Prefer not to answer	2	.5
Country of residence	USA	322	86.1
	Others	52	14.9

Table 8. *Sample characteristics*

6. Data analysis and results

To analyze the data two softwares have been used: IBM SPSS and SmartPLS. To test the success of the manipulation scenarios, realism and manipulation checks were employed. All items were measured on the 7 point Likert scale. Realism checks for each scenario situation were measured using two questions. The mean of the two scales for each of the scenarios is always above 5.40, which is consistent with the standards in previous literature (Dabholkar & Spaid, 2012; Gelbrich et al., 2016; Lastner, Folse, Mangus, & Fennell, 2016). This shows a high perception of realism for each of the six scenarios.

Manipulation checks measured through one question if the respondents felt that they experienced a failure in each scenario. All values are above the threshold of 5.40, except for the Process failure scenarios in both industries and the Design failure scenario in the airline industry. However, these values have a high standard deviation, meaning that there are extreme values. This can be confirmed by the mode of these manipulation checks, which is equal to 7. Hence, it can be concluded that the respondents felt there was a failure in the scenarios described. The second manipulation check measured if the respondents understood the type of failure they were experiencing. All values are above 5.40, except for Process failure in the airline tickets online booking, which has a value of 4.27. The values for realism and manipulation checks can be found in Appendix 3.

After conducting a test of normality it has been confirmed that the data is not normally distributed ($p < .01$ in Shapiro-Wilk test). The skewness for indicators range between -1.23 to +0.75, while kurtosis values are between -1.25 and +1.63. The general threshold for skewness and kurtosis is between +1 and -1 (Hair, Hult, Ringle, & Sarstedt, 2014). Distributions that are outside this range are considered to be non-normal. Due to non-normal data distribution, PLS-SEM has been chosen as the main method for data analysis. As opposed to the widely used CB-SEM, which is known for its assumptions for normality of distribution, PLS-SEM doesn't require such assumptions and provides more flexibility. Many studies have confirmed that differences in estimates between CB-SEM and PLS-SEM are minimal, which makes PLS an attractive alternative method. PLS-SEM has started to gain increased popularity in marketing studies, especially in services research where the impact of service failures was analyzed using this method (Hair, Hult, Ringle, Sarstedt, & Thiele, 2017; Henseler, Ringle, & Sinkovics, 2009).

PLS-SEM provides several benefits that are relevant to the current research. Besides the fact that it can be used with non-normal data, PLS is a preferred option for exploratory research, when prior theory is not very strong (Hair et al., 2011). As the research goal of this paper is mainly to identify and explore key driver constructs that impact attributions and coping mechanisms, and not theory confirmation, PLS-SEM is the appropriate statistical methodology. On top of this, PLS-SEM allows for complex models that include many constructs and indicators and works with both metric and categorical data. It also provides high statistical power even when using relatively small sample sizes (Hair, Ringle, & Sarstedt, 2013; Hair et al., 2017).

6.1. PLS-SEM

PLS-SEM involves a two-step approach in analyzing the model. First, the measurement model is tested, followed by the evaluation of the structural model. Unlike CB-SEM, which focused on theory testing and confirmation, PLS-SEM focused on prediction, hence it does not provide a global goodness-of-fit criterion to assess the overall model fit. Despite this drawback, the model can still be evaluated based on how well it predicts the dependent variables (Hair et al., 2014). Although different studies have tried to come up with measures to determine the model fit, researchers found these measures unreliable, as they cannot distinguish the valid models from the invalid ones (Henseler & Sarstedt, 2013). These criteria are still in early stages of development and they require further analysis in order to be fully taken into use by scholars. Therefore, researchers have been advised to avoid using them or to use them with caution, due to their limited applicability (Hair et al., 2014).

Most PLS-SEM studies follow the two-step assessment approach proposed by Hair et al. (2014): measurement model and structural model. To assess the reflective measurement model, the following steps need to be examined: internal consistency reliability, indicator reliability, convergent validity and discriminant validity. According to Hair et al. (2014), internal consistency reliability (or composite reliability), which takes values between 0 and 1, considers as acceptable values 0.60 and 0.70 in exploratory research. Values between 0.70 and 0.90 are preferred for advanced research. Values above 0.90 are not considered reliable, as the indicator variables manifest the measurement of the same phenomenon.

Convergent validity is examined by looking at both the outer loadings of the indicators as well as the average variance extracted (AVE). The threshold above 0.70 is considered acceptable for the indicators' outer loadings (Hair et al., 2014). Values between 0.40 and 0.70 should be removed from the model only if they raise, when deleted, the recommended threshold of composite reliability or AVE. Values lower than 0.40 should always be eliminated from the model (Hair et al., 2011). When it comes to average variance extracted (AVE), values higher than 0.50 are preferred, when the construct explains more than half of the variance of its indicators (Hair et al., 2014). Discriminant validity should be assessed using the Fornell-Larcker criterion, which is regarded as a more reliable method. In order to achieve good discriminant validity, the square root of each construct's AVE should be greater than its highest correlation with any other construct (Hair et al., 2014).

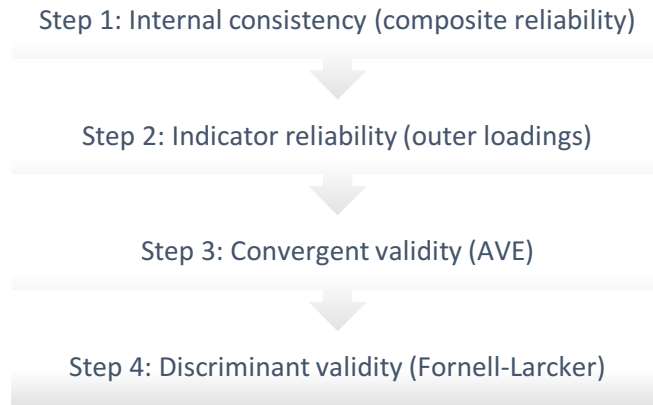


Figure 5. Evaluation steps for reflective measurement models (Hair et al., 2014)

Once the construct measures are tested and validated, the structural model is assessed. The key criteria to analyze the structural model is to evaluate the R^2 values, the level and significance of path coefficients, the f^2 effect size, the predictive relevance and the q^2 effect size. For multicollinearity assessment, VIF values < 5 are accepted (tolerance > 0.20) as indicators of non-collinearity (Hair et al., 2011). Path coefficients can take values between -1 and +1, where values close to +1 indicate strong positive relationships. Values close to 0 indicate weak or no relationship between variables. Relationships can also take negative values when close to -1. To assess significance of relationships, t value is computed and interpreted as follows: 1.65 (significance level= 10%), 1.96 (significance level = 5%), and 2.57 (significance level = 1 %). In marketing studies, a significance level of 5% is usually assumed.

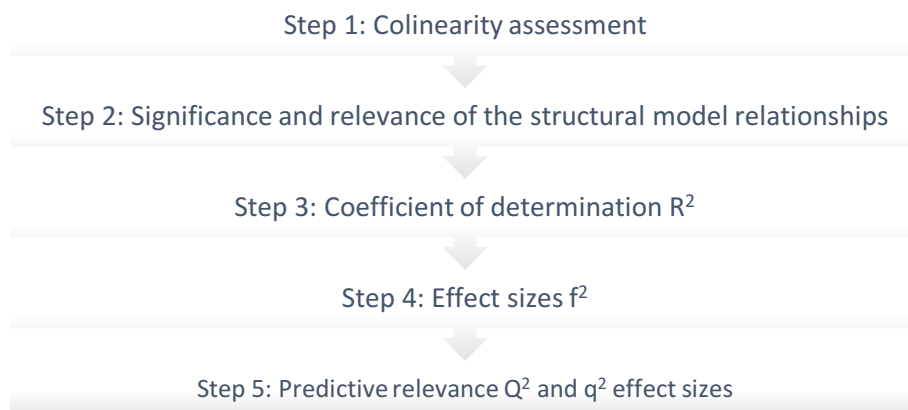


Figure 6. Evaluation steps for the structural models (Hair et al., 2014)

The coefficient of determination is a measure for the model's predictive accuracy. R^2 values of 0.75, 0.50, or 0.25 for endogenous latent variables reflect strong, moderate or weak prediction. The threshold can vary depending on disciplines. For example, in consumer research studies, R^2 values of 0.20 are considered strong (Hair et al., 2011). f^2 effect size reflects the contribution of each exogenous construct to the R^2 value of the endogenous variable. f^2 values of 0.02, 0.15, and 0.35 are usually interpreted as small, medium, and large effect.

Lastly, Q^2 is the predominant measure of the model's predictive relevance. Q^2 values higher than 0 indicate that the exogenous variables have predictive relevance for the endogenous variables. The levels for q^2 values are similar to f^2 , and it can be interpreted that 0.02 represents a small predictive relevance of an independent variable on a dependent one, while 0.15, and 0.35 indicate medium and large effect (Hair et al., 2014).

6.2. Model development

In order to assess the model, the categorical variable, Failure type, which takes 6 values, one for each manipulation, had to be recoded. Although each failure type has been manipulated for 2 different industries (airlines and footwear), the items have been combined for the purpose of hypotheses testing. This resulted in a three-level categorical variable, one value for each failure type. The new variable has been recoded into 3 different dummy variables, Design failure (DF), Technology failure (TF) and Process failure (PF). The 3 dummies, representing one failure type, will be included in the model following regression analysis requirements.

In order to test the model, two separate assessments are required. First, the measurement model is assessed as a whole. Since the measurement model focuses on the reliability and validity of the measures used to represent each construct, one single model that includes all 3 failure types can be assessed at once. Secondly, for the structural model, the impact of each failure type on attribution and coping mechanisms cannot be assessed in one single model due to the dummy variable trap. According to regression literature, when regression is performed with multiple dummy variables, the number of variables used in the model is $k-1$, where k is the number of groups (Hair, Black, Babin, & Anderson, 2010). In the current research, since there are 3 groups representing 3 different failure types, 2 dummy variables are taken at once in each model and one failure type is omitted. The omitted failure type acts

as reference group and the coefficients represent differences between the group means and the reference group. The results are reported accordingly.

6.3. Measurement model

To assess the measurement model for reliability and validity, PLS algorithm has been applied with the stop criterion of 7 and 300 iterations. The model has converged after 9 iterations, which is below the maximum of 300 iterations set initially. This means that the algorithm found a stable solution at a low number of iterations. Once the model converges, the first step is to look at internal consistency reliability, which is referred to as composite reliability in the PLS model. All constructs have values higher than the threshold of 0.70. Only External attribution and Internal attribution exceed the level of 0.95, which means that the indicator variables measure the same phenomenon. This is an expected result, as both constructs measure locus of attribution.

The next step is to assess indicators reliability by looking at the outer loadings, as all of them are reflective indicators. Certain indicators deviate from the recommended threshold as follows. Three items have outer loadings lower than 0.70 (C2, C4 and A5) and two have loadings lower than 0.40 (A2 and A3). The two indicators in the Acceptance construct (A2 and A3) with loadings lower than 0.40 are considered for deletion, as recommended by Hair et al. (2014). After deleting the two items, A5 decreases its outer loading value from 0.47 to 0.40. Deleting item A5 leaves the construct with only two indicators, which is not an optimal case. After evaluating the items, it has been acknowledged that A1 and A4 are measured with the following survey items: *I realize I brought the problem on myself* and *I decide there was nobody to blame but me*. These 2 items are phrased similarly to the indicators measuring Internal attribution construct, therefore they are eliminated from the Acceptance construct. After removing items A1 and A4, the remaining indicators, A2, A3 and A5 increased their loadings to 0.78, 0.84 and 0.92.

Regarding the items with loadings between 0.40 and 0.70, they are retained in the model for content validity as suggested by Hair et al. (2014). It has been noticed that removing them from the model doesn't increase the composite reliability or AVE to a significant level. Convergent validity is measured by AVE values. All indicators in the model have AVE values higher than 0.50. This indicates that each construct explains more than half of the variance in its indicators. The last step in assessing the measurement model is to test the

discriminant validity, as an indicator that each construct is different from the other constructs. This is done using the Fornell-Larker criterion. The results show that each construct in the current model shares more variance with its associated indicators than with other constructs. The results for the Fornell-Larker criterion can be found in Appendix 4. Table 9 reveals the final results of the measurement model, which includes the outer loadings of the six constructs (Internal attribution, External attribution, Acceptance, Confronting, Disengagement, Solving), AVE values, composite reliability and discriminant validity.

Construct	Item	Loadings	AVE	Composite reliability	Discriminant validity
External attribution	EA1	0.95	0.91	0.97	Yes
	EA2	0.95			
	EA3	0.96			
Internal attribution	IA1	0.95	0.87	0.95	Yes
	IA2	0.89			
	IA3	0.94			
Solving	S1	0.74	0.58	0.87	Yes
	S2	0.84			
	S3	0.82			
	S4	0.65			
	S5	0.74			
Confronting	C1	0.90	0.62	0.88	Yes
	C2	0.68			
	C3	0.85			
	C4	0.55			
	C5	0.87			
Disengagement	D1	0.85	0.69	0.90	Yes
	D2	0.75			
	D3	0.85			
	D4	0.86			
Acceptance	A1	<i>dropped</i>	0.72	0.88	Yes
	A2	0.78			
	A3	0.84			
	A4	<i>dropped</i>			
	A5	0.92			

Table 9. *Measurement model results*

6.4. Structural model

Once the measurement model is found valid and reliable, the structural models are assessed for hypotheses testing. First, collinearity of models is evaluated. The VIF levels of the predictor variables are under the 5 threshold, therefore there are no collinearity problems in the 3 models. To assess the models' predictive accuracy, the coefficient of determination (R^2) is measured. This shows how much of the endogenous variables, External attribution and Internal attribution are explained by the predictors Process failure, Design failure and Technology failure. Also, how much of the Coping mechanisms (Solving, Acceptance, Confronting and Disengagement) are explained by External attribution and Internal attribution. Both Internal Attribution and External attribution show moderate levels of predictive accuracy (0.332 and 0.233), followed by Confronting which has a weaker level of 0.129. According to Hair et al. (2011), R^2 values of 0.20 could be considered strong, as in consumer research studies. This means that 33% of Internal attribution construct can be explained through the chosen constructs, Process failure, Design failure and Technology failure. The same constructs explain 23% of External attribution, while both Internal and External attribution explain 12% of Confronting. The rest of the endogenous variables have weak R^2 values of 0.079 (Disengagement), 0.054 (Acceptance) and 0.042 (Solving).

	R^2	Q^2
External attribution	0.233	0.199
Internal attribution	0.332	0.271
Solving	0.042	0.019
Acceptance	0.054	0.030
Confronting	0.129	0.060
Disengagement	0.079	0.048

Table 10. *Structural model R^2 and Q^2*

To analyze the relationships between the constructs, path coefficients are analyzed for strength and significance through the bootstrapping procedure with 5000 subsamples. The results show that Process failure has a significant stronger positive effect on Internal attribution than Technology failure ($\beta = 0.643$, $p < .005$). This provides support for H1a: Process failure triggers stronger internal attribution than Technology failure. Process failure has shown also stronger positive effect on Internal attribution than Design failure ($\beta = 0.474$, $p < .005$). This finding confirms H1b as well, which says that: Process failure triggers

stronger internal attribution than Design failure. Compared to Process failure, Technology failure has stronger positive effect on External attribution ($\beta = 0.524, p < .001$). Design failure has also stronger effect of External attribution ($\beta = 0.428, p < .001$), compared to Process failure. These findings allow to accept H2: Technology failure triggers stronger external attribution than process failure as well as H3: Design failure triggers stronger external attribution than process failure.

What also needs to be noted is that Design failure triggers stronger Internal attribution than Technology failure ($\beta = 0.170, p < .001$). On the other hand, Technology failure has stronger effect on External attribution ($\beta = 0.099, p < .05$) compared to Design failure. Looking at the effect of attribution on coping mechanisms, it can be noticed that External attribution has a strong significant effect on Confronting ($\beta = 0.434, p < .001$) and Disengagement ($\beta = 0.408, p < .001$). This provides support for H4a: External attribution has a positive effect on behavioral disengagement and H4b: External attribution has a positive effect on confrontive coping. Concerning Internal attribution, it is noted that it has a significant moderate relationship with Acceptance ($\beta = 0.292, p < .001$), followed by Solving ($\beta = 0.284, p < .005$) and Disengagement ($\beta = 0.266, p < .005$). Although the effects are moderate, the values offer support for H5a: Internal attribution has a positive effect on planful problem-solving coping and H5b: Internal attribution has a positive effect on acceptance. What is unexpected in the effects of attribution on coping and hasn't been hypothesized is the positive effect of Internal attribution on Disengagement.

Next to be calculated based on Hair et al. (2014) is the predictive relevance of the model, examined through the Stone Geisser's Q^2 value. Q^2 values are assessed through the blindfolding procedure with omission distance of 7, which represents the number of blindfolding rounds (Hair et al., 2014). The Q^2 values of the endogenous variables are all larger than 0, suggesting that the model has predictive relevance. The model has higher predictive relevance for the 2 endogenous constructs External attribution and Internal attribution, with values of 0.199 and 0.271. The Coping strategies constructs take Q^2 values below 0.1, which indicate lower predictive relevance.

Process failure has a strong contribution to the R^2 value of Internal attribution, when this is compared to Technology failure ($f^2=0.460$) and to Design failure ($f^2=0.255$). Similarly, Technology failure has strong contribution to External attribution when compared to Process failure ($f^2=0.268$). Design failure has moderate effect size on External attribution when

compared to Process failure ($f^2=0.179$). In terms of coping mechanisms, External attribution has strong effect size for explaining Confronting ($f^2=0.4101$) and moderate for Disengagement ($f^2=0.085$). Internal attribution has small effects on Acceptance ($f^2=0.042$), Solving ($f^2=0.039$) and Disengagement ($f^2=0.036$).

Similar to f^2 effect size, q^2 levels indicate effect size of the constructs on the predictive relevance. The findings show that Process failure has strong predictive relevance for Internal attribution when compared to Technology failure ($q^2=0.252$) and medium predictive relevance on Internal attribution when compared to Design failure ($q^2=0.139$). When compared to Process failure, both Technology failure and Design failure have medium predictive relevance on External attribution ($q^2=0.177$ and $q^2=0.117$). Regarding the coping mechanisms, it can be noticed the small effect of External attribution on Confronting ($q^2=0.042$) and Disengagement ($q^2=0.051$). Internal attribution has small predictive relevance on Acceptance ($q^2=0.021$), Disengagement ($q^2=0.019$) and Solving ($q^2=0.017$).

	Path coefficients	T Value	P Values	f²	q²
External attribution -> Confronting	0.434	6.911	0.000	0.101	0.042
External attribution -> Disengagement	0.408	4.689	0.000	0.085	0.051
Internal attribution -> Acceptance	0.292	4.178	0.000	0.042	0.021
Internal attribution -> Disengagement	0.266	2.873	0.004	0.036	0.019
Internal attribution -> Solving	0.284	3.260	0.001	0.039	0.017
PF -> External attribution (compared to DF)	-0.425	8.184	0.000	0.179	0.117
PF -> Internal attribution (compared to DF)	0.474	9.775	0.000	0.255	0.139
TF -> External attribution (compared to DF)	0.099	2.039	0.042	0.010	0.006
TF -> Internal attribution (compared to DF)	-0.168	3.827	0.000	0.032	0.018
TF -> External attribution (compared to PF)	0.524	11.061	0.000	0.268	0.177
TF -> Internal attribution (compared to PF)	-0.641	14.672	0.000	0.460	0.252
DF -> External attribution (compared to PF)	0.428	8.073	0.000	0.179	0.117
DF -> Internal attribution (compared to PF)	-0.477	9.295	0.000	0.255	0.139
DF -> External attribution (compared to TF)	-0.100	2.015	0.044	0.010	0.006
DF -> Internal attribution (compared to TF)	0.170	3.797	0.000	0.032	0.018
PF -> External attribution (compared to TF)	-0.525	11.283	0.000	0.268	0.177
PF -> Internal attribution (compared to TF)	0.643	15.385	0.000	0.460	0.252

Table 11. *Structural model - Path coefficients*

6.5. Additional findings

Since the scenarios manipulated failures from 2 different industries, airlines and footwear, effects of industry on attribution and coping mechanisms are analyzed. The effects are studied through multi-group analysis, performed in Smart PLS. The method used is the non-parametric MGA, which is an extension of Henseler's PLS MGA implemented in SmartPLS (Sarstedt & Ringle, 2011). This approach has been selected as it does not build on any distributional assumptions. Two different groups are created with sample sizes of 186 for the airlines group and 188 for the active footwear group.

The results show that the effect of Internal attribution on Disengagement is stronger in the Airlines industry than in Footwear (difference $\beta = 0.401$, $p < .05$). Moreover, when compared to Design failure, Process failure has a stronger impact on Internal attribution in the Airlines industry (difference $\beta = 0.299$, $p < .005$). Design failure has stronger impact on External attribution, when compared to Process failure, in the Airlines industry (difference $\beta = 0.265$, $p < .05$). This means that in the Footwear scenario, Design failure and Process failure have small differences in their effect on External attribution. Finally, Technology failure has stronger negative impact on Internal attribution in the Footwear industry, compared to the effect of Design failure (difference $\beta = 0.208$, $p < .05$).

	Path Coefficients Airlines	Path Coefficients Footwear	Path Coefficients Airlines - Footwear	p-Value Airlines - Footwear
Internal attribution -> Disengagement	0.524	0.123	0.401	0.006
PF -> Internal attribution (compared to DF)	0.620	0.322	0.299	0.001
DF -> External attribution (compared to PF)	0.557	0.292	0.265	0.006
TF -> Internal attribution (compared to DF)	-0.068	-0.273	0.206	0.011

Table 12. *Industry effects results*

SmartPLS calculates as well the indirect effects of the exogenous variables (failure types) on the endogenous constructs (coping mechanisms) through the attribution constructs. It can be noted that Process failure has stronger positive effect on Acceptance and Solving, compared to Design failure ($\beta = 0.099$, $p < .005$, $\beta = 0.074$, $p < .05$) and to Technology

failure ($\beta = 0.139, p < .005, \beta = 0.108, p < .005$). Both Design failure and Technology failure have stronger effects on Confronting, compared to Process failure ($\beta = 0.132, p < .005, \beta = 0.155, p < .005$). Additionally, Design failure has a slightly higher effect on Acceptance ($\beta = 0.040, p < .01$) and Solving ($\beta = 0.034, p < .05$), compared to Technology failure.

Hypotheses	Construct	Path coefficient	t-value	Supported
	Internal attribution	$R^2=0.332$	$Q^2=0.271$	
	Process failure -> Internal attribution			
H1a	compared to Technology failure ($f^2=0.460, q^2=0.252$)	0.643***	15.38	Yes
H1b	compared to Design failure ($f^2=0.255, q^2=0.139$)	0.474***	9.77	Yes
	External attribution	$R^2=0.233$	$Q^2=0.199$	
H2	Technology failure -> External attribution	0.524***	11.06	Yes
	compared to Process failure ($f^2=0.268, q^2=0.177$)			
H3	Design failure -> External attribution	0.428***	8.07	Yes
	compared to Process failure ($f^2=0.179, q^2=0.117$)			
	Disengagement	$R^2=0.079$	$Q^2=0.048$	
H4a	External attribution -> Disengagement ($f^2=0.085, q^2=0.051$)	0.408***	4.68	Yes
	Confronting	$R^2=0.129$	$Q^2=0.060$	
H4b	External attribution -> Confronting ($f^2=0.101, q^2=0.042$)	0.434***	6.91	Yes
	Solving	$R^2=0.042$	$Q^2=0.019$	
H5a	Internal attribution -> Solving ($f^2=0.039, q^2=0.017$)	0.284***	3.26	Yes
	Acceptance	$R^2=0.054$	$Q^2=0.030$	
H5b	Internal attribution -> Acceptance ($f^2=0.042, q^2=0.021$)	0.292***	4.17	Yes

*** $p < .005$, ** $p < .01$, * $p < .05$

Table 13. *Summary of results*

7. Discussion and conclusion

The objectives of the current study were to explore customers' reactions to self-service technologies failure, as well as attribution of blame seen from the perspective of 3 types of failure: design, technology and process. Through its findings, the study brings valuable theoretical contributions to service research literature. Since most of previous studies have focused on failure in interpersonal services, self-service technologies have remained under-researched in service failure literature. Hence, one of the main contributions of the current

study is the investigation of service failure in a new and emerging context: technology based self-services. Moreover, no previous study has explored customer reactions to different types of SST failure as proposed by Meuter et al. (2000): technology, process and design. Another important theoretical contribution of the current paper relates to the application of attribution theory together with coping strategies, taken from the theory of stress and coping, in analyzing how customers perceive and respond to the 3 types of SST failure. This novel research approach offers new insights to how customers perceive responsibility for service failures, where there is no interaction with a company employee and where the customer is the sole producer of the service. Moreover, the findings shed light on the coping strategies that customers employ when the failure is perceived as a cause of their own actions or as initiated by the service provider.

The first objective of the study was to identify who customers hold accountable when they experience a failure in the technology of the SST, in its process or in its design. In contrast with the results found by Dabholkar & Spaid (2012) showing that customers are not concerned with making attributions of blame when they encounter a failure, the current research shows that customers always tend to assign responsibility to someone or something for the negative outcome, be it the company or themselves. The results show that, when customers experience a failure in the process of the service, they tend to blame themselves more for the outcome, than when they encounter a technology or design failure. The findings are in line with previous studies on co-created services, which found that customers tend to take on some responsibility for the failure when they participated in the creation of the service (Harris et al., 2006; Heidenreich et al., 2015; Meuter et al., 2000; Yen, Gwinner, & Su, 2004).

SSTs are highly co-created services, where the company provides the environment where the service takes place and the customer brings in his input in order to achieve the desired outcome. When a failure takes place in the process of the service, after the interaction with the technology, this might be due to the flawed input of information. These errors usually issue faulty outcomes. Although these errors could be as well created by the service provider, customers tend to be insecure about their input into the service, since most of the times there is no immediate and evident explanation for the failure. This is linked to the concept of attributional uncertainty, when customers don't possess enough knowledge to identify the

cause of the failure. In a state of confusion, customers tend to take on responsibility for the mistakes attributed to their own input into the co-created service.

A second finding of the study is that customers, when faced with technology or design failure, shift the blame to external forces, more than in a process failure. Similar results have been found in attribution research, where control over a situation relates to blame for a negative outcome. In the case of self-service technologies, users participate actively in the production of the service, however they cannot influence the technology they are required to use in order to perform the service. The same applies to the design of the service or to the interface design. If a failure occurs in these areas of the service, customers believe that the company could have controlled the outbreak and they hold it responsible for the outcome. These findings bring new light to self-service research, where there is no clear answer so far to how customers perceive technology failure or dissatisfactory design and who they blame for it.

Another interesting finding is that customers tend to take on more responsibility on themselves when facing a design failure compared to technology failure. Although they still blame the firm for the dissatisfactory experience, they do feel responsible for a part of the outcome. This can be caused by a feeling of low self-efficacy, where users believe that they don't have the necessary skills to perform their role in the service. This is enhanced when the service is performed through a technological interface, which can be perceived as confusing, hard to navigate or it doesn't fulfill one's preferences. Compared to the technology failure, a design failure does not signify an actual breakdown of the service. Hence the customers tend to blame less the company than in a technology failure.

The second objective of the study was to discover how customers cope in an episode of SST failure. This has been researched through their perception of attribution. The results show that when users perceive the failure as attributed to external factors, they employ strategies such as confrontation and disengagement. In line with previous studies, external attribution triggers negative emotions such as anger, dissatisfaction or desire to punish. Dissatisfied customers also complain more and want to voice out their frustration. Therefore, they decide to confront the company by expressing their anger and feelings of displeasure. Moreover, when users feel that failure of the service stays within the responsibility of the firm, they tend to disengage and quit using the service. This can also be linked to the lack of control

over the performance and outcome of the service, where customers feel that their own effort won't alter their condition, hence they apply the emotion-based coping of acceptance.

When customers feel that they are responsible for a negative outcome while using SSTs, they are more likely to engage in focused problem solving or to accept the situation. These findings support previous research, which found that internal attribution in co-created services brings feelings of guilt and less frustration. Since the firm is not held responsible for the failure and the remorse is internal, customers are expected to engage in recovery and less likely to confront the company (Zhu et al., 2013). They try to come up with plans on how they can best solve the situation. Also, as previous studies show, when customers blame themselves in highly co-created services, they don't consider the failure to be too serious. Hence, they gravitate more towards accepting the situation as it is.

An unexpected finding of the current research reveals that internal attribution has also a small effect on disengagement. Even if customers feel responsible for the flawed service, they will still stop using the service that caused them dissatisfaction. It is noticed that the emotion-focused coping mechanisms used by customers when they feel responsible for the failure includes both acceptance as well as disengagement. As these two strategies are not mutually exclusive, the user can accept the failure, but it doesn't mean that he will continue using the service. Disengagement could be interpreted as a result of low self-efficacy when working with the SST.

The indirect results of the study show the effects of failure type on coping mechanisms, through the attribution constructs. What can be noticed is that in an episode of process failure, customers tend to engage in solving or acceptance strategies more than when they experience technology or design failure. Also, since design failure has higher impact on internal attribution than technology failure, customers are also more inclined to accept the cause of the event or even try to solve it. Compared to process failure, when customers experience technology or design failure, they have stronger confronting reactions towards the company.

The additional findings of the current research focused on whether there are differences in attribution and coping in the case of the 3 types of failure between two industries: airlines and active footwear. The results show that industry does play a role in the way customers perceive the failure. For example, a failure in the process of using the SST has a stronger

effect on internal attribution in the airline industry, then in the footwear industry, when compared to design failure. Moreover, when the user experiences an inconvenient design of service while purchasing online flight tickets, he tends to blame the company more than when he experiences similar failure while purchasing footwear online. Also, a failure in the technology of the service provider from the sports apparel industry has stronger negative impact on internal attribution when compared to a design inconvenience.

The current study confirmed all 5 hypotheses of customers' reactions to SST failure. In addition to the developed hypotheses, extra findings were discovered, which brings further understanding to the current topic. Self-service technologies have been highly studied in service research due to their disruptive approach to how a service is created and delivered. What previous research hasn't tackled that much is what happens when these types of services fail and there is no employee around to remedy the situation. The current study found that, even if SSTs are highly co-created services and, many times, the customers are the sole producers of the service, they still blame the company when they experience service failure. Customers also take part of the blame when they feel that their input into the service caused a negative outcome, as it is in the case of failure in the service process. However, when they have no control of the service environment, as with the technology of the service or its design, they hold the company responsible for the flawed results.

Hence, it can be concluded that SSTs do not solve completely the blame problem that companies have when a service goes wrong. However, customers are more inclined to take part of this blame when they participate in the creation of the service. An interesting finding is that customers will stop using the service when they face a service failure, regardless if the failure was caused by the company or by themselves. This result illustrates that any type of failure has negative implications for the service provider. The difference in attributions relate to how the customer approaches the problem, whether he complaints to the company, when the failure is external, or tries to actively solve it or to accept it, when the failure is internal.

7.1. Managerial implications

The findings of this study bring valuable implications for service managers. Since services are rapidly moving from a high-touch to a high-tech environment, there is not much understanding of how consumers perceive these developments. Managers are eagerly taking

on self-service technologies as part of their customer offerings due to the many benefits these offer to both parties. However, not many companies acknowledge the fact that, although the human element is replaced in an SST, which would eventually make it less prone to failure, these types of services still experience failure at different stages in the process. When an SST fails, there is no one around to support the customer and this will ultimately trigger strong negative reactions.

The current study shows that, when customers experience a service failure, they always look for someone or something to be held responsible for the unpleasant outcome. If companies think that the responsibility of the service is transferred to the customer in the case of SSTs, this is an erroneous judgement, to some extent. The study shows that when customers interact with an SST, depending on the type of failure, they attribute the blame to the company, but to themselves as well. The environment of the service, such as its technology and its design, is the firm's liability and the customer acknowledges this as a fact. Therefore, when there is a technical failure in the SST customers blame the service provider for the outcome. This can be explained by the fact that customers don't feel any control over the technology and it is something they can't influence. At the same time, technology failure is something that even companies cannot prevent 100% of the time. What firms can do to reduce the negative reactions that come with external attributions is to offer customers a choice in how they want to perform the service. Previous research shows that customers are less likely to blame the company for the failure when they are offered choice in the participation in a service (Bendapudi & Leone, 2003).

Moreover, firms can offer more transparency to why the failure occurred and keep customers informed about the progress of the recovery. Retrospective explanation about the reason of failure and what the company is doing to prevent from future similar incidents has proven to lower anger and retaliation (Gelbrich, 2010). As previous research shows that controllability of a situation increases external attribution, by informing its users why the technology failed, the company will show less control over the outbreak and customers will be more understanding towards the company.

When customers have a dissatisfactory experience with the service design or with the design interface, which can be difficult to navigate or frustrating, they also blame the firm for this experience. However, their reactions are not as strong as when they experience technical failure and they also take some internal blame for the inferior encounter. The reason why the

external blame is not that strong can be linked to the fact that the issue is not perceived as severe and the users can still achieve their desired outcome, although the quality of the encounter is below their expectations. The internal blame that customers take in the design failure could be associated to their perceived self-efficacy. They might believe that they do not have the right skills and knowledge to navigate the system.

External attribution has been found to trigger negative reactions such as confrontation and disengagement. When customers are not satisfied with the service and feel deceived, they will make sure to let the company and the world know about their feelings. Negative word of mouth (or mouse in a tech world) is something that previous research found as a common reaction in an episode of service failure. In order to reduce the negative emotions of users, companies can offer fast recovery as well as possible compensation for the failure. Firms need to be there for the user by offering an immediate platform for the complaints, where feedback is encouraged. Firms need to also participate actively in the discussion as customers want to feel that their voice is important and heard.

Negative reactions to design failures can be mitigated by companies in several ways. First of all, users can be offered more control over the service and the steps they need to take to complete the service. More control will increase internal attribution in a case of service failure. Also, customers should always be involved in the creation of the service design. In this way, companies will have the opportunity to map all possible pain points that users might encounter and minimize them through a smoother and user-friendly design.

One of the most interesting findings for service managers is that SST customers tend to feel more responsible for a process failure than for a technology or design failure. A process failure relates to all incidents that come after the interaction with technology. Most of the times, a process failure is caused by a wrong information input into the service. Since the input is usually done by users themselves, they will also feel guilty for a flawed outcome. When customers believe that the failure was caused by them, they actively engage in solving the issue. Companies can support customers who feel responsible for the failure by offering the right tools to solve the incident. These tools can come in the form of a support online page, frequently asked questions or easily accessible contact options, such as instant chat or phone number. These same customers who are willing to solve the failure, are also likely to accept the situation, but also to disengage with the service.

What is interesting to notice is that, even though customers don't blame the company for the failure, they still decide to stop using the service. As this might be related to the belief of low self-efficacy, companies can alter this judgement by offering trainings to its users in order to increase their skills and confidence in using the service. Although previous research shows that customers do not have expectations of compensation when they blame themselves for the failure (Harris et al., 2006), companies should still offer some sort of reward for continuing to use the service. This reward could be more emotional than financial, since customers who feel responsible for the failure have a high sense of guilt and disappointment with themselves. A well-tailored reward will not only boost their morale, but will also prevent them from disengaging.

The findings of the current study should encourage companies to evaluate more thoroughly the impact SSTs have on their customers and offer the relevant support in the case of service failure. As a short term approach, recovery strategies should be designed according to the failure type and coping mechanisms. As a long term approach, companies can design services that create emotional bonding with their customers. Previous research shows that an affective relationship between the customer and the service provider can decrease the negative feelings in caused by failure (Wan, Hui, & Wyer, 2011). Since there are no more employees to build the necessary rapport with the customer, the new service technologies should possess some humanistic features to increase emotional bonding. This will deviate frustrated users from discontinuing to use the service to loyalty (Ro & Mattila, 2015).

7.2. Limitations and further research

Naturally, as with any research, there are certain limitations to be acknowledged as well as venues for future research. One limitation of the study stays within the limited research context. Since the scenarios involve two types of SSTs (flight tickets online booking system, e-commerce for sports apparel) from 2 industries: airlines and active footwear, the acceptance of the results across services is limited. There is a need to understand customers' reactions across a wider range of SSTs and industries in order to be able to generalize the findings. Therefore, further efforts should replicate this study in different research contexts (online and offline SSTs).

Secondly, the stimulus material provided in this research is based on written scenarios. Customers had to imagine the setting of the failure, as described in the scenarios and judge

how they would react in that specific situation. It is known that the findings of a this type of experimental research do not measure the actual responses employed in a service encounter and they do not reveal the same level of emotion (Yen, Gwinner, & Su, 2004). Future research can investigate customer reactions in the context of an actual service failure, through on-site experiments and observation.

Moreover, the 3 failures types researched in the current paper are technology, design and process. Although these have been studied by other scholars, there is still no clear understanding and distinction between them. There is a thin line between the technology, process and design of a service and, many times, customers or companies perceive service failure as a whole. More research should focus on defining the different stages where an SST fails in order to help service managers better plan their recovery strategies. Also, only 4 coping mechanisms were studied in the current research: solving, acceptance, confrontation and disengagement. It would be interesting to explore qualitatively the different reactions that customers have in an episode of SST failure.

Although some indirect effects were found between failure type and coping strategies, the mediating effect of attribution on coping hasn't been studied in the current research. Further work should emphasize how attribution influences, through mediation, customers' coping with failure. Also, locus of attribution has been the focus of this study. Controllability and stability haven't been measured in response to failure type and as antecedent to customers' reactions. Future research should cover the different dimensions of attribution. Additionally, external attribution has been associated with the service provider. However, there are several factors that could influence a failure, such as the environment or a third party. More investigation should go to external attribution and explore if there are failures where the company doesn't take any blame.

Another limitation to the current study relates to the sample characteristics. 86% of the respondents are from the USA and the rest from several other countries. Since the data didn't cover a wider range of nationalities, the findings might be culturally biased. Further research should focus on cultural differences in SST failure. Also, more than 60% of the respondents belong to the age group 17-34. Since young respondents represent a large part of the sample, they might have different attitude and skills towards technology and self-services. Future studies should involve respondents from different generations and measure how coping differs based on age groups.

Finally, some items of the survey were left out of the research model. These items were designed to measure failure severity, perceived control, technology readiness and repurchase intentions. These elements were intended to extend the understanding of customer reactions to SST failure by controlling from failure severity, technology readiness and perceived control. Since the scope of the study was to provide a novel view of 3 different SST failures and customers' attributions and coping methods, these constructs were left out of the current research for model complexity reasons. Further research should focus on exploring these control variables and their impact on customers' responses to SST failure.

REFERENCES

- Bateson, J. E. G. (1985). Self-Service Consumer: an exploratory study. *Journal of Retailing*.
- Bateson, J. E. G., & Hui, M. K. (1992). The Ecological Validity of Photographic Slides and Videotapes in Simulating the Service Setting. *Journal of Consumer Research*, 19(2), 271–281. <https://doi.org/10.1086/209301>
- Beatson, A., Coote, L. V., & Rudd, J. M. (2006). Determining Consumer Satisfaction and Commitment Through Self-Service Technology and Personal Service Usage. *Journal of Marketing Management*, 22(7–8), 853–882. <https://doi.org/10.1362/026725706778612121>
- Bendapudi, N., & Leone, R. P. (2003). Psychological Implications of Customer Participation in Co-Production. *Journal of Marketing*, 67(January), 14–28. <https://doi.org/10.1509/jmkg.67.1.14.18592>
- Bitner, M. J. (1990). Evaluating service encounters: The effects of physical surroundings and employee responses. *Journal of Marketing*, 54(2), 69–82. <https://doi.org/10.2307/1251871>
- Bitner, M. J., Booms, B. H., & Tetreault, M. S. (1990). The service encounter: Diagnosing favorable and unfavorable incidents. *Journal of Marketing*, 54(1), 71–84. <https://doi.org/10.2307/1252174>
- Bitner, M. J., Brown, S. W., & Meuter, M. L. (2000). Technology Infusion in Service Encounters. *Journal of the Academy of Marketing Science*, 28(1), 138–149.
- Bitner, M. J., Ostrom, A. L., & Meuter, M. L. (2002). Implementing successful self-service technologies. *Academy of Management Executive*, 16(4), 96–108. <https://doi.org/10.5465/AME.2002.8951333>
- Bruner, G. C., & Kumar, A. (2005). Explaining consumer acceptance of handheld Internet devices. *Journal of Business Research*, 58(5), 553–558. <https://doi.org/10.1016/j.jbusres.2003.08.002>
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of Personality and Social Psychology*, 56(2), 267–283. <https://doi.org/10.1037/0022-3514.56.2.267>
- Collier, J. E., & Barnes, D. C. (2015). Self-service delight: Exploring the hedonic aspects of self-service. *Journal of Business Research*, 68(5), 986–993. <https://doi.org/10.1016/j.jbusres.2014.09.036>

- Collier, J. E., & Kimes, S. E. (2012). Only If It is Convenient : Understanding How Convenience Influences Self-Service Technology Evaluation. *Journal of Service Research, 16*(1), 39–51. <https://doi.org/10.1177/1094670512458454>
- Collier, J. E., Sherrell, D. L., Babakus, E., & Horky, A. B. (2014). Understanding the differences of public and private self-service technology. *Journal of Services Marketing, 28*(1), 60–70. <https://doi.org/10.1108/JSM-04-2012-0071>
- Curran, J. M., & Meuter, M. L. (2005). Self-service technology adoption: comparing three technologies. *Journal of Services Marketing, 19*(2), 103–113. <https://doi.org/10.1108/08876040510591411>
- Curran, J. M., Meuter, M. L., & Surprenant, C. F. (2003). Intentions to Use Self-Service Technologies: A Confluence of Multiple Attitudes. *Journal of Service Research, 5*(3), 209–224. <https://doi.org/10.1177/1094670502238916>
- Dabholkar, P. A. (1996). Consumer evaluations of new technology-based self-service options: An investigation of alternative models of service quality. *International Journal of Research in Marketing, 13*(1), 29–51. [https://doi.org/10.1016/0167-8116\(95\)00027-5](https://doi.org/10.1016/0167-8116(95)00027-5)
- Dabholkar, P. A., & Bagozzi, R. P. (2002). An attitudinal model of technology-based self-service: moderating effects of consumer traits and situational factors. *Journal of the Academy of Marketing Science, 30*(3), 184–201.
- Dabholkar, P. A., Bobbitt, L. M., & Lee, E.-J. (2003). Understanding consumer motivation and behavior related to self-scanning in retailing: Implications for strategy and research on technology-based self-service. *International Journal of Service Industry Management, 14*(1), 59–95. <https://doi.org/http://dx.doi.org/10.1108/09564230210447922>
- Dabholkar, P. A., & Spaid, B. I. (2012). Service failure and recovery in using technology-based self-service: effects on user attributions and satisfaction. *The Service Industries Journal, 32*(9), 1415–1432. <https://doi.org/10.1080/02642069.2011.600518>
- Dong, B., Evans, K. R., & Zou, S. (2008). The effects of customer participation in co-created service recovery. *Journal of the Academy of Marketing Science, 36*(1), 123–137. <https://doi.org/10.1007/s11747-007-0059-8>
- Dong, B., Sivakumar, K., Evans, K. R., & Zou, S. (2016). Recovering Coproduced Service Failures: Antecedents, Consequences, and Moderators of Locus of Recovery. *Journal of Service Research, 19*(3), 1–16. <https://doi.org/10.1177/1094670516630624>
- Duhachek, A. (2005). Coping: A Multidimensional, Hierarchical Framework of Responses

- to Stressful Consumption Episodes. *Journal of Consumer Research*, 32(1), 41–53.
<https://doi.org/10.1086/426612>
- Duhachek, A., & Kelting, K. (2009). Coping repertoire: Integrating a new conceptualization of coping with transactional theory. *Journal of Consumer Psychology*, 19(3), 473–485. <https://doi.org/10.1016/j.jcps.2009.04.001>
- Duhachek, A., & Oakley, J. L. (2007). Mapping the hierarchical structure of coping: Unifying empirical and theoretical perspectives. *Journal of Consumer Psychology*, 17(3), 216–233. [https://doi.org/10.1016/S1057-7408\(07\)70030-X](https://doi.org/10.1016/S1057-7408(07)70030-X)
- Etgar, M. (2008). A descriptive model of the consumer co-production process. *Journal of the Academy of Marketing Science*, 36(1), 97–108. <https://doi.org/10.1007/s11747-007-0061-1>
- Folkes, V. S. (1984). Consumer Reactions to Product Failure: An Attributional Approach. *Journal of Consumer Research*, 10(4), 398–409. <https://doi.org/10.1086/208978>
- Folkman, S., & Lazarus, R. S. (1980). An Analysis of Coping in a Middle-Aged Community Sample. *Journal of Health and Social Behavior*, 21(3), 219–239.
- Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a Stressful Encounter: Cognitive Appraisal, Coping, and Encounter Outcomes. *Journal of Personality and Social Psychology*, 50(5), 992–1003.
- Forbes, L. P. (2008). When something goes wrong and no one is around: non-internet self-service technology failure and recovery. *Journal of Services Marketing*, 22(4), 316–327. <https://doi.org/10.1108/08876040810881713>
- Forbes, L. P., Kelley, S. W., & Hoffman, K. D. (2005). Typologies of e-commerce retail failures and recovery strategies. *Journal of Services Marketing*, 19(5), 280–292. <https://doi.org/10.1108/08876040510609907>
- Gabbott, M., Tsarenko, Y., & Mok, W. H. (2011). Emotional Intelligence as a Moderator of Coping Strategies and Service Outcomes in Circumstances of Service Failure. *Journal of Service Research*, 14, 234–248. <https://doi.org/10.1177/1094670510391078>
- Gelbrich, K. (2010). Anger, frustration, and helplessness after service failure : coping strategies and effective informational support. *Journal of Academy of Marketing Science*, 38, 567–585. <https://doi.org/10.1007/s11747-009-0169-6>
- Gelbrich, K., Gathke, J., & Gregoire, Y. (2016). How a firm’s best versus normal customers react to compensation after a service failure. *Journal of Business Research*, 69(10), 4331–4339. <https://doi.org/10.1016/j.jbusres.2016.04.010>

- Giebelhausen, M., Robinson, S. G., Sirianni, N. J., & Brady, M. K. (2014). Touch Versus Tech: When Technology Functions as a Barrier or a Benefit to Service Encounters. *Journal of Marketing*, 78(July), 113–124. <https://doi.org/10.1509/jm.13.0056>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *PARTIAL LEAST SQUARES STRUCTURAL EQUATION MODELING (PLS-SEM)*.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017). Mirror, mirror on the wall : a comparative evaluation of composite-based structural equation modeling methods. *Journal of Academy of Marketing Science*, (February), 1–17. <https://doi.org/10.1007/s11747-017-0517-x>
- Hair, J. F. J., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.).
- Hair, J. F., Ringle, C., & Sarstedt, M. (2013). Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning*, 46(1–2), 1–12. <https://doi.org/10.1016/j.lrp.2013.01.001>
- Hair, J. F., Ringle, C. M., Sarstedt, M., Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM : Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, 19(2), 139–152. <https://doi.org/10.2753/MTP1069-6679190202>
- Harris, K. E., Mohr, L. a., & Bernhardt, K. L. (2006). Online service failure, consumer attributions and expectations. *Journal of Services Marketing*, 20(7), 453–458. <https://doi.org/10.1108/08876040610704883>
- Harvey, J., & Arkin, R. (1974). Effect of expected and observed outcome of an action on the differential causal attributions of actor and observer1. *Journal of ...*, 158. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-6494.1974.tb00557.x/abstract>
- Harvey, J. H., & Weary, G. (1984). Current issues in attribution theory and research. *Annual Review of Psychology*, 35, 427–459. <https://doi.org/10.1146/annurev.ps.35.020184.002235>
- Heidenreich, S., Wittkowski, K., Handrich, M., & Falk, T. (2015). The dark side of customer co-creation: exploring the consequences of failed co-created services. *Journal of the Academy of Marketing Science*, 43(3), 279–296. <https://doi.org/10.1007/s11747-014-0387-4>
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). THE USE OF PARTIAL LEAST SQUARES PATH MODELING IN INTERNATIONAL MARKETING. *Advances in International Marketing*, 20, 277–319. <https://doi.org/10.1108/S1474->

7979(2009)0000020014

- Henseler, J., & Sarstedt, M. (2013). Goodness-of-Fit Indices for Partial Least Squares Path Modeling. *Computational Statistics*, 28, 565–580. <https://doi.org/10.1007/s00180-012-0317-1>
- Hess, R. L. J., 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), 127–145.
- Hilton, T., & Hughes, T. (2013). Co-production and self-service: The application of Service-Dominant Logic. *Journal of Marketing Management*, 29(7–8), 861–881. <https://doi.org/10.1080/0267257X.2012.729071>
- Hilton, T., Hughes, T., Little, E., & Marandi, E. (2011). Adopting self-service technology to do more with less. *Journal of Services Marketing*, 27(4), 103–113. <https://doi.org/10.1108/08876041311296338>
- Holloway, B. B., & Beatty, S. E. (2003). Service Failure in Online Retailing: A Recovery Opportunity. *Journal of Service Research*, 6(1), 92–105. <https://doi.org/10.1177/1094670503254288>
- Hoyer, W. D., Chandy, R., Dorotic, M., Krafft, M., & Singh, S. S. (2010). Consumer Cocreation in New Product Development. *Journal of Service Research*, 13(3), 283–296. <https://doi.org/10.1177/1094670510375604>
- Hui, M. K., & Toffoli, R. (2002). Perceived Control and Consumer Attribution for the Service Encounter. *Journal of Applied Social Psychology*, 32(9), 1825–1844. <https://doi.org/10.1111/j.1559-1816.2002.tb00261.x>
- Iglesias, V. (2009). The attribution of service failures: effects on consumer satisfaction. *The Service Industries Journal*, 29(2), 127–141. <https://doi.org/10.1080/02642060802293088>
- Kelley, H. H. (1973). The process of causal attribution. *American Psychologist*, 28(2), 107–128. <https://doi.org/10.1037/h0034225>
- Kelley, H. H., & Michela, J. L. (1980). Attribution Theory and Research. *Annual Review of Psychology*, 31(1), 457–501. <https://doi.org/10.1146/annurev.ps.31.020180.002325>
- Kelley, S. W., Hoffman, K. D., & Davis, M. A. (1993). A typology of retail failures and recoveries. *Journal of Retailing*, 69(4), 429–53.
- Knee, C., & Zuckerman, M. (1996). Causality orientations and the disappearance of the self-serving bias. *Journal of Research in Personality*, 30, 76–87. <https://doi.org/10.1006/jrpe.1996.0005>

- Lastner, M. M., Folse, J. A. G., Mangus, S. M., & Fennell, P. (2016). The road to recovery: Overcoming service failures through positive emotions. *Journal of Business Research*, 69(10), 4278–4286. <https://doi.org/10.1016/j.jbusres.2016.04.002>
- Lazarus, R. S. (1980). An Analysis of Coping in a Middle-Aged Community Sample
Author (s): Susan Folkman and Richard S . Lazarus Source : Journal of Health and Social Behavior , Vol . 21 , No . 3 , (Sep . , 1980), pp . 219-239 Published by : American Sociological Association, 21(3), 219–239.
- Lee, J., & Allaway, A. (2002). Effects of personal control on adoption of self-service technology innovations. *Journal of Services Marketing*, 16(6), 553–572. <https://doi.org/10.1108/08876040210443418>
- Lusch, R. F., Brown, S. W., & Brunswick, G. J. (1992). A General Framework for Explaining Internal vs. External Exchange. *Journal of the Academy of Marketing Science*, 20(2), 119–134.
- Lusch, R. F., Vargo, S. L., & O'Brien, M. (2007). Competing through service: Insights from service-dominant logic. *Journal of Retailing*, 83(1), 5–18. <https://doi.org/10.1016/j.jretai.2006.10.002>
- Makarem, S. C., Mudambi, S. M., & Podoshen, J. S. (2009). Satisfaction in technology-enabled service encounters. *Journal of Services Marketing*, 23(3), 134–144. <https://doi.org/10.1108/08876040910955143>
- Maxham III, J. G., & Netemeyer, R. G. (2002). A Longitudinal Study of Complaining Customers' Evaluations of Multiple Service Failures and Recovery Efforts. *Journal of Marketing*, 66(4), 57–71.
- Mccoll-Kennedy, J. R., & Sparks, B. a. (2003). Application of fairness theory to service failures and service recovery. *Journal of Service Research*, 5(3), 251–266. <https://doi.org/10.1177/1094670502238918>
- Meuter, M. L., Ostrom, A. L., Bitner, M. J., & Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. *Journal of Business Research*, 56(11), 899–906. [https://doi.org/10.1016/S0148-2963\(01\)00276-4](https://doi.org/10.1016/S0148-2963(01)00276-4)
- Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters. *Journal of Marketing*, 64(July), 50–64. <https://doi.org/10.1108/00242539410067746>
- Mick, D. G., & Fournier, S. (1998). Paradoxes of Technology : Consumer Cognizance,

- Emotions, and Coping Strategies. *Journal of Consumer Research*, 25(September), 123–143.
- Nielsen, M. B., & Knardahl, S. (2014). Coping strategies: A prospective study of patterns, stability, and relationships with psychological distress. *Scandinavian Journal of Psychology*, 55(2), 142–150. <https://doi.org/10.1111/sjop.12103>
- Pittman, T. S., & Pittman, N. L. (1980). Deprivation of control and the attribution process. *Journal of Personality and Social Psychology*, 39(3), 377–389. <https://doi.org/10.1037/0022-3514.39.3.377>
- Raaij, W. F. Van, & Pruyn, A. T. H. (1998). Customer Control and Evaluation of Service Validity and Reliability. *Psychology & Marketing*, 15(December), 811–832.
- Rebecca Yen, H., Gwinner, K. P., & Su, W. (2004). The impact of customer participation and service expectation on Locus attributions following service failure. *International Journal of Service Industry Management*, 15(1), 7–26. <https://doi.org/10.1108/09564230410523312>
- Ro, H., & Mattila, A. S. (2015). Silent Voices: Nonbehavioral Reactions to Service Failures. *Services Marketing Quarterly*, 36(2), 95–111. <https://doi.org/10.1080/15332969.2015.1014230>
- Sarkar Sengupta, A., Balaji, M. S., & Krishnan, B. C. (2015). How customers cope with service failure? A study of brand reputation and customer satisfaction. *Journal of Business Research*, 68(3), 665–674. <https://doi.org/10.1016/j.jbusres.2014.08.005>
- Sarstedt, M., & Ringle, C. M. (2011). Multigroup analysis in partial least squares (PLS) path modeling : Alternative methods and empirical results. *Advances in International Marketing*, 22, 195–218. [https://doi.org/10.1108/S1474-7979\(2011\)0000022012](https://doi.org/10.1108/S1474-7979(2011)0000022012)
- Smith, A. K., & Bolton, R. N. (1998). an Experimental Investigation of Customer Reactions To Service Failure and Recovery Encounters: Paradox or Peril? *Journal of Service Research*, 1(1), 65–81.
- Smith, A. K., Bolton, R. N., & Wagner, J. S. (1999). A model of customer satisfaction with service encounters involving failure and recovery. *Journal of Marketing Research*, 36(3), 356–372.
- Swanson, S. R., & Kelley, S. W. (2001). Attributions and Outcomes of The Service Recovery Process. *Journal of Marketing*.
- Tan, C.-W., Benbasat, I., & Cenfetelli, R. T. (2016). An exploratory study of the formation and impact of electronic service failures. *MIS Quarterly*, 40(1), 1–29.
- Van Vaerenbergh, Y., Orsingher, C., Vermeir, I., & Lariviere, B. (2014). A Meta-Analysis

- of Relationships Linking Service Failure Attributions to Customer Outcomes. *Journal of Service Research*, 17(4), 381–398. <https://doi.org/10.1177/1094670514538321>
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17.
- Wan, L. C., Hui, M. K., & Wyer, R. S. (2011). The Role of Relationship Norms in Responses to Service Failures. *Journal of Consumer Research*, 38(2), 260–277. <https://doi.org/10.1086/659039>
- Wang, C., Harris, J., & Patterson, P. (2013). The Roles of Habit, Self-Efficacy, and Satisfaction in Driving Continued Use of Self-Service Technologies: A Longitudinal Study. *Journal of Service Research*, 16(3), 400–414. <https://doi.org/10.1177/1094670512473200>
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548–573. <https://doi.org/10.1037/0033-295X.92.4.548>
- Weiner, B. (2000). Reflections and Reviews Attributional Thoughts about Consumer Behavior. *Journal of Consumer Research*, 27(3), 382–387. <https://doi.org/10.1086/317592>
- Wolosin, R. J., Sherman, S. J., & Till, A. (1973). Effects of cooperation and competition on responsibility attribution after success and failure. *Journal of Experimental Social Psychology*, 9(3), 220–235. [https://doi.org/10.1016/0022-1031\(73\)90011-5](https://doi.org/10.1016/0022-1031(73)90011-5)
- Yen, H. R., Gwinner, K. P., & Su, W. (2004). The impact of customer participation and service expectation on Locus attributions following service failure. *International Journal of Service Industry Management*, 15(1), 7–26. <https://doi.org/10.1108/09564230410523312>
- Yi, S., & Baumgartner, H. (2004). Coping with negative emotions in purchase-related situations. *Journal of Consumer Psychology*, 14(3), 303–317. https://doi.org/10.1207/s15327663jcp1403_11
- Zhao, X., Mattila, A. S., & Tao, L.-S. E. (2008). The role of post-training self-efficacy in customers' use of self service technologies. *International Journal of Service Industry Management*, 19(4), 492–505.
- Zhu, Z., Nakata, C., Sivakumar, K., & Grewal, D. (2013). Fix It or Leave It? Customer Recovery from Self-service Technology Failures. *Journal of Retailing*, 89(1), 15–29. <https://doi.org/10.1016/j.jretai.2012.10.004>

Appendices

Appendix 1. Scenarios

DESIGN FAILURE

Footwear

You are browsing an online retail website, searching for a pair of customized shoes you are interested in buying for a long time. You find many styles of shoes that look interesting to you and you have the option to customize them by selecting from a wide range of colors and accessories. You can personalize them based on your style. After you take some time to create a user profile by inputting your contact information and your preferences in terms of shoes, colors, materials, you also have to answer many lifestyle questions. This will provide you with a series of options of shoes that are suitable to your style, based on the information you provided. You pick one pair from the recommended range and you continue the customization by selecting all the features that you want. You spend a lot of time in the customization process as you want to make sure that you have the perfect shoes.

You finally finish the design and you are ready to place the order. You fill in the payment details as well as the delivery information and then you review your order. After taking a closer look at the shoes you are about to purchase, you decide to change the color of the laces. You can only do these changes by going back to the home page. You then realize that you lost all the customization information that you input and you will have to start the process all over again to get the shoes that you initially wanted.

Airlines

You are planning to attend a very good friend's wedding in a different state and you decide to travel there by plane. Three months before the wedding you go online to purchase your flight tickets. You take time to check all the possible options around the wedding date and play around with different departure dates, hours and airports. After some time, you eventually find the perfect flights that suit your schedule.

You select those flights and decide to customize them according to your needs by adding some extra services including special meals, insurance, extra leg room and extra luggage for the wedding present. You spend a long time adding all the information needed because you want to make sure that you will have an enjoyable journey, especially since the travel time is quite long.

You also decide to add the flexible option to your tickets. The flexible tickets allow you to modify the dates by accessing your online account. Now that you have the right tickets with all the preferred options included, you proceed to purchase them. After some weeks from your purchase you decide to change the departure date of your flight so you can arrive there 2 days earlier. You write your booking reference on the website and you find your flight information. However, you can't find any option on that page that would allow you to make changes to your flight.

TECHNOLOGY FAILURE

Footwear

You are browsing an online retail website, searching for a pair of customized shoes you are interested in buying for a long time. You find many styles of shoes that look interesting to you and you have the option to customize them by selecting from a wide range of colors and accessories. You can personalize them based on your style. After you take some time to create a user profile by inputting your contact information and your preferences in terms of shoes, colors, materials, you also have to answer many lifestyle questions. This will provide you with a series of options of shoes that are suitable to your style, based on the information you provided. You pick one pair from the recommended range and you continue the customization by selecting all the features that you want. You spend a lot of time in the customization process as you want to make sure that you have the perfect shoes.

You finally finish the design and you are ready to place the order. You fill in the delivery address and your credit card details. When you want to make the payment, you get a message saying that the request can't be processed.

Airlines

You are planning to attend a very good friend's wedding in a different state and you decide to travel there by plane. Three months before the wedding you go online to purchase your flight tickets. You take time to check all the possible options around the wedding date and play around with different departure dates, hours and airports. After some time, you eventually find the perfect flights that suit your schedule.

You select those flights and decide to customize them according to your needs by adding some extra services including special meals, insurance, extra leg room and extra luggage for the wedding present. You spend a long time adding all the information needed because you want to make sure that you will have an enjoyable journey, especially since the travel time is quite long.

After adding all the preferred extras to your order you proceed to make the payment. Since the final price of the tickets is quite high, you decide to use some of your customer points in order to get a lower fare. In order to do that you need to log in to your account. When you try to log in to your account you get a message saying that the account can't be accessed.

PROCESS FAILURE

Footwear

You are browsing an online retail website, searching for a pair of customized shoes you are interested in buying for a long time. You find many styles of shoes that look interesting to you and you have the option to customize them by selecting from a wide range of colors and accessories. You can personalize them based on your style. After you take some time to create a user profile by inputting your contact information and your preferences in terms of shoes, colors, materials, you also have to answer many lifestyle questions. This will provide you with a series of options of shoes that are suitable to your style, based on the information you provided. You pick one pair from the recommended range and you continue the customization by selecting all the features

that you want. You spend a lot of time in the customization process as you want to make sure that you have the perfect shoes.

You finally finish the design and you proceed to filling in the delivery and payment information and place the order. The estimated delivery time is 4 working days. After 4 days, you still didn't receive your merchandise. You check online the status of your order and you realize that the package was delivered to your previous address.

Airlines

You are planning to attend a very good friend's wedding in a different state and you decide to travel there by plane. Three months before the wedding you go online to purchase your flight tickets. You take time to check all the possible options around the wedding date and play around with different departure dates, hours and airports. After some time, you eventually find the perfect flights that suit your schedule.

You select those flights and decide to customize them according to your needs by adding some extra services including special meals, insurance, extra leg room, and extra luggage for the wedding present. You spend a long time adding all the information needed because you want to make sure that you will have an enjoyable journey, especially since the travel time is quite long.

After adding all your preferred extras to your order you proceed to purchase the tickets, which you soon receive by email. One day before the flight you realize that the tickets are issued for 7pm instead of 7am as initially thought. Unless the tickets are changed you will miss your friend's wedding.

Appendix 2. Questionnaire in Qualtrics

This survey collects data for a Master's Thesis. You will have to imagine yourself in the scenario described next and answer the following questions based on what you would do in that specific situation.

The survey is anonymous and all the data is strictly confidential and used for non-commercial academic research purposes. The survey will take around 10-15 minutes to complete.

Thank you for your time and effort in answering this survey!

It was easy imagining myself in the scenario situation.

Strongly disagree Strongly agree

The scenario situation was realistic.

Strongly disagree Strongly agree

I have experienced a dissatisfactory incident in the scenario situation described above.

Strongly disagree Strongly agree

The dissatisfactory incident experienced is related to the design of the service. Examples of such incidents include: unclear or inconvenient design, difficult to navigate or time consuming interface, slow system.

Strongly disagree Strongly agree

Please answer the following claims according to the view that suits you the best in the context of the scenario described.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I was responsible for this unpleasant experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The problem that led to the service failure was clearly caused by the service provider.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did contribute to this unpleasant experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The service failure that I encountered was entirely service provider's fault.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I should be blamed for the undesirable outcome.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my view, the service provider is fully responsible for the experienced service failure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What do you do in this scenario situation that you have experienced?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I think about how I might best handle the problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to come up with a plan about what to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I decide there was nobody to blame but me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I contact the company to help me solve the problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I acknowledge that getting the product/service is beyond my reach.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I resign myself to the fact that further efforts to use this service are pointless.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I realize I brought the problem on myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I let the company know how upset I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I email a service representative about the problem and ask him or her to correct it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I give up the attempt to get the product/service that I wanted.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I accept that the incident happened and that it can't be changed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will learn how to live with it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I contact the company to complain about the situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I quit trying to use this service.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I present my point of view and argue my case.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I express my feelings of displeasure to the company without reservation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I realize I will have to accept the situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know what to do and I do it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about what steps to take to resolve the problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How do you feel in this scenario situation that you have experienced?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I would feel able to influence the way things were.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would find it difficult to get my own way in the service.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that everything is under my control.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In my opinion, the problem that I experienced was a:

Major aggravation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Minor aggravation
Minor problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Major problem
Big inconvenience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Small inconvenience

How likely would you be to use this website in the future?

Very unlikely Very likely

What is the likelihood that you will go back to this website next time you need this service?

Very low Very high

Would you use this website again if you had a choice?

Definitely not Definitely yes

What is the likelihood that you will switch to another website for this service?

Very low Very high

Please answer the following claims according to the view that suits you the best.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
If I buy a high-tech product or service, I prefer to have the basic model over one with a lot of extra features.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other people come to me for advice on new technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology always seems to fail at the worst possible time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is embarrassing when I have trouble with a high-tech gadget while people are watching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find that I have fewer problems than other people in making technology work for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can usually figure out new high-tech products and services without help from others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes, I think that technology systems are not designed for use by ordinary people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy the challenge of figuring out high-tech gadgets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your age?

What is your gender?

Male

Female

What is the highest level of school you have completed or the highest degree you have received?

Which statement best describes your current employment status?

What is your country of residence?

Appendix 3. Manipulation checks

Realism checks

Scenario	N	Mean
Online retail – Design failure	64	6.07
Online retail – Technology failure	61	6.32
Online retail – Process failure	63	5.77
Online flight-booking – Design failure	63	6.01
Online flight-booking – Technology failure	61	6.14
Online flight-booking – Process failure	62	5.41

Manipulation check 1: Experienced failure in the service

Scenario	N	Mean	Mode	Std. Deviation
Online retail – Design failure	64	5.92	7	1.26
Online retail – Technology failure	61	5.75	7	1.64
Online retail – Process failure	63	4.75	7	2.17
Online flight-booking – Design failure	63	4.68	7	2.06
Online flight-booking – Technology failure	61	5.36	7	1.56
Online flight-booking – Process failure	62	4.29	7	2.28

Manipulation check 2: Failure type

Scenario	N	Mean	Mode	Std. Deviation
Online retail – Design failure	64	5.77	7	1.48
Online retail – Technology failure	61	5.92	7	1.57
Online retail – Process failure	63	5.59	7	1.55
Online flight-booking – Design failure	63	5.65	7	1.41
Online flight-booking – Technology failure	61	5.98	7	1.44
Online flight-booking – Process failure	62	4.27	4	1.88

Appendix 4. Fornell-Larcker Criterion

	Acceptance	Confronting	Design failure	Disengagement	External attribution	Internal attribution	Process failure	Solving	Technology failure
Acceptance	0.850								
Confronting	-0.364	0.788							
Design failure	0.076	-0.033	1.000						
Disengagement	0.467	-0.014	0.183	0.834					
External attribution	-0.121	0.351	0.165	0.214	0.957				
Internal attribution	0.224	-0.203	-0.155	-0.032	-0.729	0.933			
Process failure	-0.060	0.004	-0.505	-0.205	-0.474	0.557	1.000		
Solving	-0.248	0.364	-0.248	-0.501	-0.065	0.180	0.325	0.763	
Technology failure	-0.017	0.030	-0.502	0.021	0.309	-0.402	-0.493	-0.076	1.000

Appendix 5. Indirect effects

	Path coefficients	T Values	P Values
Compared to PF			
DF -> Acceptance	-0.100	3.147	0.002
DF -> Confronting	0.132	3.833	0.000
DF -> Solving	-0.075	2.564	0.010
TF -> Acceptance	-0.139	3.661	0.000
TF -> Confronting	0.155	3.854	0.000
TF -> Solving	-0.108	3.145	0.002
Compared to DF			
PF -> Acceptance	0.099	3.138	0.002
PF -> Confronting	-0.131	3.861	0.000
PF -> Solving	0.074	2.567	0.010
TF -> Acceptance	-0.040	2.603	0.009
TF -> Solving	-0.034	2.340	0.019
Compared to TF			
DF -> Acceptance	0.040	2.659	0.008
DF -> Solving	0.034	2.311	0.021
PF -> Acceptance	0.139	3.580	0.000
PF -> Confronting	-0.155	3.843	0.000
PF -> Solving	0.108	3.104	0.002