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Self-Service Technology - Friend or Foe?

The Impact of Technology-Based Self-Services on Customer Satisfaction and Retention

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Summary

Advancements in information technology have changed the way customers experience a service and their relationship with a service provider today. Especially technology-based self-services have profoundly found their way into business practice of the 21st century service economy. Today's customers are used to scan their items at the grocery store, check-in for their flight at a self check-in kiosk, or conduct banking transactions online. In today's competitive environment, many organizations use these technology-based self-services in order to increase service productivity while reducing the costs of service delivery at the same time.

Prior research has mostly focused on the benefits of technology-based self-services and determinants of customer acceptance and adoption of SSTs. Customers' responses to self-service encounters, however, remain a highly neglected area of research, especially in comparison to traditional personal services. However, to understand the true cost-efficiency of technology-based self-services an examination of their consequences is important. By relying on a unique longitudinal dataset as well as a series of scenario-based experiments, this thesis examines how the use of technology-based self-services influences the customers' satisfaction, loyalty intentions, and long-term retention.

Study 1 of this thesis focuses on the psychological implications of technology-based self-services. This research aims to address the questions 1) whether customer satisfaction with a service outcome differs between personal and technology-based self-service channels and 2) why and when satisfaction levels may differ. Building on the person-sensitivity bias and attribution theory, this study proposes and finds that customers evaluate personal, "high-touch" services in more extreme manners than technology-based, "high-tech" services. Accordingly, when service outcomes are good, customers are more satisfied with a provider when using a personal service

instead of a self-service. When service outcomes are poor, however, customers are more satisfied (or less dissatisfied) when using a technology-based self-service instead of a traditional personal service. Findings further suggest that these channel effects arise because customers make different causal inferences for a service outcome when using a self-service instead of a traditional personal service. Accordingly, results reveal that customers who use a personal service seem to overestimate the power of the service employee to cause an outcome and assume that the employee causes an outcome intentionally. As a consequence, customers attribute consistently more responsibility to the provider when using a personal service instead of a technology-based self-service. Customers using a technology-based self-service, on the other hand, are more egocentric and hence consistently attribute more responsibility to themselves or – when outcomes are poor – to external, situational factors. A follow-up experiment conducted in India demonstrates an important limitation to this effect of the service channel, however. By drawing from literature on interdependence vs. independence and extending the main experiment to an intercultural level, this study shows that the channel effects mostly arise in highly independent (Western) cultures, and cease to exist in more interdependent (Eastern) cultures.

Study 2 shifts the focus to the service task. It aims to address the questions when and how the criticality of a service affects differential customer responses to self-service and personal service encounters. Building on extant literature on self-threat, this study provides first empirical evidence that the criticality of a service task strengthens channel differences when performance outcomes are good, however not when they are bad and considered self-threatening. In particular, this study finds that customers who rely on a personal service react more compassionately to a critical service encounter than customers who use a technology-based self-service when the service outcome is good. Moreover, findings are that this affectionate response leads to important behavioral consequences. Accordingly, customers who use a personal service are not only more satisfied when the provider offers a good service in critical circumstances, but also display higher repurchase intentions. While results of *Study 2* do not provide evidence for differences in word-of-mouth activity for self-service and personal service customers, they indicate that customers' word-of-mouth can be significantly more detrimental for poor service outcomes when customers have relied on a personal service instead of a technology-based self-service. These results undermine many of the previous findings of *Study 1* and advance current knowledge on the

applicability and scope of the person-sensitivity bias. Through the inclusion of customer affect, this study also advances our understanding how channel differences are shaped.

Study 3 concentrates on the long-term effects of self-service usage on customer retention. In particular, this study aims to contribute to prior research by examining 1) how customers' self-service to personal service usage ratio affects their defection behavior, and 2) how the duration with the provider affects this relationship. Drawing from the service-dominant logic and its central concept of value-in-use, this study discusses customers' value creation in self-service and personal service channels and examines the long-term impact of these channels on customer retention. Using longitudinal customer data and survival analysis, this research investigates how the ratio of self-service and personal service influences customers' risk of defection over time. The findings suggest that the ratio of self-service and personal service affects customer defection in a U-shaped manner, with intermediate levels of self-service usage being associated with the lowest likelihood of defection. The study also finds that this effect mitigates over time. Thus, the ratio of personal and self-services used becomes less important with time – or the longer a customer has been with the particular provider. These findings suggest that firms should not shift customers towards self-service channels completely, especially not at the beginning of a relationship. Moreover, this research underlines the importance to understand when and how self-service technologies can create valuable customer experiences and stresses the notion to actively manage customers' co-creation of value.

All studies of this thesis collectively contribute to an enhanced understanding of the impact of technology-based self-services on customer satisfaction, loyalty, and retention. From a theoretical perspective, it is important to understand if customer satisfaction, loyalty, or retention is harder to achieve when customers interact with a technology instead of a person or if customers respond to human and non-human channels of service delivery in the same manner. From a managerial perspective, examining and contrasting customers' responses to self-services and personal services over time and across service tasks provides valuable insight into the true cost-efficiency of technology-based self-services and when the introduction of self-services is most appropriate. Thus, through a thorough examination of customers' psychological and behavioral responses to technology-based self-service encounters versus personal service encounters, this thesis provides valuable theoretical insights and managerial implications.

Deutsche Zusammenfassung

Der Fortschritt der Informationstechnologien hat die Art, wie Kunden eine Dienstleistung erfahren, grundlegend geändert. Besonders Selbstbedienungstechnologien sind heute nicht mehr aus den Geschäftspraktiken vieler Dienstleister wegzudenken. Im Supermarkt scannen Kunden selbstständig ihre Einkäufe, am Flughafen nutzen sie den Automaten um sich für ihren Flug einzuchecken und ihre Bankgeschäfte erledigen Kunden heute Großteils von zuhause. In dem von hoher Wettbewerbsintensität geprägten Geschäftsumfeld nutzen Unternehmen diese neuen Technologien, um die Dienstleistungsproduktivität zu erhöhen und gleichzeitig Kosten zu senken.

Die bisherige Forschung konzentriert sich auf die Vorteile, Determinanten der Kundenakzeptanz und Adoption von Selbstbedienungstechnologien. Die Reaktion der Kunden auf Selbstbedienungstechnologien, insbesondere im Vergleich zu traditionellen persönlichen Dienstleistungen, ist hingegen ein bisher relativ wenig untersuchtes Gebiet. Um die tatsächliche Kosteneffizienz von Selbstbedienungstechnologien zu verstehen, ist eine tiefgreifende Untersuchung der Konsequenzen aus deren Nutzung wichtig. Mit Hilfe eines longitudinalen Datensatzes und einer Reihe von Szenario-basierten Experimenten untersucht die vorliegende Arbeit, wie sich die Nutzung von Selbstbedienungstechnologien auf die Kundenzufriedenheit, Kundenloyalität und die langfristige Kundenbeziehung auswirkt.

Studie 1 beantwortet Fragen zu den psychologischen Implikationen von Selbstbedienungs-technologien. Insbesondere beinhaltet dies die Fragen, 1) ob sich die Kundenzufriedenheit je nach Dienstleistungskanal unterscheidet und 2) warum und unter welchen Bedingungen dies der Fall ist. Basierend auf der Theorie des Person-Sensitivity Bias und der Attributionstheorie, argumentiert diese Studie, dass Kunden persönliche Dienstleistungen extremer evaluieren, als

dies bei Technologie-basierten Dienstleistungen der Fall ist. Das bedeutet, dass Kunden mit einem Dienstleister zufriedener sind, wenn die Dienstleistungsqualität hoch ist und der Service persönlich erbracht wird. Wenn die Qualität niedrig ist, sind Kunden allerdings mit einer Technologie-basierten Dienstleistung weniger unzufrieden als mit einer persönlichen Dienstleistung. Die Ergebnisse der Studie zeigen ferner, dass diese Kanaleffekte daher kommen, dass Kunden die Verantwortlichkeit für ein Dienstleistungsergebnis unterschiedlich zuordnen wenn eine Person oder eine Maschine die Dienstleistung erbracht hat. Bei persönlich erbrachten Dienstleistungen nehmen die Kunden dabei offensichtlich eher an, dass ein Ergebnis vom Dienstleister mit Absicht erbracht wird, als dies für Technologie-basierte Dienstleistungen der Fall ist. Entsprechend machen sie den persönlichen Dienstleister auch eher für ein Ergebnis verantwortlich. Nutzer Technologie-basierter Dienstleistungen, hingegen, sind eher egozentrisch orientiert und attribuieren die Verantwortung für ein Dienstleistungsergebnis zu sich selbst oder, vor Allem wenn das Ergebnis schlecht ist, zu externen und situativen Faktoren. In einem zusätzlichen Experiment konnte noch eine wichtige Einschränkung dieses Kanaleffekts beschrieben werden: Basierend auf Literatur zur Unabhängigkeit und Interdependenz, zeigt diese Studie, dass der Kanaleffekt hauptsächlich in sehr unabhängigen (westlichen) Kulturen auftritt. In interdependenten (östlichen) Kulturen hingegen, verschwindet der Effekt.

Studie 2 verschiebt den Fokus der Untersuchung auf die Dienstleistung selbst (d.h. die tatsächliche Aufgabe). Insbesondere adressiert die Studie die Fragen, ob und wie die Dienstleistungsaufgabe die (unterschiedliche) Beurteilung von persönlich und maschinell erbrachten Dienstleistungen beeinflusst. Basierend auf bestehender Literatur, zeigt diese Arbeit erstmals empirisch, dass die beschriebenen Kanaleffekte aus *Studie 1* besonders dann zu Tage treten, wenn eine Dienstleistung kritisch und die Ergebnisqualität hoch ist. Wenn die Qualität eines Dienstleistungsergebnisses allerdings schlecht ist und somit die Selbstwahrnehmung des Kunden gefährdet, lassen die unterschiedlichen Effekte der Dienstleistungskanäle nach. Die Studie zeigt zudem, dass die beschriebenen Kanaleffekte besonders durch den Kundenaffekt getrieben werden. So zeigt sich, dass Kunden einer persönlich erbrachten Dienstleistung emotionaler auf ein Dienstleistungsergebnis reagieren als Kunden, die eine Selbstbedienungs-technologie nutzen, wenn die Dienstleistung für den Kunden kritisch und die Qualität hoch ist. Diese affektive Reaktion der Kunden führt zu weiteren Konsequenzen im Verhalten der Kunden: Kunden einer persönlich erbrachten Dienstleistung sind nicht nur zufriedener mit dem

Dienstleister, wenn die Qualität der Dienstleistung hoch ist, sie beabsichtigen auch eher, die Dienstleistung in der Zukunft wieder zu nutzen. Auch wenn die Ergebnisse der zweiten Studie keine Hinweise liefern, dass die Weiterempfehlungsintensität der Kunden davon abhängt ob Kunden eine persönlich oder maschinell erbrachte Dienstleistung in Anspruch nehmen, zeigen die Ergebnisse, dass negative Erlebnisse mit einer Dienstleistung negativer weitergegeben werden, wenn die Dienstleistung persönlich erbracht wurde. Diese Ergebnisse unterstreichen somit viele Resultate der ersten Studie und erweitern das bestehende Wissen zur Anwendbarkeit des Person-Sensitivity Bias auf den Dienstleistungskontext. Durch die Berücksichtigung des Kundenaffekts kann die Studie ferner dazu beitragen, zu verstehen, wie genau die Kanalunterschiede geformt werden.

Studie 3 fokussiert schließlich die Langzeitwirkung von Selbstbedienungstechnologien auf die Kundenbindung. Die Kernfragen dabei sind: 1) Wie beeinflusst der Anteil an Selbstbedienungs-technologien zur gesamten Nutzung eines Dienstleistungsangebots aus persönlichen und technologisch erbrachten Dienstleistungen das Kündigungsverhalten? 2) Wie entwickelt sich dieser Einfluss und Zusammenhang über die Zeit? Mit Hilfe der Service-Dominant Logic und dessen zentralem Konzept des Value-in-Use, diskutiert die Studie die Wertschöpfung des Kunden bei persönlich und technologisch erbrachten Dienstleistungen und betrachtet dabei insbesondere die Langzeitwirkung dieser Kanäle auf die Kundenbindung. Die Ergebnisse zeigen, dass der Anteil an Selbstbedienungstechnologien an der Gesamtnutzung die Kundenbindung U-förmig beeinflusst. Ausgewogene Anteile beider Dienstleistungswege zeigen dabei die niedrigste Kündigungswahrscheinlichkeit. Die Studie zeigt auch, dass sich dieser Effekt über die Zeit abschwächt. Für einen Kunden, der bereits länger bei einem Dienstleister ist, spielt der Dienstleistungskanal somit nur noch eine untergeordnete Rolle. Die Ergebnisse unterstreichen somit, dass Firmen ihre Kunden nicht komplett auf Selbstbedienungstechnologien migrieren sollten; insbesondere nicht zu Beginn der Kundenbeziehung. Die Studie zeigt aber auch auf, wie wichtig es ist zu verstehen, wann Selbstbedienungstechnologien wertvolle Erfahrungen für die Kunden schaffen können und wie wichtig es für Firmen ist, Kundenbeziehungen aktiv zu managen.

Insgesamt trägt diese Dissertation dazu bei, zu verstehen, wie sich Selbstbedienungstechnologien auf die Kundenzufriedenheit, die Kundenbindung und die Kundenloyalität auswirken. Aus theoretischer Sicht ist es wichtig zu verstehen, ob Kundenzufriedenheit und Kundenbindung

schwieriger zu erreichen sind, wenn Kunden mit einer Maschine anstatt eines Menschen interagieren. Aus Managementperspektive erlauben die Ergebnisse dieser Dissertation Rückschlüsse auf die tatsächliche Kosteneffizienz von Selbstbedienungstechnologien. Die Ergebnisse bieten ferner eine Orientierung dafür, wann die Einführung von Selbstbedienungs-technologien sinnvoll ist.

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List of Abbreviations

AIC	Akaike Information Criterion
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
ATM	Automatic Teller Machine
AVE	Average Variance Extracted
B2B	Business-to-Business
BC	Bias-Corrected
BCa	Bias-Corrected and Accelerated
CI	Confidence Interval
Coef.	Coefficient
e.g.	Exempli gratia (for example)
FAQ	Frequently Asked Questions
HR	Hazard Ratio
i.e.	Id est (that is)
M	Mean
Max	Maximum
MANOVA	Multivariate Analysis of Variance
mo(s)	Month(s)

MRT	Media Richness Theory
p.	Page
PH	Proportional Hazard
PSC	Personal Service Channel
SD	Standard Deviation
S-D Logic	Service-Dominant Logic
SDR	Social Desirable Response
SE	Standard Error
SST	Self-Service Technology
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TR	Technology Readiness
TVC	Time-Varying Covariate
U.S.	United States
USD	United States Dollar
vs.	Versus
WOM	Word-of-Mouth

1. Introduction

"What are we willing to give up when we turn to robots rather than humans? To ask these questions is not to put robots down or deny that they are engineering marvels; it is only to put them in their place."

- Sherry Turkle [1]

Should machines replace interpersonal interactions in service encounters? Current business practice suggests so. While service encounter research has long suggested that "service with a smile" improves customer satisfaction (Barger and Grandey 2006), business practice has not shied away from standardizing service processes and automating the human part in service delivery. Customers today conduct their financial business online, order their retail on the Internet, or interact with a self-service kiosk to get their airline boarding-pass or to rent a car. In strive for increased service productivity, businesses often try to substitute more expensive service personnel with self-service technologies (SSTs) and actively "push" customers to these new self-service channels (White, Breazeale, and Collier 2012). However, are human and non-human service channels really interchangeable and do customers respond to these service encounters in the same way? These are the questions this thesis aims to answer.

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[1]   Sherry Turkle is a professor at the Massachusetts Institute of Technology, who studies human interactions with technological devices. This citation is from her book "Alone Together – why we expect more from technology and less from each other", 2011 pp. 19.

Although firms increasingly substitute their personal – high-touch – services with technology-based – high-tech – (self-) services, this trend is not without controversy: On the one hand, research and practice underline numerous benefits of SSTs for the customer and the firm. Businesses report, for instance, that the number of passengers processed for a flight can be increased by up to 50 percent via self-check in options (IATA in SITA 2009); the costs for a banking transaction can be reduced from 1.15 U.S. dollars (USD) to only 2 cents when switching from teller-assisted banking to online transactions (Moon and Frei 2000); about 2.5 employees can be replaced by one self-checkout kiosk in the grocery store (The Economist 2009). For businesses, SSTs thus have great potential to increase productivity while reducing the cost of service delivery at the same time. For customers, SSTs can provide several benefits as well. Technology-based self-services can, for instance, increase the customer's level of convenience (i.e., through greater accessibility and availability) and the perceived control during a service (e.g., Collier and Kimes 2013; Zhu et al. 2007). Given these apparent advantages, extensive research on SSTs to date has examined customers' acceptance and adoption of these new service channels (e.g., Curran, Meuter, and Surprenant 2003; Meuter et al. 2005; Weijters et al. 2007). Thus, research has identified a number of important customer characteristics (e.g., Curran, Meuter, and Surprenant 2003; Dabholkar 1996; Meuter et al. 2005; Weijters et al. 2007), technology (or service channel) characteristics (e.g., Collier and Kimes 2013; Meuter et al. 2005), as well as situational components crucial for customers' self-service trial (e.g., van Birgelen, de Jong, and de Ruyter 2006; Simon and Usunier 2007).

On the other hand, a few researchers have added to the controversy by voicing concerns that the lack of interaction between customers and (human) frontline employees may deprive companies of important advantages. These researchers call back to attention that the interaction between the service employee and the customer allows an individualized attention to the customer's needs and preferences (Barnes, Dunne, and Glynn 2000), provides important relational benefits to customers (Gwinner, Gremler, and Bitner 1998), fosters trust (Chan, Yim, and Lam 2010), and creates social bonds between the employee and the customer (Selnes and Hansen 2001). Few examples from business practice add to the controversy by underlining the importance of personal service offers for business success. Gap Inc., for instance, failed with the introduction of in-store consumer kiosks as customers simply preferred to get recommendations and feedback from human sales people (Caterinicchia 2007). The oil giant Shell even pursued a strategy to re-

introduce a human touch to their self-service gas pumps and hired gas station attendants to assist customers when pumping gas or checking the oil. Shell claims that this service not only increases customer satisfaction but also the potential to cross- and up-sell products (Tiemann 2006). Given all these benefits of traditional personal services, more and more researchers question the rampant enthusiasm for technology-based self-services. In particular, researchers call for a consideration of the impact of SSTs on customers' attitudinal and behavioral responses and their long-term effect on customer retention (Dabholkar and Bagozzi 2002; Campbell 2007; Meuter et al. 2005; Selnes and Hansen 2001).

To date, no study has fully addressed and answered this call. This present thesis fills this void. In particular, this thesis contrasts the differential effects of self-service and personal service encounters on customers' attitudinal and behavioral responses and investigates the long-term effects of both service channels on customer relationships over time. In doing so, this thesis makes a number of important contributions to existing research and practice:

First, drawing from established theories in social psychology, this thesis is the first to empirically examine and contrast the psychological impact of human versus non-human channels of service delivery. While recent research has attempted to contrast customer perceptions for (spatially) separated and unseparated modes of service delivery (Keh and Pang 2010), these results do not consider whether the customer is interacting with a person or a machine. Previous research in psychology, however, suggests that humans respond quite differently to human and non-human stimuli (Moon and Conlon 2002). Considering the vast introduction of SSTs in today's business practice, Moon and Conlon (2002, p. 41) state that examining "how the success or failure of people versus machines performing these vastly different tasks affects the judgments of patients, consumers, or government officials is a mostly unstudied area of increasing importance". Following this call, this thesis is the first to demonstrate if, how, and why customer satisfaction judgments differ for personal and technology-based service channels.

Second, this thesis provides insight on the importance of service task characteristics for the introduction of SSTs. Albeit the notion that self-services may not be suited equally well for all service tasks, research has rarely discussed and examined the impact of task characteristics in self-service settings. In one of the few notable exceptions, Simon and Usunier (2007) find that

customer preferences for SSTs depend on the complexity of the service task. Similarly, Selnes and Hansen (2001) suggest, but have not tested, that SSTs may be most appropriate for easy and repetitive tasks, while personal services should be offered for critical and complex services. Campbell (2007, p. 270) notes that "it is important to understand further how consumers respond to human versus nonhuman sources, as well as what situational factors influence cognitive inferences and affective reactions to marketing sources." Following this call, this thesis provides evidence if and how the criticality of a task affects customers' psychological responses to self-service and personal service encounters. Moreover, I discuss the applicability of both channels for different service tasks and examine the importance of self-service and personal service channels for the customers' broad portfolio of service tasks over time.

Third, this thesis is the first to investigate the interactions between self-service and personal service channels and time. Although it has been suggested to examine the long-term consequences of self-services on customer relationships, longitudinal studies in the domain of SSTs are scarce. In one of the few notable exceptions, Buell and colleagues (2010) find that loyal self-service customers are not necessarily more satisfied with a provider but rather stuck with him. However, the authors do not consider how the interplay of the service channels used by a customer affects their relationship to the provider over time. Indeed, the authors note that future research should "shed light on the complexity of the retention decision in a multi-channel environment caused by the interactions between channels" (Buell, Campbell and Frei 2010, p. 696). This thesis answers this call by introducing the *self-service ratio* as an important new construct to examine and understand customer defection in multi-channel service settings. Instead of merely observing and examining channel usage separately, this thesis thus demonstrates how an integrated view on the customers' (self-service and personal service) channel usage advances the understanding of customer defection in multi-channel service settings. Moreover, through a longitudinal analysis and an examination of the strength of the *self-service ratio* on customer retention over time, the present research broadens the current view on the impact and consequences of self-service channels for multi-channel service providers.

This thesis is structured as follows. After this introduction, I present the conceptual foundation of this thesis in Chapter 2. This chapter provides a definition and circumscription of technology-

based self-services, contrasts these services from other types of services, and gives an overview of current knowledge and research on this topic.

Next, I present the three empirical studies of this thesis in the Chapters 3, 4 and 5. For each study, I briefly motivate the research, present the theoretical foundations, and derive unique hypotheses. I continue with a description of the employed methodology and analysis approach before presenting the results of the study. I close each study with a presentation and discussion of the findings.

Chapter 6 closes this thesis with a general discussion. It includes a summary of the key findings of the individual empirical studies, discusses the general theoretical and managerial contributions as well as the overall implications of this thesis, and concludes with recommendations for future research. Figure 1.1 illustrates the structure of this thesis.

1 Introduction
Motivation and Significance of this Research
2   Conceptual Basis
Self-Service Technologies – Definition, Circumscription, and Current Knowledge

3 Study 1	**4 Study 2**	**5 Study 3**
Differences in Customer Satisfaction between Self-Service and Personal Service	The Impact of Task Criticality on Responses to Self-Service and Personal Service	The Long-Term Impact of Self-Services on Customer Retention in Multichannel Service Settings
Theoretical Basis: Attribution Theory and the Person-Sensitivity Bias	Theoretical Basis: Self-Threat and the Person-Sensitivity Bias	Theoretical Basis: Value Creation in Multichannel Service Settings
Design: Scenario-based Experiment	Design: Scenario-based Experiment	Data: Longitudinal Customer Database
Follow-Up Experiment in India		

6   General Discussion, Conclusions, and Future Research
Summary of Key Findings, Theoretical and Managerial Contributions, and Opportunities for Research

Figure 1.1: Structure of the Thesis.

2. Conceptual Foundation

The present chapter introduces the conceptual foundation of this dissertation. The first subsection provides a definition and circumscription of self-service technologies. The second subsection summarizes the appeal and relevance of self-services from the providers' and the customers' point-of-view. The third subsection distinguishes technology-based self-services from other forms of service delivery and summarizes current streams of research on technology-infusion and customer participation in service delivery.

2.1 Definition of Self-Service Technologies

Self-service technologies (SSTs) are "technological interfaces that enable customers to produce a service independent of direct service employee involvement" (Meuter et al. 2000, p. 50). According to this definition, two aspects characterize a technology-based self-service: First, the customer has to actively participate in service production. That is, the customer is a co-producer of the service (Vargo and Lusch 2008). Second, the service is enabled through technology. That is, the customer interacts with a machine instead of a person during the service process.

Researchers claim that the origin of the self-service dates back to 1916, when Clarence Sanders introduced a new supermarket concept to the customers of his "Piggly Wiggly" market in Memphis, Tenneessee (Salomann 2008). In this new supermarket, customers could no longer just order and pick-up their groceries, but had to actively assemble their products in a shopping basket. What started as a small business idea turned out to revolutionize the customer's role in service delivery. The idea of the self-service was born.

Advancements in information technology have fostered the invention and widespread introduction of self-service technologies. An early and prominent example of a technology-based self-service is the automatic teller machine (ATM). First introduced in the 1980s, these machines allowed customers to get cash without interacting with a bank teller or even entering the local branch of a bank any longer. Ever since their introduction and widespread customer acceptance, more and more SSTs have been introduced into business practice. Current examples for SSTs include self check-in and check-out kiosks at hotels or airports (e.g., Meuter et al. 2000; 2005), self scanners in retail or grocery stores (Dabholkar and Bagozzi 2002; Weijters et al. 2007), online banking (Buell, Campbell, and Frei 2010), or online shopping (Childers et al. 2001).

2.2   The Relevance and Appeal of Self-Service Technologies

Today, technology-based self-services are considered the most important consequence of the advancements in information technology for the service sector (Rust and Huang 2009). While SSTs are well established in a number of service industries, such as in the financial or airline industry, business experts and analysts expect a further growth of self-services – especially in the hospitality and health care sector (The Economist 2009). According to the VDC Research Group (2011), the market for self-service technologies will grow by around 13 % a year to 936 million USD in 2015. This prognosis for self-service technologies is not surprising, given the apparent advantages for both, service provider and customer.

From the provider's point-of-view, SSTs are appealing as they allow reducing service and production costs, while increasing the efficiency of the service (e.g., Rust and Huang 2009). Consider the costs for a banking transaction, for instance: Moon and Frei (2000) estimate that a financial transaction costs 1.15 USD when delivered by a personal teller in a local branch. These costs can be reduced to .36 USD when delivered through an ATM or even down to .02 USD when delivered online. Researchers agree that transferring work from the provider to the customer is one enabler for these cost reductions. A customer as a "partial employee" hence allows to free up labor and to reduce the costs of service delivery (e.g., Mills, Chase and Marguiles 1983; Mills and Morris 1986). In support of this notion, businesses estimate, for example, that the introduction of one self-checkout scanner at the grocery store, replaces 2.5

frontline employees (The Economist 2009). Another enabler for cost reductions and increases in efficiency is the automation of service processes. Put simply, a machine does not call in sick, does not have a bad day, or gets exhausted. Instead, SSTs offer consistent quality, 24 hours, seven days a week (Weijters et al. 2007). Following this notion, researchers note that through the replacement of human labor with machines, firms can increase their operational performance and offer a consistent level of service quality (e.g., Meuter et al. 2000; Dabholkar, Bobbit, and Lee 2003; Bhappu and Schultze 2006).

From the customer's point-of-view, SSTs offer a number of benefits as well. Among the most commonly mentioned advantages of SSTs are the greater accessibility and flexibility for customers (e.g., Curran, Meuter, and Surprenant 2003; Wallace, Giese, and Johnson 2004). ATMs, for instance, are available around every corner, 24 hours a day and seven days a week. Similarly, online banking is not limited to any bank opening hours. As a consequence of this increased availability and flexibility, customers usually experience an improved level of convenience with SSTs (e.g., Collier and Kimes 2013; Meuter et al. 2000). However, SSTs do not only increase the customers' level of convenience, but also their perceived control over the process (e.g., Cyr et al. 2007; Dabholkar 1996). As customers now actively execute the tasks that were originally accomplished by service employees, they necessarily have a better overview of the individual service steps, the money involved, or the speed of service delivery. Given that customers assume the role of "partial employees" in service delivery, some service providers also offer cost advantages to customers who use their self-service offering (e.g., Salomon 2008). In Germany, some banks offer their customers a one-cent bonus for every financial transaction conducted online, for instance. Further examples are supermarkets that offer free plastic bags, when customers scan and bag items themselves, or airlines that offer reduced prices for online tickets. While these advantages all refer to monetary and utilitarian benefits of SSTs, Dabholkar (1996) also notes that SSTs can be fun and enjoyable to use for customers.

2.3 Self-Service Technologies – Current Knowledge

According to previous research, service production processes can generally be distinguished by the degree to which customers take part in service production (Bendapudi and Leone 2003;

Bitner et al. 1997) and the degree to which the service is delivered through technology (Bitner, Brown, and Meuter 2000; Bolton and Saxena-Iyer 2009). Put simply, a service can be carried out either through a human or technology, and service production can either be a joint process of the firm and the customer or a sole process of either customer or firm.[2] As illustrated in Figure 2.1, technology-based self-services, such as an ATM, mark one end of this service matrix with high levels of customer participation and technology-delivery. Traditional, personal services, such as a restaurant visit or a visit to the teller of a local bank branch, mark the opposite end, as they are produced by the firm and are not infused by technology. By actively transferring work to the customer and substituting the service employee with machines, service providers increasingly move from the traditional "high-touch" – "no-tech" services to a "high-tech" – "no-touch" services. I will use these two dimensions (i.e., technology-infusion and participation) to guide the review of relevant literature on SSTs in the following two subsections.

		Service Participation & Production		
		provider	joint	customer
Technology-Infusion	low	Traditional-Services, e.g. retail	Interactive-Services, e.g. consulting	Co-Creation-Services, e.g. weight watchers
	high	Continuous-Services, e.g. basic telecommunication	Remote-Services, e.g. remote repair	Technology-Based Self-Services, e.g. ATM

Notes: Own illustration. Adapted from Bolton and Saxena-Iyer 2009.

Figure 2.1: Technology-Infusion and Participation.

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[2]   Note that "firm production" still requires some minimal – non-voluntary – input from the customer, such as the customer's need information.

Technology-Infusion in Service Encounters

Research on self-service technologies can be divided into two major streams. First, early work in the self-service domain concentrates on the benefits of self-service technologies for firms and customers and identifies a number of important antecedents of customers' attitude towards self-service technologies and their intention to use or at least try the service technology. The main purpose of this line of research is a more nuanced understanding of customers' acceptance and adoption of these service channels. Considering the proximity to technology acceptance and innovation research, it is not surprising to find that many studies in this field are inspired by the widely accepted theory of planned behavior (TPB; Ajzen 1991), the technology acceptance model (TAM; Davis 1989), and Roger's theory on the diffusion of innovations (Rogers 2003). Meuter et al. (2005), for instance, propose and find that important innovation characteristics (i.e., relative advantage, complexity, perceived risk, observability, compatibility, and trialability) determine customers' readiness (motivation, role clarity, and ability) to try new SSTs.

A number of researchers also find strong support for the applicability of the two central TAM constructs of perceived usefulness and ease-of-use in the self-service domain (e.g., Dabholkar 1996; Dabholkar and Bagozzi 2002; Weijters et al. 2007). Accordingly, the customers' perception of the usefulness and the ease-of-use of a new technology-based self-service strongly enhance their attitude towards and acceptance of the service. Customers' satisfaction with an established personal service channel, however, can lower the customers' perception of the usefulness of a new self-service channel (Falk et al. 2007).

Building on the TPB's central construct of behavioral control, Dabholkar (1996) and Collier and Sherrell (2010) further demonstrate that customers' perceived control determines their likelihood to explore and use SSTs. As already suggested by Langeard et al. (1981) and Bateson (1985), control offers customers more power over the service process and the service outcome and thus strengthens customers' trust in and preference for new technology-based self-services.

Following the notion of the theory of reasoned action (Fishbein and Ajzen 1975)[3] that attitudes drive behavioral intentions, a great number of SST researchers provide ample evidence that customers' preference and positive attitude towards SSTs is a strong determinant of their future

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[3]   Central to the theory of reasoned action is the assumption that both attitude towards the behavior as well as subjective norms determine intentions.

intentions (e.g., Dabholkar 1996; Collier and Sherrel 2010) or even their actual use of SSTs (Weijters et al. 2007).

Based on this theoretical foundation, researchers have identified a number of important customer characteristics that influence customers' attitude and intentions towards technology-based self-services. Simon and Usunier (2007), for instance, find that customers' rational versus experiential thinking styles influence their preferences for SSTs over personal, in-contact services. According to this research, customers tend to prefer personal interactions with service personnel when they think more experientially. Customers who think more rationally, on the other hand, tend to prefer technology-based self-service options. Likewise, customers with a low need for interaction, a high technology readiness (TR; Parasuraman 2000), and a high self-efficacy generally display higher motivations to try and adopt new technology-based self-services (e.g., Dabholkar and Bagozzi 2002; Meuter et al. 2005; van Beuningen et al. 2009; Weijters et al. 2007; Westjohn et al. 2009). Additionally, research demonstrates that especially young, well-educated, and male individuals display higher preferences for technology-based self-services (e.g., Falk et al. 2007; Meuter et al. 2005).

Next to important customer characteristics, research has identified situational factors that influence customers' acceptance of SSTs. Dabholkar and Bagozzi (2002), for instance, find that the perceived ease-of-use and enjoyment of an SST becomes all the more important for the customers' attitudes towards SSTs when a situation increases customers' social anxiety through crowding. Similarly, perceived ease-of-use and perceived enjoyment of the SST have a stronger impact on customers' attitude towards and intentions to use SSTs when customers think they have to wait longer (Dabholkar and Bagozzi 2002). This highlights that the pure enjoyment of using an SST can offset negative, situational circumstances. Simon and Usunier (2007) further demonstrate that the complexity of a service moderates the impact of a customer's thinking style on preferences for SSTs over personal-in-contact services. That is, when services are more complex, the influence of a rational (vs. experiential) thinking style on customers' preference for SSTs becomes all the more important as customers anticipate the need for higher levels of cognitive effort to use and accomplish the service via SSTs. The authors, however, could not find consistent support for the assumption that service complexity influences preferences for SSTs directly.

Finally, and in a related manner, a few studies have examined how the use of a traditional, personal service channel affects customers' perception and adoption of a new technology-based self-service channel. Falk and colleagues (2007), for instance, demonstrate that customers display a status-quo bias when evaluating a new self-service channel. Accordingly, the higher the customers' satisfaction with a traditional, personal service channel, the lower their perceptions of the perceived usefulness of the SST. Xue, Hitt, and Chen (2011), however, find that once customers increase their frequency of service usage with a particular provider, their adoption of the provider's self-service channels increases, too. This suggests that some customers may consider a self-service channel the more efficient way of service delivery. In support of this notion, B2B customers generally seem to perceive that SSTs can improve their operational performance (Bhappu and Schultze 2006). However, the importance and dominance of close customer-firm relationships in traditional personal service channels, makes many fear that the introduction of SSTs may harm relational performance. The fear of relational losses thus constitutes an important obstacle to SST adoption. Table 2.1 provides an overview of the relevant literature on customers' acceptance and adoption of self-service technologies.

Table 2.1: Review of Relevant Literature on Customers' Acceptance and Adoption of SSTs.

Study	Focus	Nature of Study (Design)	Findings and Conclusions
Bhappu and Schultze (2006)	B2B customers intention to adopt SSTs	empirical (interviews, survey)	Customers associate SSTs with gains in operational performance and losses in relational performance. These perceptions directly impact customers' intention to adopt SSTs.
Bitner, Brown, and Meuter (2000)	Improvement of service encounters through technology	conceptual	Thoughtful use of technology enables customization, improved service recovery, and spontaneous delight in service encounters.
Collier and Sherrell (2010)	Impact of control and convenience on customers' SST- intentions	empirical (survey)	Increased perceptions of control and convenience increase customers' attitude and intentions towards SSTs. The impact is mediated by perceptions of trust and transaction-speed.
Curran, Meuter, and Surprenant (2003)	Customer attitudes and intentions to use SSTs	empirical (survey)	Multiple, hierarchical attitudes towards provider and service technology influence customers' intention to use a SST.

Dabholkar (1996)	Expectations and affect and their impact on intention to use SSTs	empirical (experiment, scenario)	Customers prefer SST attributes over affective aspects when forming SST service quality expectations and future intentions.
Dabholkar and Bagozzi (2002)	Impact of situational factors, customer traits on attitude and intentions	empirical (experiment, scenario)	Moderating effects, including situational factors (e.g., waiting time) and customer traits (e.g., need for interaction), strengthen the impact of SST expectations on attitude towards SSTs.
Falk et al. (2007)	Impact of offline channel satisfaction on perceptions of a new e-channel	empirical (survey, quasi-experiment)	Status quo bias in perceptions of a new channel, i.e. satisfaction with the traditional channel reduces the perceived usefulness of the new online channel.
Iqbal, Verma, and Baran (2003)	Differential preferences for transaction-based e-services	empirical (experiment, discrete choice)	Customer preferences for features of transaction-based e-services differ between offline and online customers and their usage frequency.
Lambrecht, Seim, and Tucker (2011)	Interruptions and steps in the adoption process of SSTs	empirical (longitudinal usage data)	Interruptions in early stages of the adoption process (e.g., through holidays) reduce customers' likelihood of continued and regular SST use.
Meuter et al. (2005)	Determinants of customers' initial SST trail decision	empirical (survey, cross-sectional)	Customer readiness variables (i.e., role clarity, motivation, ability) are key mediators between established adoption constructs (i.e., innovation and customer characteristics) and SST trial.
Parasuraman (2000)	Development and validation of a technology readiness scale	conceptual / empirical	Technology-readiness (TR) captures customers' propensity to embrace technology on the dimensions of optimism, innovativeness, discomfort, insecurity.
Simon and Usunier (2007)	Determinants of customers' preference for SSTs over personal services	empirical (survey)	Customers' rational vs. experiential thinking styles and situational factors (e.g., service complexity) influence preferences for SSTs.
van Beuningen et al. (2009)	Impact of self-efficacy on SST value perceptions and future intentions	empirical (survey)	Self-efficacy increases novice customers performance and value perceptions, and future intentions.
Weijters et al. (2007)	Determinants of customers' use of SSTs in retailing	empirical (survey, observational)	Perceived usefulness, ease of use, reliability, and fun are key drivers of customers' attitude towards SSTs. Attitude is shown to predict actual use.
Westjohn et al. (2009)	Impact of global self-identity on technology readiness and SST use	empirical (survey, intercultural)	Cosmopolitanism, global identification, and promotion focus increase intentions of SST use, while prevention focus decreases it. TR (partially) mediates these relationships.
Xue, Hitt, and Chen (2011)	Determinants of Internet Banking Adoption	empirical (longitudinal service data)	Increased transaction demand, customer efficiency, and internet penetration foster and speed-up SST adoption.

The second theme that has emerged in the self-service literature focuses on the consequences of customers' self-service use, including but not limited to customers' evaluations of SSTs and customer retention in the context of SSTs. In one of the first studies focusing on customers' evaluations of technology-based self-services, Meuter and colleagues (2000) have identified sources of customer satisfaction and dissatisfaction with SSTs. Most broadly, the authors find that customers are satisfied with an SST when it satisfies an intensified need, such as a need for cash when local bank branches are already closed. The relative advantage in terms of easy access, time flexibility, and convenience of an SST also constitutes an important source of customer satisfaction with SSTs. However, in their critical incident study, Meuter et al. (2000) also report a number of dissatisfying incidents with SSTs. According to the authors, these incidents mostly refer to critical technology or process failures, such as an ATM breaking down or the loss of online orders.

As customers cannot simply direct their complaints at a human counterpart in SST contexts, researchers agree on the importance of an effective complaint management and efficient service recovery processes for these services (e.g., Bitner, Brown, and Meuter 2000). Recently, a few researchers have addressed this issue by examining customers' likelihood of voiced complaints in SST contexts (Robertson and Shaw 2009), customers' recovery expectations when SSTs fail (Zhu et al. 2013), and determinants of customer satisfaction with recoveries from SST failures (Dong, Evans and Zou 2008; Zhu et al. 2013). Findings are that especially customers' perception of how easy it is to complain (i.e., ease-of-voice) and how likely it is to be successful with the complaint (i.e., voice success) influences their likelihood to complain to a provider in a self-service context (Robertson and Shaw 2009). Given these findings, research recommends to offer customers "surrogates in SST systems for the active listening, concern, and empathy shown by service personnel in interpersonal encounters" (Robertson and Shaw 2009, p. 111) to increase the likelihood of voice and satisfaction with the complaint handling. A recent study by Zhu et al. (2013) supports this notion. In their empirical investigation, the authors find that higher interactivity of the SST interface heightens customers' recovery expectations and, in consequence, their own recovery effort. The authors conclude that SST interfaces should be designed in a way that increases customers' perceived control and the interactivity of the interface. These results become all the more important when considering the results of a study by Dong and colleagues (2008). In their scenario-based experiment, the authors find evidence that

once customers exert more effort by participating in the recovery process, they are more satisfied with the service experience and display higher levels of perceived value and future intentions toward using the SST.

While customers' future intentions towards SSTs are generally well understood, less is known about customer loyalty and retention in SST contexts. In their conceptual study on the impact of technology on the quality-value-loyalty chain, Parasuraman and Grewal (2000) are among the first to question whether the constructs and relationships between quality, value, and loyalty established in interpersonal encounters also extend to technology-based self-service encounters. In particular, Parasuraman and Grewal ask (2000, p. 172): "Is customer retention/loyalty harder or easier to achieve when customers interact with technology rather than with employees? What boundary conditions or moderating factors are likely to be relevant in this regard?" Ever since, only few researchers have attempted to address this issue. Among the first, however, are Selnes and Hansen (2001). After surveying almost 400 Internet and personal banking customers, the authors conclude that self-service usage does not harm customer loyalty when used as a supplement rather than a substitute to interpersonal service encounters. In particular, results of their study imply that supplementing personal channels with technology-based self-service channels does not to harm the social bonds usually established in interpersonal encounters - especially when relationships are highly complex. Instead, results suggest that the addition of the self-service channel to a personal service channel can even foster social bonds and thus customer loyalty to the provider. The authors explain this finding with the increased meaningfulness of the remaining personal encounters. Thus, customers most likely rely on self-services for easy and repetitive tasks, while now relying on the competence of the service worker for more complex and demanding tasks. In conclusion, the authors claim that "self-service without a minimum of personal interaction may well have a negative effect on customer loyalty because the important social-bond mechanism is removed" (Selnes and Hansen 2001, p. 87). As long as self-services are only added to a personal service channel, however, findings of this study suggest that SSTs can enhance customer-firm relationships.

A recent study by Campbell and Frei (2010) seems to support this notion. From their analyses of a large customer database of retail banking customers, the authors find that existing customers' adoption of the (self-service) online banking channel did not only reduce their usage frequency of other self-service channels (e.g., telephone banking) but also increase their augmentation of

service consumption in interpersonal service channels (branch and call center). While the authors find that this development leads to lower customer profitability due to higher costs-to-serve, they also find that these customers have higher retention rates over one-, two-, and three-year time horizons. Consistent with these findings, Xue, Hitt and Chen (2011) find that customers who adopt their bank's online channel (i.e., online banking) have a higher propensity to remain with their provider. While these studies provide strong support for the assumptions put forward by Selnes and Hansen (2001), they merely rely on observational data. In one of the first attempts to contrast attitudinal data and thus link customer satisfaction with SSTs to customer retention decisions, Buell and colleagues (2010) provide empirical evidence that self-service customers are not more (or less) satisfied than their interpersonal counterparts. Instead the authors find that self-service customers seem to perceive higher levels of switching costs, which keeps them from leaving their service provider.

The notion that the customers' use of SSTs might not be voluntary is not new to the literature. Given the apparent advantages for firms, many providers actively push their customers to cheaper self-service channels or even force them to use these channels. These circumstances, however, have been found to be detrimental for customers' attitude towards the SST and the provider in general (Reinders, Dabholkar, and Frambach 2008). To attenuate these negative customer perceptions, researchers suggest that customers must consider the push policy to be fair (White, Breazeale, and Collier 2012) or offer customers a personal fall-back option should the SST channel be the predominant option (Reinders, Dabholkar, and Frambach 2008).

Finally, this stream of research provides first evidence that self-service customers do not consider the same information when evaluating a service as non-users. Accordingly, Weijters and colleagues (2007) find that customers who use a self-service (i.e., self-scan) check-out at the grocery store do not consider the number of items purchased when judging the waiting time for the service. In contrast, customers who used the traditional check-out increased their perceptions of waiting time the higher the number of items purchased. Given that perceptions of waiting time are critical for customer satisfaction, the authors conclude that self-services might be beneficial for crowded situations. Table 2.2 provides an overview of the relevant literature on customers' evaluation and use of self-service technologies.

Table 2.2: Review of Relevant Literature on Customers' Evaluations and Use of SSTs.

Study	Focus	Nature of Study (Design)	Findings and Conclusions
Buell, Campbell, and Frei (2010)	Impact of SSTs on customer satisfaction and retention	empirical (longitudinal data)	High SST usage does not increase satisfaction, but switching costs and thus customer retention.
Campbell and Frei (2010)	Self-service customers' profitability + retention to a multi-channel provider	empirical (longitudinal data)	Adoption and use of online banking leads to increases in avg. cost-to-serve, a reduction in short-term customer profitability, and increased retention.
Collier and Kimes (2012)	Impact of convenience on customers' SST evaluations	empirical (survey)	Users' satisfaction with SSTs can be increased by improving its speed and accuracy. Convenience fosters perceptions of speed and accuracy.
Dong, Evans, and Zou (2008)	Consequences of customer participation in SST service recovery	empirical (experiment)	Customer participation in recovery processes in an SST context increases role clarity, satisfaction with the recovery, and future co-creation intentions.
Lin and Hsieh (2011)	Development and validation of a SST-quality scale	conceptual / empirical	SSTQUAL measures SST quality perceptions on dimensions of functionality, enjoyment, security, assurance, design, convenience, and customization.
Meuter et al. (2000)	Sources of customer (dis-) satisfaction with SST encounters	empirical (critical incident technique)	Satisfaction with SSTs is mostly due to an immediate solution to a need and the relative advantage over personal services. Dissatisfaction is mostly due to process failures.
Parasuraman and Grewal (2000)	Impact of technology on the quality-value-loyalty chain	conceptual	Integration of the pyramid model, emphasizing the importance of technology in services, and the quality-value-loyalty chain.
Reinders, Dabholkar, and Frambach (2008)	Consequences of forcing customers to use SSTs	empirical (experiment)	Forced SST use leads to negative attitudes towards SST and provider. Effects can be attenuated by personal fall-back options and SST experience.
Robertson and Shaw (2009)	Likelihood of customer complaints in SST contexts	empirical (survey)	In an SST context, ease-of-voice is the strongest predictor of customers' likelihood to complain.
Selnes and Hansen (2001)	Social bonding and loyalty in SST and personal-service contexts	empirical (survey)	SSTs can enhance loyalty intentions when used as a supplement to personal services. SSTs harm loyalty when used as a substitute.

Weijters et al. (2007)	Outcomes of customers' use of SSTs in retailing	empirical (survey, observational)	Perceptions of increased waiting time decreases satisfaction. The effect is stronger for SST-users than for non-users. For non-users, waiting time is a function of the number of items purchased.
White, Breazeale, and collier (2012)	Customer responses to SST push policies	empirical (survey)	Perceived fairness strengthens future intentions, spending, and WOM. Fairness is determined by established SST adoption antecedents (e.g., NfI).
Xue, Hitt, and Chen (2011)	Outcomes of customers' online banking adoption	empirical (longitudinal service data)	Customers who adopt the SST option increase their frequency of usage, acquire more products, and have a lower propensity to leave the provider.
Zhu et al. (2007)	SST effectiveness for single- + multiple feature designs	empirical (experiment)	Customers' prior SST experience and TR, as well as SST design features influence customers' perceived control and interface evaluations.
Zhu et al. (2012)	Recovery from SST failures and its consequences	empirical (experiment)	Internal attributions, perceived control, and SST interactivity increase customers' recovery expectancy. Expectancy affects customers' recovery effort.

Customer Participation in Service Delivery

Customer participation describes "the degree to which the customer is involved in producing and delivering the service" (Dabholkar 1990, p. 484). The customer's involvement in the service production process can take either the form of information or effort put into it (Kelley, Donnelly and Skinner 1990). Related terms in literature are customer co-production and customer co-creation.[4] While these terms are often used simultaneously, they do not necessarily refer to the same aspect. Vargo and Lusch (2004; 2008) have coined the differentiation between co-creation and co-production. In their evolution of a new service-dominant logic, the authors state that customers always co-create a unique value through an integration of the provider's offering into their own life. While customers are always co-creators of value, they are not necessarily also co-producers of value, however. According to the authors, co-production refers to the customer's participation and production of the core (service) offering. Self-service customers are hence also referred to as co-producers (Vargo and Lusch 2008).

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[4]   Co-creation and co-design are terms often used in the context of new product development (e.g., Hoyer et al. 2010) and mass customization (e.g., Piller et al. 2005). In contrast to the customer participation discussed in this section, these forms of customer participation refer to the customers' active involvement in the design and innovation process of products and services.

As depicted in Figure 2.1, one can distinguish three basic participation levels in service production: firm production, which only requires some minimal input from customers, such as the choice of food they wish to order at a restaurant; joint production, which requires active input from both customer and firm, as would be the case in a financial consultation; and customer production, which requires high involvement and compliance of customers, as would be the case in a weight loss program or a technology-based self-service encounter.

Research on customer participation can be divided into three important literature streams. Similar to the literature on technology infusion, the first theme focuses on the benefits of customer participation for a firm. In particular, this line of research underlines the importance of customers as "partial employees" from a productivity point of view and stresses the economic benefits of customer participation for a firm (e.g., Mills and Morris 1986).

The second stream of literature shifts its focus from the question <u>why</u> customers should participate to the question <u>how</u> customer can be integrated successfully. Accordingly, this research focuses on the successful management of customers as "partial employees" (e.g., Kelley, Donnelly, and Skinner 1990; Lengnick-Hall 1996; Payne, Storbacka, and Frow 2008). This research has identified important determinants of customers' motivation to participate, such as the provision of adequate training, support, and customer learning (e.g., Bettencourt 1997; Goodwin 1988; Hibbert, Winklhofer, and Temerak 2012) and management models and approaches suited for successful customer integration, such as the organizational socialization (Claycomb, Lengnick-Hall, and Inks 2001; Kelly, Donnelly, and Skinner 1992). The bulk of research places its focus on the customer, however. Bettencourt (1997), for instance, suggests that global satisfaction and commitment determine customers' motivation for voluntary performance. Astonishingly few studies provide frameworks for the management of an active customer participation and involvement in service delivery. Prahalad and Ramaswamy (2004) note, however, that a successful management of the customers' part in service delivery is important as not only the output or outcome, but also the process determines the value a customer derives from a service.

Finally, the third stream of literature focuses on customers' psychological and behavioral responses to co-created services. This research demonstrates that the level of participation affects the customers' assignment of responsibility for a jointly produced outcome (Bendapudi and

Leone 2003), customers' sensory perception of self-produced products (Troye and Supphellen 2012), and satisfaction with the provider (e.g., Bendapudi and Leone 2003; Dong, Evans and Zou 2008). In contrast to the first stream of research, this research also points to possible drawbacks and pitfalls of customer participation in service delivery – even for the provider. Chan, Yim, and Lam (2010), for instance, demonstrate that customer participation can increase the frontline employees' job stress and decrease their job satisfaction. They also find, however, that the value both customer and provider can derive from the customer participating in service production strongly depends on the customer's and the provider's cultural orientation. Accordingly, their empirical investigation reveals that customers and employees with high collectivist value orientations can derive a higher relational value from customer participation if both share the same values.

3. Customer Satisfaction with Technology-Based Self-Service Encounters

Business press reports a number of cost savings through the introduction of technology-based self-services: "Serving customers over the Internet has saved airlines roughly $10 to $15 per booking" (Myers, Pickersgill, and Van Metre 2004, p. 36); "each self-service checkout at the grocery store replaces around 2.5 employees" (The Economist 2009); "The cost of an American-based, customer-service telephone agent is approximately $ 7.50 per phone call versus only about 32 cents per call for an automated phone system" (Castro, Atkinson, and Ezell 2010, p. 30). Although the monetary aspects of SSTs have received widespread attention in both business practice and research, little is known about the effect of technology-based self-services on customers' psychological responses to these encounters.

In service research, a number of studies have identified important attributes of self-services, which determine customers' perceptions and evaluations of SSTs. Enjoyment (e.g., Dabholkar 1996), convenience (e.g., Collier and Kimes 2013), customization (e.g., Lin and Hsieh 2011), as well as functionality and design (e.g., Zhu et al. 2007), for instance, all determine how customers perceive and evaluate technology-based self-services. Similarly, research has identified a number of customer characteristics, which determine the value and satisfaction customers may derive from technology-based self-service encounters. Van Beuningen et al. (2009), for instance, show that a customer's self-efficacy increases novice customers' evaluations of the value of a self-service. While these studies help us understand customer satisfaction with technology-based self-service channels, they do not shed any light on the customers' psychological responses to self-service encounters. In particular, no study to date exists, which helps us understand how a

customer's perception and evaluation of self-services might differ from those of traditional personal services.

Considering the broad introduction of self-service channels in a vast variety of service industries, a more nuanced understanding of customers' psychological responses to an active co-production of a technology-based self-service becomes all the more important. This study aims to address this issue. Drawing from the theories of the person-sensitivity bias and attribution-biases in human cognition, this study contrasts customers' attribution-processes and subsequent satisfaction judgments between self-service and personal service channels. In particular, I demonstrate (1) if customers' satisfaction judgments differ between technology-based self-services and personal services and (2) how and why customers' evaluations may differ.

This study proceeds as follows: First, I present the theoretical foundation of this study. Drawing from attribution theory and the person-sensitivity bias, I derive hypotheses on customers' unique responses to personal and self-service encounters. Then, I describe the empirical analysis used to test these hypotheses. Following the presentation of results, I close with a discussion and conclusions.

3.1   Theoretical Basis: Attribution Theory and the Person-Sensitivity Bias

Research suggests that attribution theory (Heider 1958; Weiner 1986) is especially suited when trying to understand customers' psychological responses to jointly produced services (Bendapudi and Leone 2003) as well as customer behavior in human-computer interactions (Moon and Nass 1998). At the heart of attribution theory lies the question to what or whom customers assign responsibility for an outcome. Based on the customers' assessment of the reasons and hence responsibilities for an outcome, customers may either feel satisfied or dissatisfied. According to the theory, customers infer causality for an event along three dimensions: 1) the locus of causality, 2) stability, and 3) controllability (Weiner 1986). Put simply, locus of causality refers to either internal or external sources. That is, customers may assume that they themselves are responsible or at least partly responsible for an outcome (internal attribution) or attribute the responsibility to external factors, such as the service provider, other customers, or even luck

(external attribution). While both, stability (i.e., are events likely to occur again in the future?) and controllability (i.e., are events outside the counterparts or the own control?) have been shown to influence satisfaction judgments, research has frequently demonstrated that the locus of causality is the key attribution dimension for customer satisfaction (Folkes 1984).

To date, research supports the notion that attributional searches are generally more likely to take place when negative events occur (Weiner 2000). This proposition goes back to Folkes (1984) who demonstrates that attributional processes are more likely following a product failure than successes or positive outcomes. Nonetheless, it is important to note that attribution can also take place in the case of positive events. Morales (2005), for instance, demonstrates that customers engage in an attributional search and tend to reward firms when they engage in extra effort – even when customers themselves do not directly benefit from these efforts.

Attribution research has recently also been applied to understand the customers' psychological responses to service outcomes. Accordingly, a study by Bendapudi and Leone (2003) implies that customers' satisfaction judgments differ between jointly co-produced and firm-produced services, because customers assign responsibility differently when they are actively involved in the service process. Results demonstrate that when the service outcome is better than expected, customers, who jointly produce a service with a provider, tend to be less satisfied with the provider than customers, who mainly rely on the provider to deliver the service; satisfaction differences between co-produced and firm-produced services vanish, however, when service outcomes are worse than expected. The authors conclude that customers generally engage in a self-serving bias[5] when evaluating a service outcome. That is, customers have a tendency to attribute good service outcomes to themselves, while attributing bad service outcomes to the provider. Findings, however, also suggest that customers, who actively co-produce a service with the provider, only have a higher tendency to credit themselves for good quality outcomes; when service outcomes are poor, they do not have a higher tendency to self-blame. Customers thus

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[5]   Most generally, the self-serving bias has been defined as a humans' tendency to "make attributions for positive events that are more internal, stable, and global than their attributions for negative events" (Mezulis et al. 2004, p. 712). While the idea that customers engage in a self-serving bias is rather new to the service field (Bendapudi and Leone 2003), this bias has been demonstrated in research and is widely acknowledged in social psychology (Mezulis et al. 2004). In fact, the roots of the self-serving bias go back to Heider's (1958) "naive analysis of action" model, where the author suggests that cognition is not only driven by objective facts, but also by individual (subjective) needs, preferences, and desires. According to the model, subjective needs impact human cognition in such a way that flatters one's own ego. The self-serving bias has consequently also been labeled as ego-defensive, ego-protective, or ego-biased attribution (Miller and Ross 1975).

clearly display a tendency to protect their own ego. Bendapudi and Leone (2003) also demonstrate, however, that customers "own" their decision and hence engage in egocentric rather than self-serving attributions when they can choose to participate and actively co-produce the service. As a result, choosers are more satisfied with a provider in the case of a bad outcome (due to self-blame) and less satisfied with a provider in case of a good outcome (due to self-credit). Research by Botti and McGill (2006) fully supports this notion. According to their study, choosers display a more pronounced egocentric bias[6] and hence a stronger tendency to both, self-credit and self-blame.

Social response theory (Reeves and Nass 1996) suggests that humans also engage in self-serving attributions when interacting with a computer. According to Moon and Nass (1998) and Moon (2000, 2003) people respond to computers subconsciously and in consequence often treat computers "as social actors even when they know that machines do not possess feelings, intentions, "selves", or human motivations" (Moon 2000, p. 325). In a series of experiments, these studies find that customers treat their interaction with a machine as a social encounter and hence also make social – self-serving – attributions (Moon and Nass 1998; Moon 2000, 2003). That is, humans tend to blame the computer for poor outcomes, while crediting themselves for good outcomes. While this research suggests that humans respond quite similarly to machines and humans, Morkes and colleagues (1999) demonstrate that the propositions of social-response theory do not always apply. In their comparison of human-computer and computer-mediated interactions, the authors find that once participants perceive to interact with a person via a computer instead of interacting with a computer alone, they are more sociable, spend more time on a task, and perceive themselves as more similar to their counterpart. Research also suggests that self-serving attributions are less pronounced in human-computer interactions when humans perceive to be in control of the process and / or similar to their counterpart (Moon and Nass 1998; Moon 2000, 2003). Accordingly, participants attribute consistently more responsibility to themselves in these instances instead of engaging in self-serving attributions (Moon and Nass 1998). This implies that perceived control strengthens egocentric attributions. These findings might hence also explain why Meuter et al. (2000) only find marginal support for self-serving attributions in the context of technology-based self-services.

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[6]   According to this bias, people that are more aware of their own actions and contributions (i.e., have an increased self-awareness), have a tendency to continuously assume more responsibility for an outcome, no matter if it is good, average, or bad (Greenberg 1983).

Contrary to the propositions of social response theory, recent research in social psychology suggests that humans react differently to persons and machines. According to the person-sensitivity bias, human perceptions and evaluations of an outcome depend on whether the source is human or non-human (Moon and Conlon 2002). In particular this bias suggests that humans are evaluated in more extreme manners, getting more credit for good outcomes but also taking more blame for bad outcomes than their non-human counterparts.[7] While this bias has been demonstrated in a series of studies in social psychology (e.g., the evaluation of security cameras versus security personnel; Moon and Conlon 2002), applications in the marketing field are still almost non-existent - with the exception of Campbell (2007). According to Campbell's study, customers evaluate price changes differently when they are communicated in person versus through an object (i.e., price tags). In support of a person-sensitivity bias, this study demonstrates that customers consider price increases less unfair when they are communicated in person, while they consider price decreases less fair when simply displayed on a price tag.

But why do people respond differently to human versus non-human counterparts? Some researchers have proposed that these effects could be driven by the fact that, in general, humans tend to react more affectionately to other humans (Moon and Conlon 2002; Rosenbaum 1986). Another reason might be that humans assume that another human (but not an object) causes an outcome intentionally (Campbell 2007; Green and Mitchell 1979; Moon and Conlon 2002). That is, humans tend to infer a motive behind a human's actions and overestimate their power to control an outcome (Gilbert and Malone 1995). This idea is closely related to the fundamental attribution error (Jones and Harris 1967; Ross 1977), which suggests that humans tend to make fundamental mistakes when observing and explaining the behavior of human counterparts. In particular, this theory suggests that humans have the tendency to attribute the observed behavior of others to internal, personality-related factors (e.g., opinion, attitudes, or personality traits), while underestimating the impact of external, situational factors (e.g., time-constraints and weather conditions). This error, however, only occurs when humans evaluate the behavior of

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[7]   The person sensitivity bias is rooted in the widely acknowledged person-positivity bias (Sears 1983), which suggests that humans are treated more favorably than objects for positive outcomes.

others, not their own. When humans try to explain or evaluate their own behavior, they are more likely to consider external factors.[8]

3.2 Conceptual Model and Hypotheses

The previous discussion illustrates that there are a number of aspects that need to be kept in mind when trying to understand customers' psychological responses to technology-based self-service encounters. First, humans have a tendency to protect or even enhance their self-image when evaluating an outcome. Second, humans have a tendency to explain the behavior of other human counterparts with internal, personality-related, dispositional factors, while neglecting external, situational factors. Third, humans tend to react to humans in more extreme manners, thus giving them more credit in good times, while blaming them more strongly in bad times than their non-human counterparts.

Following this theoretical discussion, I expect that customers will evaluate a service provider in more extreme manners when using a personal service channel than when using a technology-based self-service channel. I explain these differences with customers' different locus of attribution for a service outcome in self-service and personal service encounters. I will explain this reasoning and detail this study's hypotheses in the following subsections for high, neutral, and poor service quality outcomes, respectively.

Customers' Responses to Poor-Quality Service Outcomes

When a service outcome is of poor quality, customers will try to maintain a positive view of their self and protect their positive self-concept. According to the self-serving bias, customers will consequently attribute little – if any – responsibility to themselves (i.e., internal attribution will be low) for low quality outcomes no matter what service channel they are using. The question that remains, however, is the following: Whom can customers blame for a poor service outcome?

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[8]   One reason is that these factors are simply more salient to oneself than they are when observing other people. Another reason, however, is that humans have a tendency to protect or enhance their own self – as can be seen in the theory of a self-serving bias for instance.

In the case of a personal service encounter, where customers interact with and observe the behavior of the service employee, customers engage in a fundamental attribution error and thus blame the service outcome to internal, personality-related factors of their counterpart. That is, customers blame the service provider for the poor quality of the outcome rather than external, situational factors. Quite the contrary happens in the case of self-services: While customers are still reluctant to take responsibility for the outcome (due to the self-serving bias), they find it hard to infer a bad internal motive to their non-human counterpart and hence blame other external factors for the bad service outcome, e.g. the current state of technology or bad luck. As a consequence, customers should be less satisfied with the service provider when using a personal service instead of a technology-based self-service. This proposition is in line with the person-sensitivity bias, which suggests that customers should react in more extreme manners to their human counterparts.

> **Hypothesis 1 (H1):** In the case of a poor service outcome, customers will generally be more satisfied with the service provider when they have used a technology-based self-service instead of a personal service.

The above reasoning suggests that the person-sensitivity bias evolves as customers attribute more responsibility to the service provider in the case of personal services, whereas self-service customers attribute more responsibility to external, contextual factors. Another plausible reason, however, might be that customers attribute more responsibility to themselves in the case of self-services than personal services. Following the notion of an egocentric bias (Ross and Sicoly 1979), research also suggests that once customers are more in control and more aware of their own actions and contributions to an outcome, they are more likely to assume responsibility for a negative outcome. Previous research also suggests that self-services increase the customers' perceptions of control during the service process (e.g., Cyr et al. 2007). Taken together, this suggests that self-service customers may tend to accept more responsibility of a poor service outcome and hence engage in less self-serving attributions than customers, who use a personal service.

> **Hypothesis 2 (H2):** In the case of a poor service outcome, customers will attribute a) less responsibility to the service provider, b) more to external, situational factors (i.e., chance),

and c) more to themselves when they have used a technology-based self-service instead of a personal service.

The study by Bendapudi and Leone (2003) suggests that the level of customer participation during service delivery additionally affects the customers' tendency to engage in self-serving attributions. According to this study, customers engage in ego-protecting attributions regardless of their participation level when service quality is worse than expected. However, once customers perceive to be in control and are able to choose to participate, they engage in less self-serving attributions. This suggests that participation may lead to more egocentric attributions in self-service settings (where customers perceive to be in control) than in personal service settings. High participation should hence strengthen differences in satisfaction judgments between self-service and personal service channels when service quality is poor.

> **Hypothesis 3 (H3):** In the case of a poor service outcome, participation moderates the impact of the service channel on customer satisfaction. That is, channel differences in satisfaction will be more pronounced when participation is high.

Customers' Responses to Neutral Service Outcomes

Research continuously disregards the option of a neutral (service) outcome. Given the fact that customers are most likely to engage in an attributional search when outcomes are unexpected (i.e., surprisingly positive or unexpectedly negative, Weiner 2000), this lack of research is not surprising. However, as neutral outcomes are probably the most common outcome in business practice, a more nuanced understanding of customers' psychological responses to these service outcomes is required. In one of the few exceptions examining neutral outcomes, Bendapudi and Leone (2003) show that the level of customer participation does not affect satisfaction judgments when quality levels are as expected. The authors base their assumptions and findings on the previous notion that customers are simply unlikely to think much about the responsibility of a mediocre outcome.

While attribution research might not be well suited to explain satisfaction differences between high and low levels of participation or even self-service and personal service customers for

neutral quality outcomes, Troye and Supphellen (2012) suggest that self-anchoring might be. According to the authors, customers use an average outcome that is most ambiguous in its interpretation and adjust their sensory perceptions to match the outcome with a positive view of their own self. In a number of experiments with self-producing customers, Troye and Supphellen (2012) find that customers who put a lot of effort into adjusting a ready-made dinner kit (i.e., a self-production task) perceive and evaluate the outcome more positively. The authors conclude that the effect of self-anchoring is stronger, the more "self" a customer puts into achieving the outcome. It is important to note that the authors do not only find this effect for the self-produced outcome, but also for the income product provided by the firm. Similar to the effect of self-production in the study by Troye and Supphellen (2012), it is likely that customers, who use a technology-based self-service and consequently assume more "ownership" of their role as a co-producer, perceive and evaluate a mediocre service outcome <u>and</u> the service provider more positively than their personal service counterparts. This effect should again be even stronger, the more effort customers have put into the service. That is, high participation should strengthen the self-anchoring effect of self-service customers for neutral service outcomes.

The notion of an egocentric bias suggests the opposite, however. According to this bias, individuals who have an increased self-awareness, also have a tendency to assume more responsibility for an outcome, no matter if it is good, average, or bad (Greenberg 1983). Considering that self-service customers should be much more aware of their own input and contribution to a service process and outcome, it is likely that self-service customers also claim more responsibility for an average service outcome than customers who use a personal service. Following this line of thought, it is plausible that customers assume more responsibility for an outcome themselves and are hence less satisfied with the provider when using a technology-based self-service instead of a personal service.

Given these conflicting theoretical predictions, I propose two alternative hypotheses for the impact of the service channel when service outcomes are neutral.

> **Hypothesis 4 (H4):** In the case of a mediocre service outcome, customers will be a) more or b) less satisfied with the service provider when they have used a technology-based self-service instead of a personal service.

Hypothesis 5 (H5): In the case of a mediocre service outcome, participation moderates the impact of the service channel on customer satisfaction. That is, channel differences in satisfaction will be more pronounced when participation is high.

Customers' Responses to High-Quality Service Outcomes

For high quality service outcomes, attribution processes and evaluation of outcomes are less ambiguous. Similar to a poor quality outcome, it is likely that customers will first and foremost engage in a self-serving bias when evaluating the outcome and the service provider. This time, however, customers will gladly accept the responsibility for the outcome and attribute less responsibility to external factors, no matter which service channel is utilized.

The question that remains, however, is the following: Who will customers credit for a good outcome, other than themselves, and how much credit is given to factors external to themselves? Research suggests that an attributional search is less likely for high-quality outcomes as these events do not pose a threat to the customers' self-image (e.g., Skitka 2003). It is hence unlikely that customers will give much thought about external factors, which might have contributed to a positive service outcome. Instead, it is most likely that customers will simply attribute responsibility to themselves - even more so if they feel they have "owned" the service process. In line with previous research, attribution to their own self should therefore be higher, the higher a customer's perceived participation in the service production process (Bendapudi and Leone 2003) and the greater a customer's perceived ownership of the process or outcome (Botti and McGill 2006). Again, I assume that customers will have a stronger sense of ownership and control in the case of self-services and thus attribute even more responsibility to themselves and less to the provider for a good quality outcome. Considering that high-quality outcomes do not motivate customers to make inferences about the causality of the outcome – and hence consider external factors that might also have contributed to the service – I do not expect to find any channel differences in a customer's attribution to external, situational factors.

Hypothesis 6 (H6): In the case of a favorable service outcome, customers will attribute a) less responsibility to the service provider and b) more to themselves (i.e, internal

attribution) when they have used a technology-based self-service instead of a personal service.

Hypothesis 7 (H7): In the case of a favorable service outcome, customers will attribute a) more responsibility to the service provider and b) less to themselves (i.e., internal attribution) when their level of participation is low.

I expect that these differences in customers' attributions will directly translate into differential satisfaction judgments of customers in self-service and personal service settings. In particular, I expect that customers are less (more) satisfied with their service provider when they have relied on a technology-based self-service (personal service). This reasoning is supported by the person-sensitivity bias, which suggests that humans should react differently to persons and machines. Following the notion of this bias, customers should respond more extremely and thus also be more satisfied with the provider in the case of a good quality outcome when they use a personal service instead of a self-service. As mentioned above, one reason for this difference might be that customers feel that their human counterpart intentionally causes the service outcome. This, again, implies that customers make a fundamental attribution error. This time, however, this error is to the advantage of the service provider. Accordingly, customers will tend to infer that factors internal to the service provider (i.e., employee) have contributed to the positive service outcome. Clearly, the more customers assume that a provider intentionally helps them to achieve a good service outcome, the more satisfied they will be with the provider.

Hypothesis 8 (H8): In the case of a favorable service outcome, customers will generally be less satisfied with their service provider when they have used a technology-based self-service instead of a personal service.

3.3 Methodology

Design. Study 1 tests the proposed hypotheses in an experimental setting using different service scenarios. The experiment is a 2 x 2 x 3 factorial design with service channel (personal vs. technology-based self-service), participation level (high vs. low), and service outcome (high vs.

medium vs. low quality) as between-subject factors. To allow a straightforward testing of possible interactions between the service channel and participation conditions, the study design is crossed instead of nested. That is, each level of each factor crosses with all levels of the remaining factors. This research design offers a number of advantages: First, the factorial design allows testing combinations of treatments more easily (Kirk 1982) while also requiring smaller sample sizes than a series of single-factor studies (Maxwell and Delaney 2004; Shadish, Cook, and Campbell 2002). Second, the between-subjects design ensures independent observations and lowers the risk of demand artifacts (Maxwell and Delaney 2004). Third, the experimental design in general allows a straightforward examination of causal relationships through the active manipulation of a treatment and a subsequent measurement of the effect.

Participants. I acquired all subjects for this study online through the crowd-sourcing platform "Amazon's Mechnical Turk".[9] An online survey was programmed using Unipark software and its link was distributed to participants located in the U.S. through the platform. To ensure variance in the demographic profile of respondents, the online survey was programmed to stratify by age, gender, and level of educational attainment. Following the suggestions by Oppenheimer, Meyvis, and Davidenko (2009), all participants had to successfully complete an instructional check to ensure they were reading instructions correctly and carefully. Appendix 3.1 presents a detailed illustration of this instructional check.

A total of 1'243 subjects participated in this experiment. As participants received payment for their participation (0.7 USD per person), I employed additional checks to control for the quality of their responses. Accordingly, I deleted participants who took a dubious amount of time to finish the survey (< 4.5 minutes or > 25 minutes; study average = 10.7 minutes) as well as multivariate outliers from further analysis. As both analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA) are sensitive to outliers, the identification of

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[9]   Mechanical Turk is gaining increasing attention and acceptance for social science research, as it offers researchers fast access to research subjects and a cost-efficient execution of studies (Bohannon 2011). Moreover, predictions are that „the use of MTurk subjects will eventually become mainstream" (Bohannon, 2011, p. 307). Subjects of this online platform, however, tend to be younger, highly educated, and more ideologically liberal than the general U.S. population (Paolacci, Chandler, and Ipeirotis 2010; Bohannon 2011). Research nonetheless notes that American Mechanical Turk subjects are representative of the population of U.S. Internet users (Ross et al. 2010) and thus tend to be more representative of the general U.S. population than commonly used student samples (Paolacci, Chandler, and Ipeirotis 2010). Although many researchers remain skeptical of this new platform, researchers have already replicated a number of classical experiments through Mechanical Turk (Bohannon 2011).

critical observations is important (Warner 2013). For the identification of multivariate within-cell outliers, I relied on Stata's bacon algorithm (Billor, Hadi and Velleman 2000), which identifies observations as outliers when their Mahalanobis distance exceeds the 15th percentile of the X^2 distribution of the overall sample.

The final sample contains data from 1'192 participants, 53.44% of whom are female. The mean age of the participants is 35.74 years (SD = 12.76) with values ranging from 16 to 70 years. The education level of participants is slightly better than the general American population. Accordingly, 33.89% of participants have completed a Bachelor's degree. Participants of this study are not only located in the United States, but are mostly (98.41%) born and raised here. Most participants (27%) report to have an annual net income level between 40,000 and 69,999 USD, followed by another 25% of participants with an income level ranging from 20,000 to 39,999 USD. Approximately ten percent of participants use Mechanical Turk as their main source of income. Table 3.1 summarizes the sample characteristics of the entire sample and within each quality condition. Appendix 3.2 provides a more detailed sample description.

Table 3.1: Study 1 - Descriptive Sample Statistics.

	Overall	Low-Quality Condition	Medium-Quality Condition	High-Quality Condition
N	1192	401	392	399
M (SD)$_{age}$ in years	35.7 (12.8)	35.3 (12.7)	35.8 (12.5)	36.1 (13.1)
Range$_{age}$ in years	16 - 70	18 - 70	16 - 67	18 - 69
% female	53.4	49.1	52.3	58.9
% Bachelors degree	33.9	32.9	36.5	32.3

Stimulus Materials. The present study relies on different service scenarios, which represent twelve experimental conditions. Prior to the main experiment, I tested every scenario ($N = 78$) for believability and realism ("Overall, I find the scenario believable", "I could imagine myself in the situation", and "The situation described earlier was realistic") using a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Results indicate that the majority of respondents consider the scenarios believable (mean of believability score $M = 5.78$). Besides an assessment of the adequacy of the experimental manipulations, the pretest also served as an evaluation of the

psychometric properties of the measures applied in this study. Before this pilot study, 12 marketing experts also checked the overall quality of the stimulus material and the questionnaire. Following their suggestions, scenarios were slightly shortened. Findings of the pretest showed no need for further changes for the main experiment.

The scenarios of this study describe a service encounter at a fictitious car rental agency called "EasyDrive". Instead of using a third-person perspective, participants were asked to imagine themselves in the situation described. While the choice of a first-person perspective poses the threat of increased social desirability effects, research also indicates that psychological responses such as a self-serving bias are less pronounced when adopting an "observer" stance (Campbell and Sedikides 1999; Jones and Nisbett 1972). This study thus relied on an "actor" perspective and used additional measures to control for social desirability. These additional measures are explained below.

When crafting the scenarios special attention was given to the independence of all experimental conditions. Thus, the wording of the scenarios is as similar as possible. All participants read that they are at a car rental agency to rent a car for a couple of days. In the self-service condition, customers use a touch-screen kiosk; in the personal service condition, customers use a rental counter. To keep the level of participation independent from the service channel, I always describe high levels of participation as a customer's extra effort to give detailed information about needs and preferences and examining the details of the recommended service offer, whereas customers only provide very basic information about their needs when the level of participation is low. Similarly, I manipulated the quality of the service outcome independent of the service channel and participation level. In the high-quality condition, participants thus always read that the service is fast, cheap, and highly reliable in terms of the high quality of the rental car; in the low-quality condition, the service is slow, expensive, and disappointing in terms of the quality of the rental car. Table 3.2 presents details of the experimental manipulations employed in this study.

Table 3.2: Study 1 - Experimental Manipulations.

Service Channel

Self-Service Channel	Personal Service Channel
You are at a car rental agency called EasyDrive. Inside the agency, you head to an available touch-screen kiosk to rent a car for the next five days. The kiosk welcomes you to EasyDrive.	You are at a car rental agency called EasyDrive. Inside the agency, you head to an available rental counter to rent a car for the next five days. Jamie, the employee currently on duty, welcomes you to EasyDrive.

Particiaption Level

Low	
As you do not want to be highly involved in the whole rental process, you participate as little as possible and enter just the very basic information about your rental needs and wishes and leave the search for suitable rentals completely up to the kiosk. Out of the offers that match your search criteria, the kiosk recommends you EasyDrive's most popular offer, an intermediate car with a carefree package. Without making the effort of going through all the details of this rental, you decide to take this offer and finalize the rental.	As you do not want to be highly involved in the whole rental process, you participate as little as possible and give Jamie just the very basic information about your rental needs and wishes and leave the search for suitable rentals completely up to Jamie. Out of the offers that match your search criteria, Jamie recommends you EasyDrive's most popular offer, an intermediate car with a carefree package. Without making the effort of going through all the details of this rental, you decide to take this offer and finalize the rental.

High	
As you want to be involved in the whole car rental process, you participate as much as possible and enter very detailed information about your rental needs and wishes. After you have informed yourself about the different car classes and add-on packages, you select the two offers you wish to take a further look into. Out of these two, the kiosk recommends you EasyDrive's most popular offer, the intermediate car with a carefree package. Once you have gone through the effort of informing yourself about all the details of this rental, you decide to take this offer and finalize the rental.	As you want to be involved in the whole car rental process, you participate as much as possible and give Jamie very detailed information about your rental needs and wishes. After you have informed yourself about the different car classes and add-on packages, you tell Jamie the two offers you wish to take a further look into. Out of these two, Jamie recommends you EasyDrive's most popular offer, the intermediate car with a carefree package. Once you have gone through the effort of informing yourself about all the details of this rental, you decide to take this offer and finalize the rental.

Outcome Quality

High
At EasyDrive's rental lot, you realize that you have been at the agency for less than 5 minutes and now receive a rental car that is a clean, brand-new convertible. Later, you also discover that you paid 80 dollars less for the carefree package, than you would have by adding all included items to the rental separately.

Medium
At EasyDrive's rental lot, you realize that you have been at the agency for about 20 minutes and now receive a rental car that is in a fair condition and clean. Later, you also discover that you paid the same for the carefree package, than you would have by adding all included items to the rental separately.

Low
At EasyDrive's rental lot, you realize that you have been at the agency for more than 60 minutes and now receive a rental car that is completely worn-out and dirty. Later, you also discover that you paid 80 dollars more for the carefree package, than you would have by adding all included items to the rental separately.

Procedure. After a short introduction and a screening of the participants' demographic information, respondents were prompted to give a short insight into their service preferences and expectations, serving as a baseline in the upcoming analyses. Before participants could be randomly assigned to one of the twelve experimental conditions[10] they had to pass an instructional check. This check was employed to ensure that participants read the instructions correctly. In vignette research, where manipulations rely on slight differences in the descriptions of the scenarios this is of utmost importance. To avoid a systematic sampling bias, however, participants who failed to follow the instructions the first time were allowed to try again as proposed by Oppenheimer, Meyvis, and Davidenko (2009). All remaining participants continued to one of the twelve experimental conditions. The random assignment used Unipark's random trigger with the equal distribution option to ensure fairly equal cell sizes. After reading the scenario, participants were asked about their perceptions of the service quality and the level of participation in the respective scenario. Additionally, respondents needed to indicate whether they were interacting with a person or a machine during the described service encounter. These questions served to check the success of the manipulations in the experimental conditions. In a next step, I collected perceptual dependent measures, such as the participants' satisfaction with the provider and the perceived locus of responsibility for the outcome (i.e., attribution to self, other, or chance). Next, I asked participants to answer additional questions about themselves to serve as possible covariates in the upcoming analyses. Additionally, I employed measures to control for the participants' social desirability in the final section of this questionnaire. Finally, respondents needed to answer some last demographic information.

Dependent Variables. I used existing measures for all dependent variables of this study. Specifically, I measured satisfaction with the provider using the three items adopted from Tsiros, Mittal, and Ross (2004; e.g., "I feel satisfied with ____"). Cronbach's alpha indicates strong internal consistency for this measure ($\alpha = .99$), which is supported by results of confirmatory factor analysis (composite reliability = .99). To capture the participants' locus of attribution, I relied on Weiner's (1986) classification scheme. Thus, participants had to indicate how much they themselves, the service provider, or chance was responsible for the described service outcome. Due to the complexity of attributional processes, the participants' attribution to

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[10] In experimental settings, participants should be randomly assigned to treatment conditions. This procedure enhances the internal validity of the study through a minimization of possible confounds between individual (group) differences and exposure to different treatments (Warner 2013).

themselves, to the provider, or to chance was measured with single items. All items were measured with a 7-point scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree)*.

3.4 Analysis and Results

Baseline. Social desirability was examined following the procedure recommended by Steenkamp and colleagues (2010). In contrast to the commonly used social desirability measures by Crowne and Marlowe (1964), this new approach measures both, deliberate impression management and unconscious self-deception, which both may lead to socially desirable responses. The original scale of *self-deception* and *impression management* consists of ten items each. For the purpose of this study, these scales were shortened to only four items each (random selection from the pool of items by Steenkamp, de Jong, and Baumgartner 2010). Cronbach's alpha indicates moderate internal consistency for the social desirability measures (*impression management*: four items, α = .59; *self-deception*: three items, one deleted, α = .52).

Participants' tendencies to provide socially desirable responses do not differ significantly between experimental conditions (SDR; *self-deception*: $F(11, 1180) = 1.50$, $p = .13$; *impression management*: $F(11, 1180) = 1.28$, $p = .23$). Following the procedure proposed by Steenkamp, de Jong, and Baumgartner (2010), I also tested the impact of SDR measures on the dependent variables *satisfaction*, *attribution to firm*, *self,* and *chance*. Results of individual regression analyses do not show relevant relationships between the SDR measures on the dependent variables. The impact of both *self-deception* and *impression management* constructs on dependent variables were neither greater $\beta = 0.2$ (standardized regression coefficient) nor did they have a statistically significant effect.

Manipulation Checks. Analyses of the manipulation checks demonstrate that all three manipulations are successful. Participants assess the service to be poor in low-quality condition ($M = 1.67$), mediocre in the medium-quality condition ($M = 4.18$), and high in the high-quality condition ($M = 6.44$; $F(2, 1189) = 2974.99$, $p < .001$).[11] Likewise, perceived participation is low

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[11] The success of this study's outcome quality is measured with two items adapted from Zeithaml, Berry, and Parasuraman (1996) and Tsiros, Mittal, and Ross (2004). The items are measured on a semantic differential scale asking participants to

in the low-participation condition ($M = 2.08$) and high in the high-participation condition ($M = 5.79$; $F(1, 1189) = 3222.11$, $p < .001$).[12] All participants remember their counterpart in the service scenario (i.e., human vs. machine) correctly.[13] Additionally, results do not cause any concern for a possible confound between participation and service channel. Participants in the self-service condition do not perceive their participation levels to be significantly different from their personal-service counterparts ($M_{PSC} = 3.83$; $M_{SST} = 3.96$, $F(1, 1189) = 1.11$, $p = .29$).

Analysis Approach. To examine the research hypotheses empirically, I conducted a series of analyses: First, in order to evaluate the differences between experimental treatments on satisfaction judgments and attribution, I relied on a MANOVA to examine the effect of the experimental manipulations on all dependent variables collectively and individual ANOVAs to examine the effect on each dependent variable separately. Both estimation methods are the most common approaches for analyzing experimental data (Hair et al. 2010).

Second, to gain confidence in the mediating effect of attribution on satisfaction, I relied on the currently recommended procedure by Preacher and Hayes (2004, 2008). Instead of the traditionally-used causal-steps approach by Baron and Kenny (1986), Preacher and Hayes (2004, 2008) recommend using bootstrapped standard errors and confidence intervals to examine the significance of a mediating effect *a x b*. The approach by Baron and Kenny (1986) has received increasing criticism in current research (e.g., Preacher and Hayes 2004, 2008; MacKinnon et al. 2002; Zhao, Lynch, and Chen 2010), based on the fact that the Sobel's *z*-test (Sobel 1982) relies on a normal sampling distribution of the indirect effect. Since the sampling distribution of the effect *a x b* is most likely to be skewed and kurtotic, however, the corresponding *p*-values of Sobel's *z*-test are not reliable (MacKinnon et al. 2002; Zhao, Lynch, and Chen 2010). Bootstrapping mitigates this problem by generating an empirical sampling distribution of *a x b* from the original sample. Most basically, bootstrapping a sampling distribution means drawing a sample with *n* cases from the original sample and calculating the values of both direct and

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rate the quality of the service (e.g., 1- extremely poor to 7- extremely good). The scale provides sufficient internal consistency ($\alpha = .96$).

[12]   Participation is measured with three items adapted from Chan, Yim, and Lam (2010) and Ennew and Binks (1999). The questions include "I had a high level of participation in the service process", "I put a lot of effort into the service process", and "I revealed a lot of information about my needs and wishes during the service process". All items are measured on 7-point scale with the anchors of *strongly disagree* and *strongly agree*. The scale provides sufficient internal consistency ($\alpha = .95$)

[13]   I adopted the recognition check from Yen, Gwinner, and Wanru (2004).

indirect paths for this sample. This procedure is repeated a number of times (usually ranging from at least 1,000 up to 5,000; Preacher and Hayes 2008; Warner 2013). The resulting empirical sampling distribution can then be used to estimate the standard errors and the confidence interval of the indirect effect. Given the fact that the resulting distributions of *a x b* values are often asymmetrical, I also followed the recommendation to use bias-corrected and percentile confidence intervals (e.g., Preacher and Hayes 2008).

Model Assumptions. (M)ANOVAs underlie the assumptions of normality, homogeneity of variances, and interdependence of observations between groups (e.g., Warner 2013). While the between-subjects design of this study assures independence of observations, I conducted additional tests to estimate any violations to the assumptions of normality and homogeneity of variances.

To examine if the normality assumption has been met, I employed the Shapiro-Wilk test (Royston 1983) and the Stata module omninorm (Baum and Cox 2009) to calculate an omnibus test for univariate and multivariate normality. All test statistics are significant at the .05 level, indicating a possible violation of the normality assumption. However, as significant levels are reached more easily for larger sample sizes, I ran additional analyses to examine the individual levels of skewness and kurtosis of the dependent variables as suggested by Warner (2013). All dependent variables have skewness levels below the acceptable threshold of 3 and kurtosis levels below the threshold of 10 in each quality condition (Kline 2005). As both ANOVA and MANOVA are robust to minor violations of the normality assumption if sample sizes are large enough (Maxwell and Delaney 2004, p. 112), I did not transform the data for the upcoming analyses.

To test the assumption of homogeneous variances, I employed Levene's test (Levene 1960) and more robust variants by Brown and Forsythe (1974), which use a 10%-trimmed mean and the median rather than the mean. Results of these tests indicate that homogeneity of variances can mostly be assumed. However, especially in the low- and high-quality condition, test statistics are statistically significant, indicating a violation of the homogeneity assumption. To assess whether variances are too unequal in these instances to continue, I also examined the variance-ratio of these cases. Results show that the variance-ratios do not exceed the threshold of 2 (Field 2009) in

all but two instances. Only satisfaction ($\sigma^2_{largest}$ / $\sigma^2_{smallest}$ = 3.54) and attribution to the firm ($\sigma^2_{largest}$ / $\sigma^2_{smallest}$ = 2.12) exceed the recommended threshold in the low-quality condition. While a violation of the homogeneity of variances can alter the risk of committing a Type I error (i.e., nominal alpha levels do not give an accurate picture about the actual risk of a Type I error) and decrease statistical power (i.e., alter the risk of a Type II error), research suggests that this violation is less critical when cell sizes are rather balanced (Howell 2007). Hair et al. (2010) advise that the ratio of the largest to the smallest sample cell size should not exceed 1.5. With cell sizes in this study ranging from 93 to 106, minor violations of the assumption of homogeneous variances across a few experimental conditions should not cause serious concern. However, to estimate the risk of committing a Type I error with the given data, I also examined the inflation factor for a Type I error in the dependent variables *satisfaction* and *attribution to firm* for the low-quality level using Stata's simanova module. Results indicate a minor inflation, with maximum inflation levels reaching less than one percentage point. That is, effects estimated to be significant at a .05 level, would be at a .051 level for *satisfaction* and at a .054 level for *attribution to firm*. Thus, the fairly balanced design of this study seems to alleviate minor problems of variance heterogeneity.

Results. I first performed a full 2 (self-service vs. personal service) x 2 (participation low vs. high) MANOVA on each quality level (low, medium, high) to assess the effects on all dependent measures collectively. *Satisfaction* with the provider and *attribution to firm, chance*, and *self* served as the dependent measures. Table 3.3 summarizes the corresponding results. Results show that all four multivariate differences measures (i.e., Pillai's trace, Hotelling's trace, Wilk's lambda, and Roy's largest root) are significant at $p < .05$ in the high- and low-quality conditions for the independent variable *service channel*. The dependent variables do not differ significantly across service channels in the medium-quality condition. However, dependent measures vary significantly ($p < .05$) across the different levels of customer *participation* in all three quality-conditions. The interaction effects of *service channel* and *participation* are not statistically significant in any quality condition.

Table 3.3: Results of MANOVA and Individual ANOVAs.

Condition	Dependent Variable	Service Channel		Participation		Participation x Service Channel	
		d.f.	F-Value (*p*-value)	d.f.	F-Value (*p*-value)	d.f.	F-Value (*p*-value)
Low-Quality (***n* = 401**)	Combined Effect	1	**4.18 (.003)**	1	**47.35 (.000)**	1	0.94 (.439)
	Satisfaction	1	**3.92 (.048)**	1	**16.37 (.000)**	1	0.11 (.736)
	Attribution - Firm	1	2.87 (.091)	1	**100.08 (.000)**	1	2.14 (.142)
	Attribution - Chance	1	**12.72 (.000)**	1	1.69 (.194)	1	0.79 (.373)
	Attribution - Self	1	**5.39 (.021)**	1	**159.65 (.000)**	1	0.41 (.523)
Medium-Quality (***n* = 392**)	Combined Effect	1	0.45 (.774)	1	**9.31 (.000)**	1	0.68 (.605)
	Satisfaction	1	1.50 (.220)	1	**9.46 (.002)**	1	0.96 (.327)
	Attribution - Firm	1	0.19 (.662)	1	**16.69 (.000)**	1	1.56 (.212)
	Attribution - Chance	1	0.01 (.932)	1	1.01 (.316)	1	0.33 (.569)
	Attribution - Self	1	0.32 (.573)	1	**23.23 (.000)**	1	0.41 (.524)
High-Quality (***n* = 399**)	Combined Effect	1	**6.17 (.000)**	1	**46.18 (.000)**	1	1.10 (.358)
	Satisfaction	1	**4.18 (.042)**	1	0.02 (.892)	1	0.32 (.571)
	Attribution - Firm	1	**7.77 (.006)**	1	**36.27 (.000)**	1	0.20 (.651)
	Attribution - Chance	1	2.78 (.096)	1	**11.49 (.001)**	1	2.35 (.126)
	Attribution - Self	1	**15.33 (.000)**	1	**162.34 (.000)**	1	2.38 (.123)

Note: Effects significant at $p < .05$ in bold.

Given the significance of the multivariate test, I investigated the importance of each dependent variable with individual univariate tests. Table 3.3 also summarizes the resulting univariate *F*-statistics. Table 3.4 details the mean values and the results of mean comparisons for the dependent variable *satisfaction* for each quality level. I will review the hypotheses and summarize the results for each quality level in the following subsections.

Table 3.4: Means, Standard Deviations, and Mean Comparisons for Satisfaction.

| Participation Level | | Service Channel | | | | | | Personal vs. Self-Service | High vs. Low Participation | Personal vs. Self-Service (Low Part. Cond.) | Personal vs. Self-Service (High Part. Cond.) |
| | | Personal Service | | Self-Service | | Total | | | | | |
		Mean	SD	Mean	SD	Mean	SD	$F(1, df_w)^a$ p-value	$F(1, df_w)^a$ p-value	$F(1, df_w)^a$ p-value	$F(1, df_w)^a$ p-value
Low-Quality Condition	**Low**	1.47	0.69	1.58	0.77	1.52	0.74				
	High	1.19	0.41	1.34	0.63	1.26	0.54	(3.92)	(16.37)	(1.35)	(2.69)
	Total	1.33	0.59	1.45	0.71	1.39	0.66	.048	.000	.245	.101
Med.-Quality Condition	**Low**	4.18	1.53	4.56	1.73	4.37	1.64				
	High	3.83	1.64	3.87	1.76	3.85	1.70	(1.50)	(9.46)	(2.57)	(0.03)
	Total	4.02	1.59	4.23	1.77	4.12	1.69	.220	.002	.109	.866
High-Quality Condition	**Low**	6.63	0.55	6.43	0.88	6.53	0.73				
	High	6.59	0.71	6.48	0.81	6.54	0.76	(4.18)	(0.02)	(3.43)	(1.08)
	Total	6.61	0.64	6.46	0.84	6.54	0.74	.042	.892	0.064	.299

Notes: [a] df_w = 397, 388, 395 for low-, medium-, and high-quality conditions respectively; df_w - degrees of freedom within group.

Results for Poor-Quality Outcomes

In H1, I propose that self-service customers will be more satisfied with a provider than personal service customers when the service outcome is poor. In support of this hypothesis, results reveal that participants are significantly more satisfied with the provider when using a self-service technology (SST) than when using a personal service channel (PSC). While these channel differences are more pronounced when the customer's level of participation is high, results do not show a significant interaction effect of the *service channel* and *participation level* as proposed in H3. As Table 3.4 illustrates, results are in the expected direction, however.

In H2, I explain that these channel differences arise due to customers' attribution of responsibility. In particular, I assume that self-service customers attribute less responsibility to the service provider (H2a), more responsibility to external, situational factors (H2b), and more to themselves (H2c) when the quality of a service outcome is poor. In support of these propositions, results reveal that participants in the self-service condition attribute more responsibility to chance (H2b: $M_{SST} = 2.30$, $M_{PSC} = 1.87$, $F(1, 397) = 12.72$, $p < .001$) and to themselves (H2c: $M_{SST} = 3.42$, $M_{PSC} = 3.07$, $F(1, 397) = 5.39$, $p = .02$) than participants in the personal-service condition. These results are in support of hypotheses H2b and H2c. Regarding customers' attribution to the service provider, however, results provide only marginal support for significant channel differences. Nonetheless, effects are in the proposed direction (H2a: $M_{SST} = 5.33$, $M_{PSC} = 5.56$, $F(1, 397) = 2.87$, $p = .09$).

Results for Neutral-Quality Outcomes

In H4, I state two alternative hypotheses. In particular, I propose that customers in the self-service condition may be more satisfied with their service provider (H4a) due to self-anchoring or less satisfied (H4b) due to egocentric attributions. As illustrated in Table 3.3 and Table 3.4, results do not reveal any significant satisfaction differences between self-service and personal service conditions. Contrary to H5, the channel differences are also not more pronounced in the high-participation condition. Instead, results demonstrate that customers are more satisfied with the service provider in the self-service condition than in the personal-service condition. While the direction of the effect is consistent for both high- and low-participation levels, it is more pronounced in the low participation condition (low-participation condition: $M_{SST} = 4.56$, $M_{PSC} =$

4.18, $F(1, 388)= 2.57$, $p = .11$; high-participation condition: $M_{SST} = 3.87$, $M_{PSC} = 3.83$, $F(1, 388) = 0.03$, $p = .87$). The interaction effect of *participation* and *service channel* is not statistically significant. Both, H4 and H5 are thus not supported.

Results for High-Quality Outcomes

In H8, I propose that self-service customers will be less satisfied with a provider than personal service customers when the quality of the outcome is high. Results fully support this notion. As summarized in Table 3.3 and Table 3.4, participants are more satisfied with the provider in the personal service condition ($M = 6.61$) than in the self-service condition ($M = 6.46$). I explain these differences with customers' differential attribution to themselves, the provider, or chance. In particular, I hypothesize that customers will attribute more responsibility to the provider (H6a) and less to themselves (H6b) when using a personal service instead of a technology-based self-service. I do not expect to find that customers differ in their attribution to chance between service channels when service-quality is high. In support of H6a, results reveal that self-service customers attribute significantly less responsibility to the service provider than personal service customers when service quality is high ($M_{SST} = 5.57$, $M_{PSC} = 5.88$, $F(1, 395) = 7.77$, $p = .01$). Instead, self-service customers attribute more responsibility to themselves than personal service customers ($M_{SST} = 3.92$, $M_{PSC} = 3.38$, $F(1, 395) = 15.33$, $p < .001$). This is in support of H6b. As expected, results do not provide full statistical support that participants' assignment to chance differs between service channels ($M_{SST} = 2.53$, $M_{PSC} = 2.77$, $F(1, 395) = 2.78$, $p = .10$).

In H7, I also propose that customers will attribute less responsibility to the provider (H7a) and more to themselves (H7b) when actively co-producing the service. In support of H7a, results show that participants assign more responsibility to the provider in the low-participation condition ($M = 6.07$) than in the high-participation condition ($M = 5.38$, $F(1, 395) = 36.27$, $p < .001$). Instead, participants in the high-participation condition attribute more responsibility to themselves ($M = 4.53$) than participants in the low-participation condition ($M = 2.40$, $F(1, 395) = 162.34$, $p < .001$). These results fully support H7b. Although not hypothesized, results also demonstrate that customers assign more responsibility to chance in the low-participation condition ($M = 2.90$) than in the high-participation condition ($M = 2.40$, $F(1, 395) = 11.49$, $p < .001$).

Mediating Effects. As noted previously, I believe that the customers' differential attributions give rise to the differences in satisfaction judgments between self-service and personal service customers. Following previous hypotheses, I thus assume that *attribution to the firm*, *self*, and *chance* serve as mediators of the *service channel – satisfaction* link. Following the recent recommendations of Preacher and Hayes (2004, 2008) and Zhao, Lynch, and Chen (2010), I examine the multiple mediation of *attribution to firm*, *chance* and *self* simultaneously using seemingly unrelated regressions, followed by a bootstrap module (5,000 samples) to construct confidence intervals (CIs) for the total and specific indirect effects.[14] Instead of using separate simple mediator models, this approach allows me to examine the total effect of attribution and the contribution of individual (loci of attribution) mediators, while reducing parameter bias due to omitted variables (Preacher and Hayes 2008). Table 3.5 summarizes the resulting estimates and 95% confidence intervals. As can be seen, *attribution to firm* is the only statistically significant mediator of the *service-channel - customer satisfaction* relationship in the high-quality condition. In the low-quality condition, results indicate that both, *attribution to chance* and *attribution to self* are significant mediators, since their (bias-corrected) 95% confidence intervals do not include zero. Also, the total effect of attribution is statistically significant in the low-quality condition, which underlines the importance of attributional searches for negative events.

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[14]   This procedure parallels the approach proposed in the SPSS and SAS macros provided by Preacher and Hayes (2004, 2008).

Table 3.5: Tests of the Multiple Mediation of Attribution to Firm, Chance, and Self.

	Observed Coefficient	Bias	Product of Coefficients SE	Z	Percentile 95% CI Lower	Upper	BC 95% CI Lower	Upper	BCa 95% CI Lower	Upper
Low-Quality Condition										
Attribution - firm	0.0110	0.0002	0.0075	1.46	-0.0012	0.0282	-0.0003	0.0302	-0.0004	0.0301
Attribution - chance	**0.0193**	**-0.0001**	**0.0073**	**2.65**	**0.0070**	**0.0348**	**0.0077**	**0.0365**	**0.0077**	**0.0365**
Attribution - self	**0.0056**	**0.0000**	**0.0042**	**1.33**	**-0.0009**	**0.0155**	**0.0000**	**0.0178**	**0.0001**	**0.0180**
TOTAL	**0.0359**	**0.0002**	**0.0116**	**3.08**	**0.0151**	**0.0602**	**0.0156**	**0.0608**	**0.0156**	**0.0608**
High-Quality Condition										
Attribution - firm	**-0.0165**	**-0.0001**	**0.0078**	**-2.12**	**-0.0342**	**-0.0038**	**-0.0368**	**-0.0049**	**-0.0367**	**-0.0049**
Attribution - chance	0.0084	0.0002	0.0078	1.37	-0.0012	0.0226	-0.0002	0.0252	-0.0003	0.0252
Attribution - self	-0.0015	0.0001	0.0077	-0.19	-0.0170	0.0143	-0.0172	0.0141	-0.0171	0.0141
TOTAL	-0.0096	0.0002	0.0119	-0.81	-0.0336	0.0135	-0.0341	0.0132	-0.0338	0.0133

Notes: SE - standard error; CI - confidence interval; BC - bias corrected; BCa - bias corrected and accelerated; 5,000 bootstrap samples. Indirect effect is statistically significant if the confidence interval does not include zero; significant effects highlighted in bold. Participation served as covariate.

Alternative Explanations. Previous research suggests that customers are overly optimistic or positive with <u>anything</u> that is connected to their self.[15] That is, the labor and effort customers put into something changes the way they perceive and evaluate it. Following this notion, it is plausible that self-service customers do not only evaluate the service provider differently, but also perceive service outcomes more positively than personal service customers (as they have put more of their "self" into the process). I tested this assumption with an ANOVA for each quality condition. *Satisfaction with the <u>outcome</u>* served as the dependent variable, *service channel* and *participation level* served as the independent measures. Under the assumption of a self-anchoring effect, self-producing (i.e., self-service) customers should always evaluate a service outcome more positively than their personal service counterparts. Results, however, did not reveal any significant mean differences in outcome satisfaction between self-service and personal service customers. However, the effects are in the proposed direction for low and medium outcomes (low quality: $M_{SST} = 1.42$, $M_{PSC} = 1.37$, $F(1, 401) = 0.56$, $p = .456$; medium quality: ($M_{SST} = 4.33$, $M_{PSC} = 4.12$, $F(1, 392) = 1.79$, $p = .182$; high quality: $M_{SST} = 6.56$, $M_{PSC} = 6.65$, $F(1, 399) = 1.69$, $p = .195$). Nonetheless, this current study could not find statistical support for the assumption of a self-anchoring effect of self-producing, self-service customers.

Self-service and personal service customers could also differ in their expectations towards the service channel and hence evaluate a service outcome differently. While expectations did not differ significantly across experimental conditions (due to random assignment), results indicate that the participants generally expect a higher level of service quality when using a personal service instead of a technology-based self-service ($M_{SST} = 4.81$, $M_{PSC} = 5.65$; $t(1192) = -13.84$, $p < .001$).

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[15]   In a recent study on the psychological implications of self-production, Troye and Supphellen (2012) find that self-producing customers adjust their sensory perceptions of an outcome that matches the positive view they usually hold of themselves. Specifically, customers who actively "produce" or refine a meal based on a ready-made dinner-kit, perceive both, the income product as well as the final outcome (i.e. meal) in a more positive light due to self-anchoring. What Troye and Supphellen (2012) call the "I Made It Myself" effect has in fact been demonstrated in various other settings. For instance, according to the so-called "egg theory", evaluations of ready-made cake-mixes increase once housewives need to add additional ingredients, such as eggs, to the mix (Ariely 2010). In a similar vein, Mochon, Norton, and Ariely (2012) term the "IKEA effect" to refer to a customer's over-evaluation of an outcome that customers "produce" or assemble to a large part – such as IKEA furniture.

While research suggests that confirmation of expectations determines satisfaction[16] (Oliver 1980), it also shows that expectations can change perceptions (Boulding et al. 1993). Following the notion of a confirmation bias (e.g., Devine, Hirt, and Gehrke 1990), customers may selectively seek information that matches their expectations and, in consequence, confirm their expectations despite information that would suggest otherwise. The customers' prior expectations towards both, personal and self-service channels could thus influence their perceptions of a service outcome and the service provider.

In order to test whether or not participants engage in a confirmation bias when evaluating a service encounter, I conducted two median-splits on the channel expectation scales[17] to form groups with high versus low expectations towards SSTs and high versus low expectations towards personal services, respectively. Next, I conducted individual ANOVAs for self-service and personal service conditions separately. The two expectation groups served as the independent variables in the analysis. Overall, results indicate that participants with high expectations towards a self-service tend to evaluate the outcome of a self-service encounter better than participants with lower expectations towards SSTs. This indication for a confirmation bias is evident across all three quality conditions; however, differences are only statistically significant in the high-quality condition ($M_{\text{SST-low}} = 6.42$, $M_{\text{SST-high}} = 6.69$, $F(1,184) = 6.23$, $p = .01$). In personal service encounters, participants do not display such a confirmation bias. Instead, results reveal that, in the case of a poor service outcome, customers are more dis<u>satisfied</u> with the outcome when prior expectations towards the personal channel are <u>high</u> ($M_{\text{PSC-low}} = 1.48$, $M_{\text{PSC-high}} = 1.24$, $F(1, 190) = 6.84$, $p = .01$). The effect reverses, although non-significantly, for high-quality outcomes. Taken together, results thus partly support the notion that customers use their expectations as an anchor that shapes their service perceptions – especially when they are enthusiastic self-service users. Appendix 3.3 and 3.4 provide detailed results on the mean differences in outcome satisfaction.

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[16]   According to expectancy-disconfirmation theory (Oliver 1980), satisfaction forms through a customer's comparison of prior expectations to actual performances. This judgment can either result in satisfaction if the actual performance confirms expectations (or even *delight* if positively disconfirmed), or dissatisfaction if the actual performance negatively disconfirms the expectations (Oliver and DeSarbo 1988). A customer's individual expectation level forms a baseline around which judgments are made: If expectations are high (low), satisfaction judgments will be equally high (low) when these are confirmed (Oliver and DeSarbo 1988).

[17]   I measured the expectation towards the self-service and the personal service channel with one item each, which I adopted from Dabholkar (1996). The item asks participants to indicate their expectations in terms of the overall expected quality of the particular service channel on a semantic differential scale ranging from 1 (*low quality*) to 7 (*high quality*).

3.5 Summary and Discussion of Findings

This study is the first empirical investigation of customers' differential responses to technology-based self-service encounters and personal service encounters. It is also the first study to provide evidence that the person-sensitivity bias extends to the service domain. As implied by theory, this research shows that customers evaluate personal services in more extreme manners than technology-based self-services. In particular, results demonstrate that personal service customers are less satisfied with the provider when outcomes are poor and more satisfied with the provider when outcomes are good than self-service customers.

This research further demonstrates that the customers' attribution of responsibility provides an important explanation why these channel differences arise. Accordingly, results reveal that self-service customers attribute more responsibility to themselves and to external, situational factors (e.g., chance) than their personal service counterparts when service outcomes are poor. This finding suggests two things: First, self-service customers are inherently more egocentric. That is, when using a self-service, customers are more aware of their own contributions to a service outcome and consequently also assume more responsibility for a poor outcome. Second, self-service customers also engage in self-defensive attributions. However, instead of blaming the service provider for the outcome, self-service customers seem to either be more aware of external, situational factors that might have contributed to a service or simply less inclined to infer a bad motive or poor motivation on behalf of the (self-service) technology. Personal service customers, on the contrary, seem to over-evaluate the service employee's motive to cause a particular outcome intentionally and consequently put more blame on the provider for a poor outcome. In the case of high-quality service outcomes, self-service customers attribute significantly less responsibility for the service outcome to the service provider, but more to themselves. This again provides strong support for the assumption that self-services strengthen egocentric – self – attributions of customers, whereas personal services increase attributions to the provider.

In line with previous research, this study also finds that inferences of causality, i.e. attributions, are especially important to explain customers' differential responses to self-service and personal service encounters when service outcomes are poor. When service outcomes are good, only the

customers' attribution to the firm seems to provide the foundation for the different effects of personal and self-service channels on customer satisfaction. This study does not find any significant channel effects when service outcomes are mediocre. According to previous research, this may reflect the fact that customers – or humans at large – do not think about these events very much because they are not surprising. In support of this notion, results of this study demonstrate that customers do not differ in their inferences of causality between self-service and personal service channels.

Results of this study further reveal, however, that the customers' expectations towards personal and self-service channels may provide an additional explanation for the channel effects uncovered in this research. Thus, customers generally expect to receive a higher service quality when using a personal service instead of a self-service. Interestingly, however, results demonstrate that personal service customers use their high expectations as a comparison standard around which satisfaction judgments are made. As a result, customers with high expectations are considerably less satisfied with a provider when the service quality of an outcome is poor. Self-service customers, on the contrary, continuously use their expectations to color their perceptions. That is, they seem to selectively seek information that matches or confirms their prior expectations. As a result, self-service customers with high expectations are generally more satisfied with a provider than customers with low SST expectations regardless of the service outcome.

Finally, in addition to the service channel, this study also demonstrates that the level of participation during the service process increases self-enhancing attributions. Accordingly, results show that customers attribute more responsibility for a positive outcome to themselves when they have actively participated in the service process. Interestingly, these differences do not translate into differential satisfaction judgments when service outcomes are good. However, when service outcomes are poor and mediocre, results show that satisfaction with the provider is significantly lower when participation is high. This suggests that participation drives ego-defensive attributions and responses. That is, customers, who have actively co-produced the service, degrade the service provider's work to maintain a positive view of themselves when service outcomes are poor.

3.6 Contributions and Implications

The findings of this study have several theoretical implications: First, this research contributes to the recent discussion on whether or not personal services are interchangeable. In particular, this study demonstrates when and how customers' psychological responses differ for self-service and personal service encounters. While previous research has mostly neglected the consequences of technology-based self-services and its differential impact on customer satisfaction in comparison to "old-fashioned" personal services, this research demonstrates that customers respond differently to service encounters when a machine instead of a person delivers them. In line with the person-sensitivity bias, results demonstrate that customers who use a personal service evaluate the service provider in more extreme manners. That is, these customers are more satisfied with a provider when outcomes are good, but also less satisfied when outcomes are bad. This study also provides a first insight into the underlying reasons for this effect. Accordingly, personal service customers seem to overestimate the service employees' power to control and intention to cause a particular outcome. As a result, personal service customers attribute more responsibility to the provider, whereas self-service customers continuously attribute more responsibility to themselves. This suggests that self-service customers are inherently more egocentric. That is, customers are more aware of their own and not the provider's contributions and thus more willingly accept responsibility for both successful and unsuccessful service outcomes when using a technology-based self-service instead of a personal service.

Second, and in a related manner, this research adds to extant literature on human-machine interactions. While previous research suggests that humans react similarly to humans and computers (Moon and Nass 1998), this study could not find full support for this notion in the context of technology-based self-services. According to Moon and Nass (1998), self-serving attributions usually found in human interactions, also extend to human-computer interactions. Previous research, however, only considers an individual's attribution to the self or the counterpart and completely disregards the option of external, situational factors, which might have contributed to an event. The present study demonstrates the importance of including such an option. Accordingly, this study supports the notion of previous research that humans engage in ego-defensive or ego-enhancing attributions. Results of this study further reveal, however, that causal inferences are more nuanced than suggested in previous research. Accordingly, the present

results suggest that humans find it hard to infer a bad internal motive on behalf of a technology when outcomes are poor. As a result, self-service customers display a greater tendency to blame external, situational factors such as chance for a poor outcome, while personal service customers place more blame on the provider. Customers hence always engage in ego-enhancing attributions; however, they blame different aspects for poor outcomes in human-human and human-machine interactions. This demonstrates that through the inclusion of external, situational factors, the present study helps advance our understanding of human-machine interactions in general and the customers' psychological responses to self-service encounters in particular.

Third, this research contributes to recent discussions on the impact of customer co-production on customer evaluations. Previous research offers two views on the effect of an active customer involvement on customer satisfaction. On the one hand, Bendapudi and Leone (2003) find that customer participation in service delivery strengthens self-serving attributions. As a result, customers are less satisfied with a provider no matter if the outcome is good or bad. On the other hand, Troye and Supphellen suggest that self-producing customers engage in self-anchoring when evaluating an outcome. As a consequence, customers always perceive an outcome better, when they are involved in its production. While it is reasonable to assume that this self-anchoring effect extends to the self-service domain, this study does not find full support for this proposition. Accordingly, results demonstrate that self-service customers do not perceive a service outcome in a more positive light per se. However, results also demonstrate that self-service customers use their prior expectations towards the channel as an anchor. In support of this assumption, this study shows that participants in a self-service scenario perceive the outcome as better and in a more positive light, when they have high expectations towards this service channel to begin with. This suggests that customers who have high expectations towards a technology-based self-service selectively seek information that confirms their prior expectations. This confirmation bias is consistent, however not always statistically significant, across quality conditions. Even more interestingly, personal service customers do not display such a consistent confirmation bias. On the contrary, when the outcome is poor or mediocre, participants who use a personal service perceive the service outcome to be worse when they have high expectations towards this channel to begin with. This suggests that personal service customers do not use their prior expectations as an anchor, but rather as a comparison standard against which they make satisfaction judgments. Taken together, these results suggest that the self-anchoring effect of self-producing customers

found in Troye and Supphellen (2012) does not directly translate to the service context. Instead of their own self, results of this study demonstrate that (self-service) customers use their expectations as an anchor for subsequent perceptions and evaluations.

With regard to the level of customer participation, the results of this study replicate and extend the findings by Bendapudi and Leone (2003), which suggest that customers, who participate in service production, engage in a self-serving bias. That is, customers that participate in the service production are more likely to credit themselves for good outcomes, while blaming the service provider for bad outcomes. While Bendapudi and Leone (2003) could demonstrate that participation increases the tendency to self-credit when outcomes are good (i.e., they find that satisfaction is lower), the authors do not find any differences between low and high participation customers in the case of a poor service outcome. The current study thus extends their research by demonstrating that highly participative customers are in fact more likely to blame the provider for a poor and even for an average outcome in both self-service and personal service settings.[18] This suggests that participation encourages ego-defensive customer behavior regardless of the service channel used.

These findings also have important managerial implications. Currently, more and more businesses actively "push" their customers to cheaper self-service channels (White, Breazeale, and Collier 2012). While business analysts underline the benefits of SSTs and expect this trend to continue (e.g., Castro, Atkinson, and Ezell 2010; VDC Research Group 2011), this research demonstrates that the replacement of service employees with self-service technologies is not only beneficial for the firm. Accordingly, self-service customers may be less satisfied with their service provider than personal service customers, even – and especially – when a good service is provided. Results reveal that these differences arise as self-service customers give the service provider less credit and instead attribute more responsibility to themselves for a good outcome. From a managerial point of view, these findings have two important implications: First, customer satisfaction can be enhanced through the provision of high-quality services in personal service

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[18]   Bendapudi and Leone (2003) further demonstrated that offering customers a choice to participate increases their focus on the service process and, in consequence, alienates the self-serving tendencies of high participation customers. While it is reasonable that the service channel could also diminish the self-serving bias induced through participation (self-service customers might also be more process-focused), this study does not find support for this notion. Thus, the interaction effect of participation and service channel does not have a significant impact on the participants' assignment of responsibility.

encounters. Second, strategies should be employed to demonstrate the service provider's input and effort in self-service encounters. By demonstrating that the technology is exerting effort, providers may be able to offset the customers' tendency to merely attribute outcomes to themselves and hence increase customers' satisfaction with the provider in self-service encounters. In support of this notion, Buell and Norton (2011) demonstrate that the mere illusion of labor in technology-based self-service encounters can increase customers' perceived value of the service.

Results of this research also demonstrate that customers who use a personal service are more dissatisfied with a service provider when service outcomes are poor. The present experiment highlights that customers assume that service employees, but not a self-service technology, cause (poor) outcomes intentionally. This has two implications for management: First, service providers should employ strategies, such as adequate employee training and empowerment, to avoid poor service outcomes in personal service encounters. Second, as service failures are inevitable, service employees should provide sufficient explanations when the service outcome falls below customer expectations. This research sheds light on the customers' differential attribution in self-service and personal service encounters and finds that personal service customers are less likely to consider external, situational factors that might have contributed to a poor outcome. Providing a sufficient explanation and pointing to situational factors that might have contributed to a poor service, may hence help attenuate customer dissatisfaction in personal service encounters.

Additional findings of this study also suggest that marketing communications may help improve the customers' satisfaction with technology-based self-service encounters. Accordingly, self-service customers use their prior SST expectations to color their subsequent perceptions. In particular, self-service customers seem to engage in a confirmation bias and thus only consider information that confirms their – high – prior expectations. This suggests that marketing managers could communicate the benefits of their SST offering more clearly to enhance customers' satisfaction with self-service encounters. Previous research provides additional support for this recommendation. Accordingly, Dabholkar and Bagozzi (2002) find that self-service encounters reduce customers' perception of waiting times. That is, customers, who self-scan items at the grocery store (at the "speedy" self checkout), continuously perceive to need less time to accomplish the task than customers who used the traditional personal service check-out.

This study is subject to a number of limitations that give rise to opportunities for future research. First, the present experiment relied on an online subject pool to recruit participants. Participants recruited online, however, tend to have a more favorable attitude towards new technologies and SSTs in general than the general population (Parasuraman 2000). This choice clearly limits the generalizability of the findings and should hence be addressed in future research.

Future research could also investigate the whole variety of technology-based self-services to see how distinct design features impact the customers' evaluation of these encounters differently. It is plausible, for instance, that an increased personalization (e.g., greet customer with name) of self-service encounters can offset many of the effects proposed and found in the present study. Similarly, found effects could differ for technology-based self-services that are separated from the providers' location (e.g., online banking) and SSTs where provider and customer are co-located (e.g., ATM machine at a local branch).

Next to the service design, future research could also examine the impact of the various service tasks on the customers' evaluation of self-service and personal service encounters. Previous research suggests that customers respond more compassionately to persons than to objects (Campbell 2007). As some tasks (e.g., critical tasks) are more likely to invoke emotions, it is also likely that the service task itself influences self-service and personal service customers' perceptions and evaluations differently.

Finally, researchers can explore if and how important customer characteristics affect the channel effects examined in this study. A customer's self-esteem, for instance, could increase self-serving attributions of customers in personal service encounters and egocentric attributions in self-service encounters. Similarly, previous research suggests that self-serving attributions are also less likely when customers have a high internal locus of control and when customers consider themselves more like a team with their counterpart (Campbell et al. 2000; Sedikides et al. 1998). This suggests that a customer's construal as an independent versus interdependent self or a collectivist versus individualist value orientation may reduce many of the channel effects found in this study.

3.7   Follow-Up Study: Intercultural Differences in Evaluation Processes

Given the centrality of the ego-defensive biases found in the previous experiment, I conducted a follow-up study to examine their boundaries in self-service settings in more detail. In particular, this follow-up study extends the previous analyses to an intercultural level.

Theoretical Basis: Interdependence versus Independence

Egocentric and ego-defensive thinking styles have long been associated with highly independent customers or individualistic cultures (e.g., Heine et al. 1999; Gelfand et al. 2002). With most research "conducted with normally functioning college students and adults in predominantly White, Western cultures such as the United States" (Mezulis et al. 2004, p. 712), many of the proposed ego-defensive mechanisms only generalize to humans who hold a rather independent view of their self (e.g., Markus and Kitayama 1991). Research that has departed from a mono-cultural approach points out that cultures with a high orientation on individualism have a higher likelihood to engage in a self-serving bias than cultures with a high collectivistic or interdependent orientation (Gelfand et al. 2002; Mezulis et al. 2004). While these intercultural studies have focused on individual human interactions, it is plausible that this effect extends to customer-firm relationships as well (Bendapudi and Leone 2003).

According to social psychology research, cultural differences in human behavior are rooted in fundamental differences in the way people view their own self and their relation to others. People from most Western cultures and the American culture in particular, usually hold a rather independent view of the self, whereas most Asian (but also Latin-American and African) cultures hold a more interdependent view of the self (Markus and Kitayama 1991). An independent self-construal describes a human's view of the self as an autonomous, independent person and stresses a human's need to realize one's difference from others. It has thus also been labeled as individualist, egocentric, separate, or autonomous (Markus and Kitayama 1991). An interdependent self-construal on the contrary, describes a human's view of the self as an integral – interdependent – part of a social relationship and stresses the inseparability of self, other, and context. It has thus also been labeled as a collective, sociocentric, connected, or relational view of the self (Markus and Kitayama 1991). In contrast to humans with an independent self-construal

(i.e., most Western cultures), humans with an interdependent self-construal (i.e., most non-Western cultures) share a common sense of connectedness of each other.

Findings are that a self-construal as an independent versus interdependent self influences cognition and emotions (e.g., Mezulis et al. 2004). Of particular relevance for this research are the following consequences, however: First, interdependents are generally more attentive to others and the focal context when evaluating a situation than independents (Choi, Nisbett, and Norenzayan 1999; Miller 1984). As a consequence, interdependents tend to explain causes of an event with contextual information instead of attributing outcomes to factors internal to a person. When comparing Indian and American people's explanation of events, Miller (1984) could demonstrate that on average American respondents attributed 36% of a counterpart's behavior to personal attributes (e.g., pursuing success) and 17% situational factors, whereas Indians attributed only 15% to dispositions of the actor and 32% to contextual factors. As noted in the theory section 3.1 above, the human tendency to overly explain the behavior of others with personal attributes instead of contextual factors, is known as the fundamental attribution error (Jones and Harris 1967). Markus and Kitayama (1991) as well as Choi, Nisbett, and Norenzayan (1999) suggest, but have not tested, that this fundamental attribution error might only apply to people with an independent view of the self.

Second, people with a rather interdependent view of their self will usually experience ego-focused emotions (i.e., emotions that have the individual's internal attributes as a referent) such as anger, frustration, and pride less often than individual's with an independent view of the self (Markus and Kitayama 1991). Even more so, these individuals avoid negative self-focused emotions such as anger to maintain social harmony. In support of this notion, recent research has demonstrated that customers with an interdependent self-construal are more tolerant of service failures that resulted from a breach of an implicit service promise (Wan, Hui, and Wyer 2011). In the case of a good outcome, individuals with an interdependent self-construal also display fewer feelings of pride, however. Consistent with this notion, research has shown that Chinese are less likely to credit themselves for a successful outcome than Americans (Stipek, Weiner, and Li 1989).

Third, and in a related point, interdependents display lower tendencies to enhance the self, as others are relatively more focal (e.g., Mezulis et al. 2004). As noted previously, the self-serving

bias has been commonly demonstrated in Western cultures (e.g., Bendapudi and Leone 2003). In cultures with a more interdependent view, self-enhancements seem to play a minor role. Moreover, research suggests that interdependents have a tendency to enhance others – also known as a modesty bias (Markus and Kitayama 1991). Thus, instead of attributing successful outcomes to factors internal to the self (e.g., ability) and unsuccessful ones to external factors (e.g., luck, task), Shikanai (1978) demonstrates that interdepedents display a tendency to attribute successful outcomes externally (e.g., to the ease of the task) and unsuccessful ones internally (i.e., lack of effort). Mezulis and colleagues point out, that such behavior is not interpreted as an inferior competence of the actor. Instead the authors note that "individuals in Asian cultures who make more self-effacing attributions are actually more well-liked by others than those who make self-serving attributions" (Mezulis et al. 2004, p. 737). In sum, research suggests that while interdependent individuals also hold a positive illusion about their self, they express this in view in ways other than self-serving attributions usually found in Western cultures.

Thus far, service research has not examined the effect of different self-construals on evaluations of self-service and personal service channels. However, considering that much of the differences in self-service and personal service evaluations (i.e., the person-sensitivity bias) were based on self-enhancing and egocentric effects in attribution, it is likely that the previously found pattern in service evaluations and the differential responses to personal and self-service encounters do not extend to cultures characterized by rather interdependent self-construals. This follow-up study tests this assumption by comparing the previous results from an American cultural background (i.e., independents) to those from an Indian cultural background (i.e., interdependents).

Methodology

The present follow-up study replicated the service scenarios and the design of the main study and thus had a 2 (self-service vs. personal service) x 2 (participation: high vs. low) x 3 (quality: high vs. medium vs. low) between-subjects design. In order to examine and contrast the impact of self-construal in more detail, participants for the current study were recruited from an online subject pool of individuals throughout India. Participants received 0.45 USD for their participation in this study. I chose India for my subject pool in this follow-up study, due to the high availability of online subjects as well as the previously noted high interdependent self-construal in this country. According to Markus and Kitayama (1991, p. 228), Indians "regard responsiveness to the needs

of others as an objective moral obligation to a far greater extent than do Americans". This notion is deeply rooted in Hindu beliefs that regard the self as an entity that is shaped by social interactions and relationships. Indians thus have a far greater interdependent view of the self than Americans and should hence be highly suited to study the impact of an interdependent self-construal in self-service settings in more detail. Previous research also suggests that self-enhancing tendencies are lower to non-existent in India, whereas participants from China or Korea seem to have a higher tendency for self-serving attributions (Mezulis et al. 2004).

A total of 1,202 individuals participated in this follow-up study. Given that participants were paid for their participation in this study, additional measures were employed to ensure the quality of their responses. Accordingly, participants who finished the questionnaire in an unrealistic duration (< 4.5 minutes, study average 15.5 minutes), failed to correctly recognize the service channel in their assigned scenario, or were identified as a multivariate outlier were deleted from the sample. The final sample includes responses of 1,171 participants. The mean age of participants is 30.46 years ($SD = 9.29$, Range from 16 to 67 years), 37.06% of respondents are female, and the highest education level of 52.95% of respondents is a Bachelor's degree. Almost all participants were born and raised in India (99.38%). Table 3.6 summarizes overall and within-quality condition sample characteristics.

Table 3.6: Follow-Up Study - Descriptive Sample Statistics.

	Overall	Low-Quality Condition	Medium-Quality Condition	High-Quality Condition
N	1171	392	380	399
M (SD)$_{age}$ in years	30.46 (9.29)	30.63 (9.46)	30.28 (9.42)	30.45 (9.01)
Range$_{age}$ in years	16 - 67	17 - 67	18 - 65	16 - 66
% female	37.06	38.78	34.74	37.59
% Bachelors degree	52.95	53.57	52.89	52.38

As in the previous study, I relied on existing measures for all dependent variables. All constructs were measured on a 7-point scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree)*. The coefficient alpha for the central construct *satisfaction with the provider* indicates strong internal consistency (three items, $\alpha = .97$), which was confirmed using confirmatory factor analysis (composite reliability: .97).

 Analysis and Results

Manipulation Checks. Results show that all manipulations of the experiment are successful. Accordingly, respondents rated the quality of the service outcome as poor in the low condition ($M = 2.68$), mediocre in the medium condition ($M = 4.96$), and high in the high quality condition ($M = 5.84$, $F(2, 1168) = 663.98$, $p < .001$). Participation was also rated low in the low participation condition ($M = 3.59$) and high in the high participation condition ($M = 5.27$, $F(1, 1169) = 378.80$, $p < .001$). All participants of the final sample also recognized the service channel in their assigned scenario correctly.

Analysis and Results. A 2 (self-service vs. personal service) x 2 (participation low vs. high) between-subjects ANOVA was performed on each quality level (low, medium, high) to examine differences in satisfaction judgments. All model assumptions are met in the current study. Appendix 3.5 provides detailed results of model assumption tests.

As expected from the previous theoretical discussion, results of this follow-up study reveal that neither the service channel nor the participation level has a significant effect on customers' satisfaction judgments in all three quality conditions. The interaction of both treatments is also not statistically significant. Moreover, the pattern of results of the main (U.S.) experiment is reversed – although non-significantly – for the Indian subjects. Thus, Indians tended to be more satisfied with a provider when a poor service is delivered in person ($M = 2.81$) instead of a machine ($M = 2.63$, $F(1, 388) = 0.99$, $p = .32$) and less satisfied when a good service outcome is delivered through a personal service channel ($M = 5.83$) instead of a self-service channel ($M = 5.92$, $F(1, 395) = 0.53$, $p = .47$). In case of a mediocre outcome, satisfaction judgments hardly differed between service channels ($M_{SST} = 4.89$, $M_{PSC} = 4.94$, $F(1, 376) = 0.10$, $p = .75$).

When examining respondents assignment of responsibility for an outcome, this study finds that customers assign significantly more responsibility for a poor outcome to themselves when a personal service is used instead of a self-service ($M_{SST} = 3.45$, $M_{PSC} = 3.88$; $F(1, 388) = 6.04$, $p = .01$) and when participation is low ($M_{low} = 4.02$, $M_{high} = 3.31$; $F(1, 388) = 16.92$, $p < .001$). Results do not reveal any significant differences in participants' attribution to the firm or chance between personal and self-service channels when service outcomes are poor.

When the service outcome is good, results do also not reveal any significant differences in customers' attribution of responsibility for the outcome. Respondents, however, did assign more responsibility for a good outcome to themselves when their level of participation was high (M_{low} = 3.95, M_{high} = 4.67; $F(1, 395)$ = 23.20, $p < .001$). Additional and more detailed results of this follow-up study are summarized in Appendix 3.6.

Discussion and Implications

This study was conducted to analyze the generalizability of previous findings on customers' differential responses to a service delivered via self-service and personal service channels. In particular, previous research suggests that egocentric and ego-enhancing biases are most prevalent for humans who generally hold an independent view of the self – i.e. in Western cultures. This study thus extended the previous analyses to an intercultural level to examine the impact of customers' interdependent self-construal.

Overall, results support the notion that an interdependent self-construal found in rather collectivistic cultures such as India mitigates the self-enhancing tendencies and ego-defensive mechanisms usually found in Western cultures (and the U.S. in particular). Consistent with expectations from the previous theoretical discussion, findings are that customers who hold a rather interdependent view of the self are generally more satisfied with a poor service outcome, especially when a person delivers the service. The differential locus of attribution of customers with an interdependent self-construal helps explain this effect. Thus, as suggested by theory, interdependent customers displayed a considerably higher consideration of external factors such as chance when evaluating an outcome. Interestingly, some participants thus noted that one major cause for the service outcome might be the constraints the service employee is experiencing during the service encounter in an open field provided in the questionnaire (e.g., "There may be no cars available in a good condition", "business tactic"), luck ("maybe I was unlucky", "misunderstanding"), and difficult circumstances ("maybe some technical fault", "poor maintenance"). Instead of blaming a service employee's lack of effort or a bad motive, Indian participants seem to be more aware of the contextual factors and the employee's role and constraints within a service encounter.

Next to considering contextual information, interdependent customers also blamed a service provider less for a poor service outcome and attributed more responsibility to their self. This effect was especially pronounced when the service was delivered in person. This indicates that even in customer-firm interactions, interdependent people strive for social harmony. This notion was further supported by participants' comments on the major cause of their assigned service outcome. Here, participants assigned to a poor service outcome and personal service, frequently mentioned their own lack of effort and their insufficient communication with the service provider as a major cause for the poor outcome (e.g., "it might be that I have demanded too many favors which would take time to deliver", "maybe if I was more involved in the rental process I might have gotten a better deal", "I did not take much interest when going through the procedure", "I have given insufficient information", "I was careless and in a hurry", "I should have given more details about me and my expectations").

Interestingly, it also seems that interdependents seem to encounter less self-focused emotions such as anger when experiencing a poor service. Thus, some participants mentioned to feel embarrassed when a service failed in the presence of others. This is in complete contrast to the anger and the voiced complaints usually reported in high individualistic and independent cultures such as the United States.

Taken together, these findings suggest that customers with a rather interdependent view of the self are more aware that the performance of both a service employee and a technology strongly depends on the roles and capabilities management has assigned to them. Regardless of the service channel used, the service outcome thus strongly depends on the contextual factors, such as the skills an employee has learned in training or the capabilities a self-service technology was designed to have. I find strong support for this notion in the open answer field in the questionnaire, with participants mentioning the "perfect management and well trained employees", "experience of the personnel at the rental counter", "very efficient system and software" , "good automated system", or the "easy to use interface for accessing services" as the major cause for the good service outcome.

I find further support for the differential responses of interdependents to positive versus negative outcomes in previous research. Accordingly, it has been suggested that interdependents' other-

enhancing tendencies are especially pronounced in negative events, which might constitute a potential threat to social harmony (Markus and Kitayama 1991). Results of this follow-up study fully support this notion. In the case of a positive service outcome, customers with an interdependent self-construal might thus feel less need to enhance the other, especially in customer-firm interactions. Findings of this study might be different, however, when examining more intimate and close customer-firm relationships.

4. The Impact of Task Criticality on Customer Responses to Technology-Based Self-Services

" 'This technology is very useful when customers immediately see where the benefit is, where the convenience is and where it's more personalized,' Kopalle said, citing simple tasks such as withdrawing cash or placing a fast-food order."

- Caterinicchia 2007

In line with Professor Kopalle's quote above, a number of researchers have put forward the idea that some tasks are more suited for the introduction of technology-based self-services than others. Keh and Pang (2010), for instance, recommend that marketers should match the mode of service delivery to the criticality of the service task, while Simon and Usunier (2007) provide first evidence that the complexity of a service affects customers' preferences for SSTs.

The previous study of this thesis suggests that customers evaluate personal and self-service encounters differently. It remains unclear, however, whether this effect extends to the full range of service tasks offered. Given the broad introduction of SSTs, a more nuanced understanding of the customers' psychological and behavioral responses to SSTs across different service tasks is important. Drawing from research on self-threat (Campbell and Sedikides 1999) and the person-sensitivity bias (Moon and Conlon 2002), this study develops and empirically tests a model that captures and contrasts the customers' responses to a service encounter with different situational

factors (i.e., service channel and service task). In doing so, the present study makes a number of important contributions to extant literature. First, it adds to the recent discussion of whether technological and human service channels are interchangeable or whether customers respond differently to these distinct channels. Hereby, this study does not only contrast differences in customer satisfaction, but also sheds light on the customers' repurchase intentions, word-of-mouth activity, and word-of-mouth valence in SST encounters compared to personal service encounters. It also goes beyond the previous study of this thesis by contrasting the customers' affective response to a personal service and self-service encounter. Second, this study empirically examines the influence of task criticality and its impact on customers' differential responses to personal and self-service encounters. Through the inclusion of the criticality of the service task as an additional situational factor, this study can derive precise managerial recommendations on the tasks most suited for the introduction of self-service channels. Finally, and in a related point, this study shows if and when the person-sensitivity bias extends to the service context.

This study proceeds as follows. I begin by presenting the conceptual and theoretical foundations of this research. Based on this framework, I derive hypotheses on the differential impact of self-service and personal service channels. I test these hypotheses using a scenario-based online experiment ($N = 815$). I then provide a summary and discussion of key findings. The study concludes with theoretical contributions and managerial recommendations on the applicability of self-service channels for particular service tasks.

4.1   Theoretical Basis: Self-Threat and the Person-Sensitivity Bias

Three important aspects about existing SST research should be noted: First, previous research mainly focuses on customers' acceptance of and preference for SSTs (e.g., Meuter et al. 2005). Second, research focusing on the consequences of SSTs is mainly observational and does not contrast the customers' responses when using SSTs instead of personal service channels (PSC; e.g., Weijters et al. 2007). Third, research falls short to provide empirical evidence why differences between responses to SSTs and PSCs may exist (e.g., Xue, Hitt, and Chen 2011). This research tries to close this gap. I propose that both affect and cognition influence the customers' responses to a particular service performance. Moreover, I expect that the service channel and the

service task moderate the effect of service performances on customers' attitudes and behavioral intentions. The following two subsections provide an overview of the theoretical reasoning underlying these assumptions. Precise hypotheses are derived in the subsequent section.

How Customers' Reactions to Self-Service and Personal Service Encounters should differ:

Recently, a few studies, including the previous study of this thesis, have demonstrated that people react differently to humans and machines. As suggested by the person-sensitivity bias (Moon and Conlon 2002), humans evaluate other humans in more extreme manners. That is, humans evaluate humans more favorably (i.e., display a positivity bias) when things go right. When things go wrong, however, the effect reverses and humans are evaluated less favorably than objects. Campbell (2007) provides two explanations for this bias: First, humans differ in their causal attributions for human versus non-human sources. In support of this notion, the previous study of this thesis demonstrates that personal-service customers attribute more responsibility to the provider while self-service customers attribute more responsibility to factors external of the provider (such as chance or themselves). As suggested by Campbell (2007, p. 263), customers thus "tend to overestimate the role of humans in controlling outcomes" and assume that a person (but not a machine or an object) causes an outcome intentionally. Second, humans react more compassionately to other humans than to objects. Campbell (2007), for instance, demonstrates that customers show higher levels of negative affect when price increases are communicated in person than through an object. Similarly, Moon and Conlon (2002) find that feelings of discomfort are higher towards humans than towards objects when negative events occur. Overall, previous research suggests that both, cognition and affect mediate the impact of events on human evaluations and give rise to the source effects proposed in the person-sensitivity bias.

To date, service research focuses on the role of cognition when trying to understand customer satisfaction and behavior in the service context (e.g., Bendapudi and Leone 2003; Meuter et al. 2005). The role of affect and emotion has mostly been neglected. This is not surprising considering the predominance of expectancy-disconfirmation theory and attribution theory in satisfaction research. An increasing number of studies in the service field, however, suggest that emotions arising from an employee's emotional labor display (Hennig-Thurau et al. 2006) or situational factors such as crowding (Machleit and Eroglu 2000) mediate service evaluations. A

growing body of research acknowledges this gap and focuses on multi-component models which underline that an exposure to stimuli leads to both affective and cognitive reactions that impact the customers' evaluations and their behavior (e.g., Homburg, Koschate, and Hoyer 2006). While research often disagrees about the relative importance of cognition and affect, recent findings in the marketing domain suggest that – similar to human relationships – affect is most important for a customer's initial satisfaction judgments while cognition becomes relatively more important over time (Homburg, Koschate, and Hoyer 2006). Current self-service research fully supports this notion: Wang, Harris, and Patterson (2013) find that both affective and cognitive determinants drive the continued use of SSTs. In their three-wave study, the authors show that the customers' SST use is initially driven by their self-efficacy, then by their emotions, and finally by habit. While these studies focus on the relative importance of cognition and affect over time, Campbell (2007) suggests that the relative importance of both also depends on the information processing capabilities available to a customer. In line with the affective-cognitive model (Shiv and Fedorikhin 1999), Campbell claims that cognition has a relatively greater impact on the customers' evaluations and behavior when processing resources are unconstrained, while stimulus-induced affective responses exhibit a stronger influence when processing resources are constrained (e.g., through multi-tasking, time constraints).

When Customers' Reactions to Self-Service and Personal Service Encounters should differ:

Previous research provides first evidence that the person-sensitivity bias depends on the particular task or situation. Campbell (2007), for instance, finds that constraining a participant's information processing capabilities (through a cognitive task) increases human versus object differences in fairness evaluations of positive <u>and</u> negative events. According to this study, participants use an affective rather than a cognitive route to make inferences about the cause of price increases and decreases when processing resources are constrained. These source effects occur for both positive and negative events when the cognitive route is blocked, because customers <u>always</u> react more compassionately and hence more extreme to humans than to objects.[19] At a first glance, these findings seem contrary to the results of Moon and Conlon

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[19] When processing resources - and thus the cognitive route - is available, however, Campbell finds that the information source (person vs. object) moderates the impact of price increases (i.e., negative events) on fairness evaluations. Given that price decreases (i.e., positive events) are often connoted with negative events (such as a store going out of business),

(2002), which suggest that differences between the evaluation of persons and objects cease to exist when humans limit their information processing. However, instead of manipulating the availability of processing resources, Moon and Conlon (2002) vary the degree of criticality of a particular situation, or "problem threat" as they call it. They find that in threatening situations – that is, situations that pose a high financial and / or social risk – controlled and automatic information processing becomes more rigid and narrow. They conclude that once humans restrict their information processing under high threat, they tend to ignore person versus object differences. When situations are not critical or threatening, however, they assume that humans take-in and respond to more subtle information such as person versus objects differences. Similar to Campbell (2007), the authors base their explanation on the availability of information processing resources. However, especially in the service context where customers interact with a person or a machine, customers' inferences about the cause of an outcome, i.e. their attributions of responsibility, may provide an alternative explanation for the (non-) existence of person versus object differences. Here, the self-threat model advances our understanding how human attributions may differ between various levels of threat.

In general, self-threat refers to instances "when favorable views about oneself are questioned, contradicted, impugned, mocked, challenged, or otherwise put in jeopardy" (Baumeister, Smart, and Boden 1996, p. 8). According to this definition, the level of self-threat that people experience depends on a number of factors, such as the importance, criticality, or difficulty of a task as well as the participant's self-esteem, locus of control, or interpersonal orientation (Campbell and Sedikides 1999). According to the self-threat model (Campbell and Sedikides 1999, p. 26), individuals are motivated to "maintain the integrity of a positive self-concept in the face of threatening information." This fundamental premise is deeply rooted in a number of psychological theories, such as the cognitive dissonance theory (Festinger 1957) and self-affirmation theory (Steele 1988). While research has identified a number of moderators of individuals' self-enhancing tendencies, the self-threat model subsumes these constructs under the umbrella of self-threat. Accordingly, the model proposes that tendencies to maintain a positive self-image or self-concept become prevalent in situations that humans generally perceive as threatening to their self-concept or self-image. In line with this proposal, marketing research finds

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person versus object differences do not impact evaluations when processing resources are available in this particular setting.

that in face of self-threatening information "customers are more likely to protect their self-esteem by selectively seeking information that disparages the source of negative feedback" (Dunn and Dahl 2012, p. 672). Accordingly, findings are that internally attributed product failures cause customers to lower their product evaluations in threatening situations (i.e., when asked to publically voice their impressions about the product). This illustrates that self-threat motivates customers to shift the blame of <u>negative</u> events to external sources. Following this line of thought, previous research also suggests that ego-enhancing tendencies strongly depend on the criticality of a task, the performance on a task, or the relevance of the task for an individual's self-concept. Troye and Supphellen (2012), for instance, find that self-anchoring effects, i.e., more positive evaluations of stimuli that are associated with the self, are more pronounced when the self-production task assigned to customers is more important to them. Similarly, research on the self-serving bias indicates that self-enhancing tendencies in an individual's attribution are stronger when individuals consider the task important, critical, or threatening to them (Campbell and Sedikides 1999).

Taken together this theoretical discussion suggests that threat attenuates the person-sensitivity bias in two ways: First, <u>problem threat</u> (i.e., the criticality of a task) limits the customers' cognitive capabilities.[20] This causes humans to neglect information they would normally use (e.g., person versus object differences). Second, <u>self-threat</u> motivates humans to shift the blame to external sources in order to maintain a positive self-image. Regardless of the type of source (such as a person or an object), customers thus tend to selectively seek information that degrades the source to affirm or even enhance their self-image. In conclusion, this theoretical discussion suggests two important boundary conditions: In the context of SSTs, the person-sensitivity bias is limited to tasks that are <u>not</u> perceived as critical (i.e., tasks that are not risky in social or financial terms and hence have a low problem threat) and service outcomes that are <u>not</u> poor and perceived as threatening to the self-image (i.e., low self-threat).

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[20]   In support of this notion, Ariely and colleagues (2009) find in a series of experiments that high financial incentives or rewards reduce participants' performance in cognitive tasks. According to the authors, high rewards distract participants and cause distress that reduces their performance levels.

4.2 Conceptual Model and Hypotheses

A growing body of research acknowledges the importance of both affect and cognition for customer satisfaction in service settings (e.g., Wang, Harris, and Patterson 2013). Following this notion, I include affect and cognition as mediators of the impact of a service (encounter) quality on the customers' satisfaction and their subsequent behavioral intentions. Affect describes the customers' positively and negatively charged emotions, whereas cognition refers to the customers' assignment of responsibility (i.e., locus of attribution) for the service outcome in the current study.

Figure 4.1 illustrates the conceptual model and the hypothesized relationships. I discuss the impact of the situational factors on all dependent variables separately in the following subsections. The first subsection derives hypotheses on the impact of the mediators *affect* and *attribution*, the second and third subsection focus on customer *satisfaction* and customers' *behavioral intentions*, respectively. Note that all hypotheses refer to the SST; the personal service channel serves as a reference category.
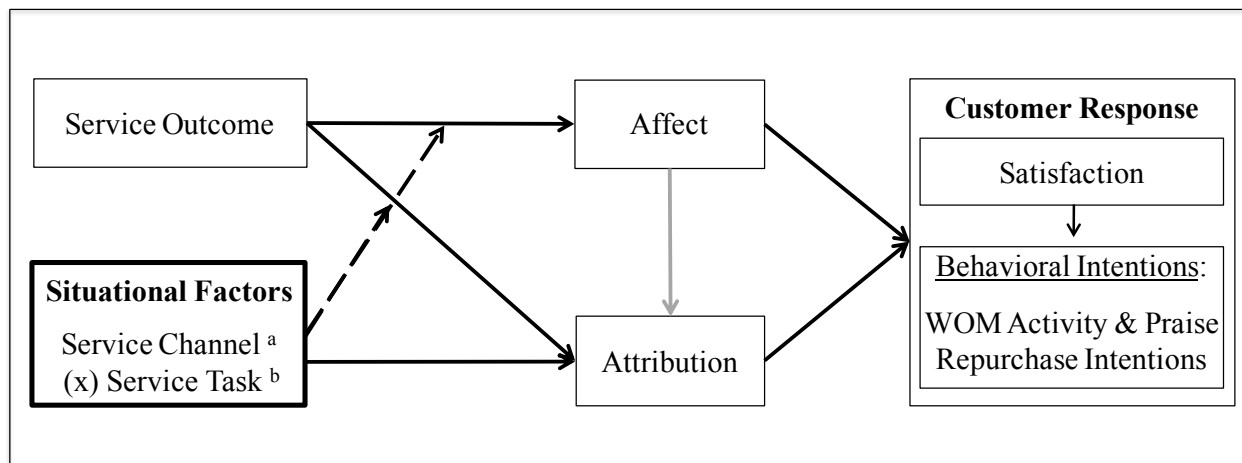
a. Personal Service versus Technology-based Self-Service; b. Low versus High Task Criticality

Figure 4.1: Conceptual Model on the Impact of the Service Channel and the Service Task.

The Impact of the Service Channel and Task Threat on Affect and Attribution

Following the theoretical considerations above, I postulate that the service channel moderates the impact of the service quality on the customers' affect and attribution. More specifically, I assume that customers respond more compassionately to personal service encounters than to technology-based self-service encounters. This suggests that customers display higher levels of negative affect to poor service outcomes and higher levels of positive affect to good service outcomes when a person delivers the service rather than a machine. Parallel to the work of Campbell (2007), which suggests that customers respond more affectionately to price changes that are communicated in person rather than through a price tag, I assume that customers' affective route is stronger when using a personal service than a technology-based self-service. This leads to following assumption on the impact of personal vs. self-service channels:

> **Hypothesis 1 (H1):** The service channel moderates the effect of service quality on affect:
>
> a) When service outcomes are <u>good</u>, customers will display <u>lower</u> levels of positive affect when using a technology-based self-service than when using a personal service.
>
> b) When service outcomes are <u>poor</u>, customers will display <u>higher</u> levels of positive affect when using a technology-based self-service than when using a personal service.

Next, I postulate that the service channel affects the customers' assignment of responsibility for a service outcome. The previous *Study 1* of this thesis suggests that customers differ in their inferences of causality for a service outcome when interacting with a human instead of a machine. In particular, humans generally assume that another person acts based on internal motives while machines do not intentionally cause an outcome. As a result, customers interacting with a person are more likely to credit and blame the service provider for good and poor service outcomes respectively. However, the theoretical discussion above suggests two important limitations of this effect: First, critical situations or tasks make information processing more narrow, leading customers to disregard human versus object differences (Moon and Conlon 2002). Second, self-threatening performances on a task increase an individual's tendency to

blame external sources in order to maintain a positive self-view (Campbell and Sedikides 1999). This suggests that the differences in the inferred causality between personal service and technology-based self-service cease to exist when a task is critical and a service outcome is poor (and self-threatening).

Hypothesis 2 (H2): Customers using a technology-based self-service will attribute less responsibility to the provider only when <u>task criticality</u> is low.

Hypothesis 3 (H3): Customers using a technology-based self-service will attribute less responsibility to the provider only when <u>service outcomes</u> are good.

Customer Responses to Self-Service and Personal Service Encounters

I postulate that the mediators *affect* and *attribution* give rise to the differential effects of the *service channel* on the link between *service outcome* and *satisfaction*. That is, when a service outcome is good, customers display higher levels of positive affect and attribute more responsibility to the provider in personal service encounters than self-service encounters; when the quality of a service outcome is poor, customers display lower levels of positive affect while still attributing more responsibility to the provider in personal service encounters than self-service encounters. Consequently, both attribution and affect add up to the providers' disadvantage, resulting in lower levels of satisfaction, in personal service encounters when a service outcome is poor. I expect that this effect reverses for good service outcomes. That is, higher levels of positive affect and higher attribution to the provider lead to higher satisfaction levels when a person delivers the service.

Note, however, that in H2 and H3 I propose that self-service and personal service customers will only differ in their causal attributions when the criticality of a task is low and service outcomes are good. As customers' attributions are an important determinant of their satisfaction with a provider, it is likely that differences between self-service and personal service customers' satisfaction levels also only exist when task criticality is low and / or service outcomes are good.

However, given that threat strengthens the customers' affective responses (see theoretical discussion above and Campbell 2007) and that customers always react more compassionately to personal service encounters, it is also possible that differences between satisfaction levels of self-service and personal service customers increase when threat is high.

Hypothesis 4 (H4): Customers using a technology-based self-service instead of a personal service will display lower levels of satisfaction with the provider service only when <u>service outcomes</u> are good.

Hypothesis 5 (H5): The service channel will moderate the service outcome – satisfaction link only when <u>task criticality</u> is low. That is, when task criticality is low, customers will be a) more satisfied with a poor service outcome and b) less satisfied with a good service outcome when using a technology-based self-service instead of a personal service.

This study also examines important behavioral intentions, namely the customers' WOM activity, WOM praise, and repurchase-intentions.[21] Research provides ample evidence that performance outcomes (e.g., Zeithaml, Berry, and Parasuraman 1996) and subsequent satisfaction judgments (e.g., Maxham and Netemeyer 2002) are strong determinants of the customers' behavioral intentions.[22] I hence postulate that person – object differences in satisfaction levels directly translate into differences in behavioral responses.

Hypothesis 6 (H6): Customers using a technology-based self-service instead of a personal service will display lower levels of a) WOM activity, b) WOM praise, and c) repurchase intentions with the provider only when <u>service outcomes</u> are good.

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[21]   While a number of studies subsume these constructs as customer loyalty (e.g. Jones and Taylor 2007; Zeithaml, Berry, and Parasuraman 1996), the present research follows recent research that questions this "cocktail approach" (de Matos and Rossi 2008) and calls for a clear-cut differentiation of these constructs.

[22]   For a detailed overview of these studies see the meta-analysis by de Matos and Rossi (2008).

Hypothesis 7 (H7): The service channel will moderate the impact of service outcomes on a) WOM activity, b) WOM praise, and c) repurchase intentions only when <u>task criticality</u> is low. That is, when task criticality is low, customers will have higher WOM activity, WOM praise, and repurchase intentions after a poor service outcome and lower WOM activity, WOM praise, and repurchase intentions after a good service outcome when using a technology-based self-service.

4.3 Methodology

This study focuses on three key aspects: First, task criticality serves as an additional experimental factor to evaluate the boundary of the person-sensitivity bias documented in the previous study of this thesis. Second, I include a measure of affect in addition to measures of attribution to examine the different routes of information processing in self-service and personal service settings in more detail and to advance the understanding how customers' differential responses to personal and self-service channels arise. Third, I include additional measures on the customer's responses to these different service encounters to examine the managerial implications and the scope of the person-sensitivity bias in more detail.

Design. This study is a 2 (service channel) x 2 (task criticality) x 2 (service outcome) between-subjects, full-factorial experiment. The experiment is scenario-based, which allows a straightforward operationalization of treatments, control over variables, and a compression of events that might otherwise take place over a longer period of time (Bitner, Booms, and Tetreault 1990; Dong, Evans and Zou 2008). I developed the scenarios with three aspects in mind. First, the service described should be <u>the</u> service in the customer's eye. That is, the self-service should constitute the whole service process and not just a short part of the whole service delivery process or sequence. Second, the scenario should allow a realistic manipulation of outcome quality independent of the service channel. Finally, the service should allow different levels of task criticality as well as performance outcomes that can be rather threatening to the customer's self-image. Given these requirements, I chose an educational service for the purpose of this study. Many university or test preparation courses are now offered through adaptive online software, which often replaces traditional personal tutoring or in-class lectures. Moreover, these courses

can vary dramatically in their criticality for the customer (e.g., a test preparation course for university entry tests can cost from several hundred dollars to one or two thousand dollars and can pose a high threat for one's future career, whereas a business language course may be less costly and / or less critical), and they can pose a high threat to the customer's self-image when service outcomes are poor (e.g., poor test score, lack of improvement on a test).

Participants. A market research institute was commissioned to recruit a total of 1,000 U.S. participants for this study. The sample was stratified by age, gender, and education according to U.S. census information (United States Census Bureau 2010; 2011). As participants were paid for their participation in this study (approx. 1.5 USD), I ran additional checks to control for the quality of their responses. Participants who provided inconsistent and dubious answers (e.g., random typing in an open answer field) and needed a suspicious amount of time to complete the survey (Unipark's quality index[23] $\leq$ .20) were dropped from the sample.

The final sample contains data of 815 individuals aged between 18 and 92 years. The mean age of participants in the sample is 41 years (SD = 13.47), with both men (48.7%) and women (51.3%) represented equally well. The educational level of the sample closely follows U.S. census information: 40.5% of participants have completed a High School Diploma or less, 18.3% have some college, 32% have an Associate's or Bachelor's degree, and 9.2% have a Master's or Doctorate degree. With regard to income, most participants (29.3%) indicate to have an annual net income of 40,000 to 69,999 USD, followed by 23.4% with an income ranging from 20,000 to 39,999 USD. Most participants (98.3%) are born and raised in the United States. 33.7% of participants indicate to have experience with online educational services such as Coursera. Table 4.1 provides an overview of descriptive sample statistics. Appendix 4.1 provides a more detailed overview of the present study's sample characteristics.

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[23]   This quality index is based on the participant's deviation from the duration median of each individual page of the online questionnaire. An index of .5 indicates that the participant needs the average time to complete the survey.

Table 4.1: Study 2 - Descriptive Sample Statistics.

	Overall	Self-Service Condition	Personal Service Condition
N	815	436	379
M (SD)$_{age}$ in years	40.98 (13.5)	41.66 (13.4)	40.21 (13.6)
Range$_{age}$ in years	18 - 92	18 - 64	18 - 64
% female	51.3	48.4	54.6
% Bachelors degree	22.5	21.1	24

Stimulus Materials. I developed eight different service scenarios to represent the eight experimental conditions. Each scenario was pretested ($n = 72$) for believability and realism ("I could imagine myself in the situation", "Overall, I find the scenario believable", and "The situation described earlier was realistic") using a seven-point scale with the anchors 1 (*strongly disagree*) and 7 (*strongly agree*). Pretest results revealed that participants consider the scenarios realistic with average believability ratings ranging from 4.7 to 5.8 within experimental conditions. Findings of the pretest did not indicate the need for any changes to the experimental manipulations.

Participants were randomly assigned to one of the eight experimental conditions and asked to imagine themselves in the described situation. All scenarios describe the service of a fictitious educational institute called "Usmart". The wording of the scenarios is as similar as possible in terms of descriptive language and money invested. All participants were asked to imagine they have been promoted at work and now wish to improve their language skill-set. In the low task criticality condition, participants read that they decide it might be fun take a foreign language course for 100 USD. In contrast, participants in the high task criticality condition read that they take a course at Usmart to prepare for a critical exam that is required for the promotion. This time, the cost of the course is 1.100 USD. The manipulation of task criticality thus uses a social and a financial component. The manipulation of the service channel either tells participants that they have signed up for Usmart's online course (for the technology-based self-service channel) or for a personal tutoring (for the personal service channel). To manipulate the quality of the service, participants learn at the end of the scenario that their initial score did not (poor outcome)

or did dramatically (good outcome) improve in a final exam testing their improvement. Table 4.2 provides details of the manipulations used in this study.

Table 4.2: Study 2- Experimental Manipulations.

Criticality of Service Task

Low	High
Your employer has offered you a promotion at work. As you will be in charge of foreign affairs in your new position, you have decided it might be fun to improve your foreign language skills through a course at Usmart for 100 dollars in your spare time.	Your employer has offered you a promotion at work. As you will be in charge of foreign affairs and have to acquire a certificate of foreign language competence (CFLC) for your new position, you have decided to take a course at Usmart for 1.100 dollars that prepares you for the critical CFLC exam.

Service Channel

Technology-based Self-Service Channel	Personal Service Channel
You enroll for Usmart's online course. When you first log onto the website, the website asks you a number of questions to test your strengths and weaknesses. Based on your results, the website recommends you to listen to four e-tutorials and offers you a number of quizzes over the duration of the course. The website also recommends you some additional reading material that you can work through on your own. You decide to follow the website's recommendation and focus on the identified areas and recommended tutorials. At the end of the 4-week-course you take a final exam to test your improvement.	You enroll for Usmart's personal tutoring. When you first meet Jamie, your personal tutor, Jamie asks you a number of questions to test your strengths and weaknesses. Based on your results, Jamie recommends you to listen to four of Jamie's tutorials and offers you a number of quizzes over the duration of the course. Jamie also recommends you some additional reading material that you can work through on your own. You decide to follow Jamie's recommendation and focus on the identified areas and recommended tutorials. At the end of the 4-week-course you take a final exam to test your improvement.

Service Outcome

Poor	Good
Results of the final exam show that your test score has not improved at all after Jamie's / this online course. As Usmart did not offer an improvement guarantee, you still have to pay the course fee. Moreover, you find that you were charged extra for the recommended reading material.	Results of the final exam show that your test score has improved dramatically after Jamie's / this online course. Given this result, you do not need to make use of Usmart's improvement (– or money back –) guarantee. Moreover, you find that you received the recommended reading material free of charge.

Procedure. Following a short introduction and screening of the participants' demographic information, respondents were prompted to answer a few questions about their general preferences and expectations towards self-service and personal service channels. Next, participants were randomly assigned to one of the experimental conditions. After carefully reading through and imagining themselves in the assigned scenario, participants were asked to indicate their perceived level of service quality and criticality of the situation. These measures served as a check of the experimental manipulations of this study. Additionally, I included a recognition check that prompted participants to indicate whether they interacted with a person or a machine during the described service encounter. Following these checks, I collected perceptual dependent measures, such as the participants' affect, locus of attribution, and satisfaction with the provider. Finally, participants answered some last personal information about themselves, such as their online course experience.

Dependent Variables. I used existing measures for all dependent variables of this study. I measured *affect* with four items on a semantic differential scale, adopted from Campbell (2007), which asks respondents to indicate how the described scenario makes them feel (e.g. "unhappy" – "happy"). To measure attribution, I adopted two items from Moon and Nass (1998) that capture the customers' comparative attribution to themselves and to the firm on a semantic differential scale (e.g. "Who was more responsible for the recent level of performance – You or the provider?"). In addition, I asked participants to provide causal explanations for the service outcome in the scenario on the basis of Weiner's (1986) classification for attributions (e.g. "luck", "ability", and "effort"). That is, I also asked participants to indicate to what degree 1) the provider's effort and 2) the provider's expertise contribute to the service outcome in the scenario. Exploratory factor analysis reveals that all four (provider - attribution) items load onto one single factor for the customers' causal attribution to the firm. The attribution factor has satisfactory reliability (α = .80); confirmatory factor analysis confirms these findings (composite reliability = .80). The satisfaction measure consists of three items (e.g., "I feel satisfied with ___") which I adopted from Tsiros, Mittal and Ross (2004). As suggested by Harrison-Walker (2001), I measured customers' WOM behavior on the two dimensions WOM activity and WOM praise. WOM activity (three items, α = .92) captures the intensity and frequency of WOM behavior while WOM praise (two items, α = .96) refers to the positivity of the intended communication about the service provider. Finally, I measured the customers' behavioral intentions with three

items, which I adopted from Hui et al. (2004). These items ask participants to indicate their likelihood of using the provider again in the future (e.g., 1 "*definitely no*" – 7 "*definitely yes*"; three items, α = .99). All items of this study use 7-point scales ranging from 1 (*strongly disagree)* to 7 (*strongly agree)* unless otherwise noted.

Results of exploratory factor analysis and confirmatory factor analysis provide evidence that construct validity and reliability of all dependent variables are satisfactory. All Cronbach's alphas and composite reliabilities of constructs are larger than .80, exceeding the required thresholds proposed by Bagozzi and Yi (1988, 2012) and Nunally (1978). In addition, the average variance extracted (AVE) is greater than the squared correlations of all constructs, suggesting that discriminant validity is also given in the present study. Appendix 4.2 provides a complete description of the measurement items, sources, and properties for the dependent variables of this study. Appendix 4.3 summarizes correlations and tests for discriminant validity of the constructs.

4.4 Analysis and Results

Manipulation Checks. All manipulations of this experiment are successful. All participants in the final sample recognize the service channel in their assigned scenario correctly. Additionally, participants rate the quality of the service outcome as poor in the low quality condition (M = 2.31, SD = 1.34) and as high in the high quality condition (M = 5.85, SD = 1.03, $F(1, 813)$ = 1805.04, p <.001). Participants also perceive the criticality of the task lower in the low criticality condition (M = 4.10, SD =1.41) than in the high criticality condition (M = 4.97, SD = 1.41, $F(1, 813)$ = 77.30, p < .001).[24]

Analysis and Model Assumptions. ANOVAs are the most common method to examine experimental data. This method is based on the assumption of normality and homogeneity of variances (Howell 2007). The data of this study shows only minor, negligible violations of these

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[24] It is important to note that results indicate that participants in the personal service condition rated their level of participation slightly higher (participation: M = 5.13; perceived control: M = 4.75) than participants in the self-service condition (participation: M = 4.78; perceived control: M = 4.60). These differences are partly statistically significant (participation: $F(1, 813)$ = 16.79; p < .001; perceived control: $F(1, 813)$ = 2.11 p = .15). Given the lack of independence, these constructs could not be included as additional covariates in the upcoming analysis. Note, however, that reported results are partly conditional on this confound.

assumptions. Thus, the central dependent variable *satisfaction* is fairly normally distributed with a skewness of -.03 and a kurtosis of 1.61. Similar values result for the mediating variables *attribution* (skewness: .18, kurtosis: 3.13) and *affect* (skewness: -.06, kurtosis: 1.46) as well as the dependent variables *WOM activity* (skewness: -.40, kurtosis: 2.87), *WOM praise* (skewness: -.01, kurtosis: 1.69), and *repurchase intentions* (skewness: -.03, kurtosis: 1.39). Tests by Brown and Forsythe (1974) demonstrates that variances are sufficiently homogeneous across experimental treatments for the central dependent variables *WOM praise* ($F(7, 807) = .84$, $p = .55$), *WOM activity* ($F(7, 807) = 1.64$, $p = .12$), and *repurchase intentions* ($F(7, 807) = 1.23$, $p = .29$). Only the variables *satisfaction*, *affect* and *attribution* indicate minor violations of the homogeneity assumption ($F_{satisfaction} (7, 807) = 2.20$, $p = .03$; $F_{affect} (7, 807) = 2.33$, $p = 02$; $F_{attribution} (7, 807) = 2.12$, $p = .04$). To test whether these variances are too unequal to cause problems in the upcoming analyses, I additionally examined the variance ratio of the three critical variables as suggested by Field (2009). Results indicate that only *satisfaction* may be critical with variance ratios exceeding the recommended threshold of 2 ($\sigma^2_{largest} / \sigma^2_{smallest} = 2.47$). A simulation of the *p*-value, however, indicates that the violation is minor. Simulated *p*-values for a .05 level of the variable *satisfaction* are at .0504 with the given data.

Results. I analyzed individual 2 (outcome quality) x 2 (service channel) x 2 (perceived task criticality) ANOVAs for the mediating and dependent variables of the conceptual model. I report the results for each dependent variable separately in the following subsections.

Affect. In H1, I propose that the service channel moderates the impact of service quality on affect. That is, personal service customers should always react more compassionately to a service outcome than SST customers. The analysis of *affect* supports the two-way interaction between *outcome quality* and *service channel* proposed in H1 ($F(1, 809) = 10.62$, $p = .001$). As expected, a high-quality service outcome leads to significantly higher levels of positive affect when using a personal service ($M = 5.91$) instead of a self-service ($M = 5.38$, $F(1, 809) = 15.70$, $p < .001$). Results thus fully support H1a. When the service outcome is poor, results do not show any statistically significant differences between service channels ($M_{PSC} = 2.03$, $M_{SST} = 2.13$, $F(1, 809) = 0.56$, $p = .46$). The differences are consistently in the expected direction and marginally significant in the low task criticality condition ($M_{PSC} = 2.01$, $M_{SST} = 2.13$, $F(1, 809) = 2.86$, $p = $

.09). The results thus only partially support H1b. Figure 4.2 illustrates the means of *affect* for all experimental conditions.[25]
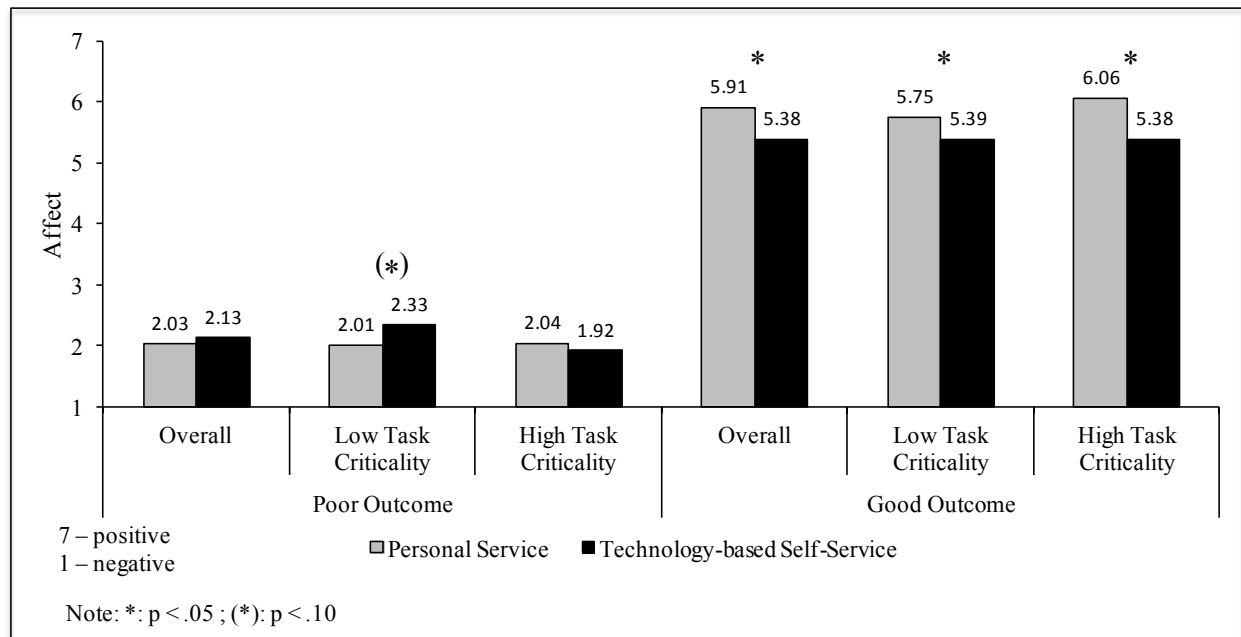
Figure 4.2: Mean Differences in Affect for Personal vs. Technology-Based Self-Service.

Customer Attribution. In H2, I propose that the effect of the *service channel* on the customers' *attribution* depends on the *service task*. However, opposed to H2, results do not show a statistically significant two-way interaction between *service channel* and *task criticality* ($F(1, 809) = 0.16$, $p = .69$). Rather, findings are that self-service customers consistently attribute less responsibility to the firm regardless of the task. This effect is consistent for both high and low levels of task criticality. Results thus reveal a main effect of the *service channel* that is marginally significant ($F(1, 809) = 3.28$, $p = .07$). As can be seen in Figure 4.3, *task criticality* by itself strengthens self-serving attributions. That is, in critical situations customers blame the provider more for a poor outcome and give less credit to the provider when service outcomes are good. When outcomes are poor, participants in the high criticality condition assign significantly more responsibility to the provider ($M = 4.17$) than participants in the low criticality condition ($M = $

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[25]   Results also reveal a marginally significant interaction of *service outcome* with *task criticality* ($F(1,809) = 3.02$, $p = .08$). Customers react more affectionately to high-quality outcomes when encountering a critical task ($M = 5.71$) as opposed to a non-critical task ($M = 5.58$, $F(1, 809) = 1.26$, $p = .26$). Results show that this effect reverses in the poor service outcome condition. Thus, participants' in the poor outcome condition show lower levels of positive (!) affect when they encounter a critical task ($M = 1.98$) than participants who do not encounter a critical task ($M = 2.18$, $F(1, 809) = 1.87$, $p = .17$).

3.90, $F(1, 809) = 5.28$, $p = .02$). Conversely, when service outcomes are good, participants in the high-criticality condition assign less responsibility to the provider ($M = 3.41$) than participants in the low-criticality condition ($M = 3.52$, $F(1, 809) = 0.86$, $p = .35$). The interaction of *service quality* and *task criticality* is statistically significant ($F(1, 809) = 5.19$, $p = .02$). Results also show a statistically significant main effect of *outcome quality* ($F(1, 809) = 40.46$, $p < .001$).

In H3, I propose that the *service outcome* also moderates the impact of the *service channel* on the customers' attribution of responsibility. In support of H3, results show that the self-service and personal service customers differ significantly in their attribution when a service outcome is good ($M_{PSC} = 3.59$, $M_{SST} = 3.35$, $F(1,809) = 4.22$, $p = .04$). This effect is most pronounced when the service outcome is good *and* task criticality is high ($M_{PSC} = 3.56$, $M_{SST} = 3.27$, $F(1,809) = 3.37$, $p = .07$). This finding is surprising and contrary to expectations. As expected, however, results do not reveal any significant mean differences between service channels when service outcomes are poor ($M_{PSC} = 4.06$, $M_{SST} = 4.00$, $F(1,809) = 0.26$, $p = .61$). Figure 4.3 illustrates mean differences across all experimental conditions for the dependent variable *attribution*.

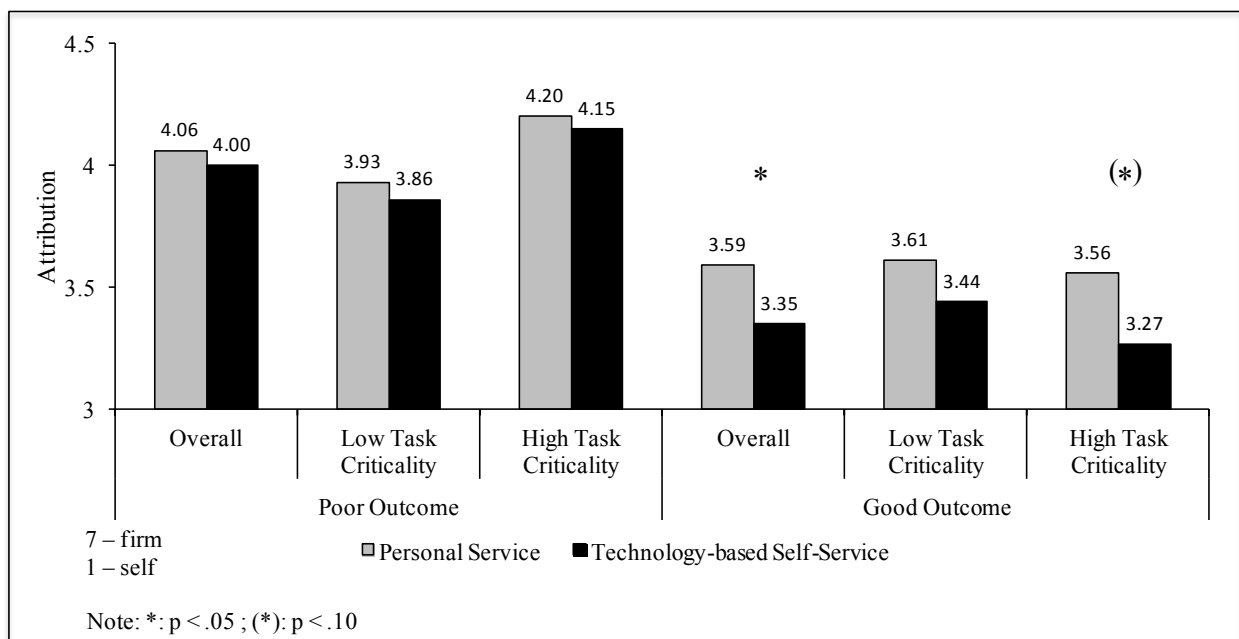**Figure 4.3: Mean Differences in Attribution for Personal vs. Technology-Based Self-Service.**

Customer Responses. With regard to the customers' responses, I conduct individual ANOVAs with *satisfaction*, *WOM activity*, *WOM praise*, and *repurchase intention* as dependent variables.

In H4, I propose that customer satisfaction is lower for self-service customers than for personal service customers when service outcomes are good. When service outcomes are poor, I do not expect differences in satisfaction judgments between service channels, given that this outcome is more threatening to the customer. Figure 4.4 summarizes the resulting differences in mean satisfaction levels between service channels. In support of H4, the analysis of customer satisfaction reveals a statistically significant interaction between *service channel* and *outcome quality* ($F(1, 807) = 5.07$, $p = .02$). The main effect of *service outcome* is also highly significant ($F(1, 807) = 1186.42$, $p < .001$). Contrasts reveal that, as expected, customers are less satisfied with a good service outcome when a person ($M = 5.67$) rather than a machine ($M = 5.44$, $F(1, 807) = 3.09$, $p = .08$) delivers the service. The effect reverses when the service outcome is poor. Thus, customers display lower levels of satisfaction with the provider of a poor service outcome, when a person ($M = 2.21$) rather than a machine ($M = 2.40$, $F(1, 807) = 2.05$, $p = .15$) delivers the service. In H5, I propose that the criticality of the service task constitutes an important limitation to this effect. That is, I expect that the moderating effect of service channel on the service outcome – satisfaction link diminishes, the higher the criticality of a task. In support of H5, results show that channel differences depend on the service task: When *task criticality* is low, the interaction between *service channel* and *service quality* is marginally significant ($F(1, 414) = 3.14$, $p = .08$).[26] When *task criticality* is high, this is not the case ($F(1, 393) = 2.00$; $p = .16$).[27, 28]

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[26] Contrasts within each quality condition reveal that, when *task criticality* and *service quality* are low, *satisfaction* levels differ significantly between self-service and personal service customers ($M_{SST} = 2.57$; $M_{PSC} = 2.19$; $F(1, 807) = 4.02$, $p = .05$). When service quality is high, mean differences are not statistically significant ($M_{SST} = 5.44$; $M_{PSC} = 5.54$; $F(1, 807) = 0.29$, $p = .59$).

[27] It is important to note, however, that the interaction effect of service channel and quality almost vanishes when including the mediators affect and attribution in the full ANOVA ($F(1, 805) = 0.04$, $p = .84$). Results then indicate significant main effects of affect ($F(1, 805) = 612.14$, $p < .001$) and attribution ($F(1, 805) = 5.83$, $p = .02$).

[28] With regard to the service task, results do not reveal any statistically significant main or interaction effects. Contrasts show, however, that customers are more satisfied with a good service when the task is perceived as critical ($M_{high-criticality} = 5.61$; $M_{low-criticality} = 5.49$, $F(1, 807) = 0.83$, $p = .36$). As expected, this effect reverses for poor service quality outcomes ($M_{high-criticality} = 2.24$; $M_{low-criticality} = 2.38$, $F(1, 807) = 1.13$, $p = .29$).
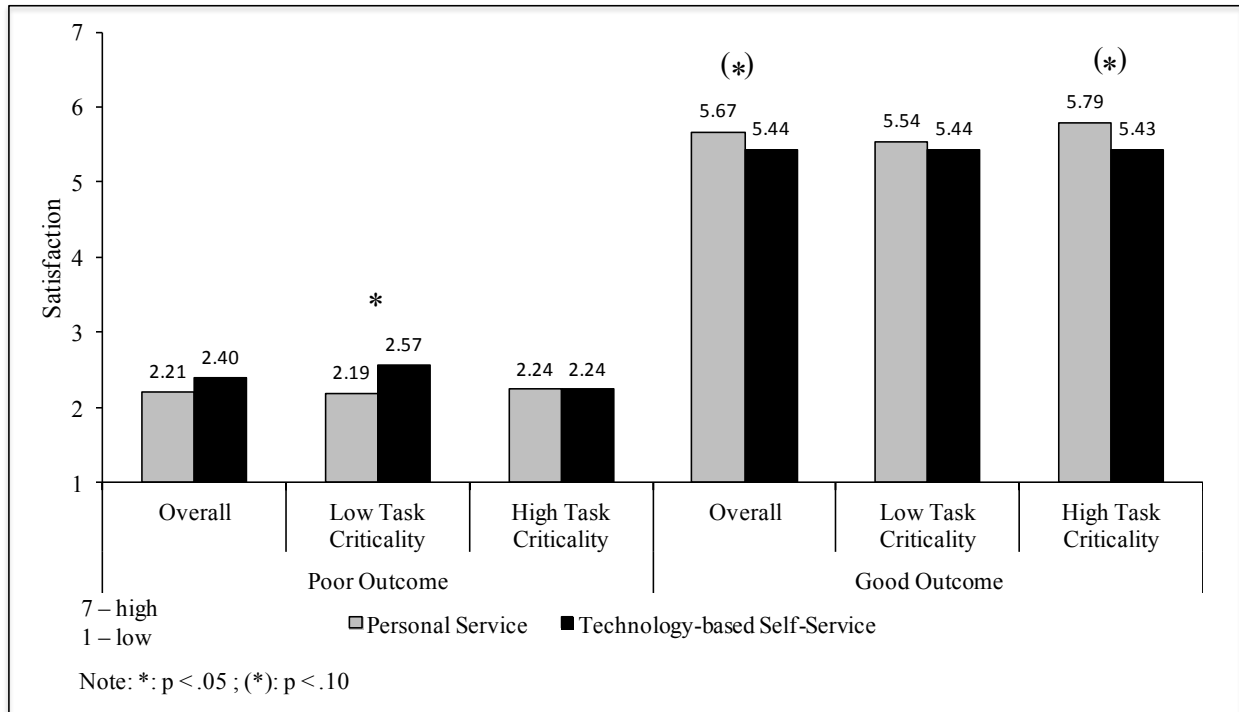
Figure 4.4: Mean Differences in Satisfaction for Personal vs. Technology-Based Self-Service.

In H6 and H7, I propose that channel differences in satisfaction judgments directly translate into differences in customers' behavioral intentions. Accordingly, I expect that the service channel moderates the impact of the service outcome on the customers' subsequent behavioral intentions. This effect should be most pronounced when task criticality is low and the service outcome is good.

The analysis of *WOM activity* does not show any statistically significant main or interaction effect of the service channel. The results are thus not in support of H6a and H7a. Instead, the results show highly significant main effects of the *service outcome* ($F(1, 807) = 16.90$, $p < .001$) and a marginally significant impact of *task criticality* ($F(1, 807) = 3.49$; $p = .06$) on *WOM activity*. Thus, customers have higher intentions to tell their friends about the provider (in a good or bad sense), when the *service outcome* is good ($M_{good} = 5.07$, $M_{poor} = 4.67$) and *task criticality* is high ($M_{high} = 4.97$, $M_{low} = 4.78$). The main effect of *service outcome* vanishes once the analysis includes *affect* and *attribution*, however ($F(1, 805) = 0.12$, $p = .73$).

As illustrated in Figure 4.5, findings with regard to customers' *WOM praise* parallel the results of customer satisfaction. Thus, the analysis of *WOM praise* reveals a statistically significant interaction between *service channel* and *service outcome* ($F(1, 807) = 6.43$, $p = .01$). The main effect of *service outcome* is also highly significant ($F(1, 807)= 1032.58$, $p < .001$). Planned contrasts reveal that *WOM praise* for a <u>poor</u> *service outcome* is lower when a person ($M = 2.21$) rather than a machine ($M = 2.48$, $F(1, 807) = 4.18$, $p = .04$) delivers the service. This result is contrary to my expectations that channel differences cease to exist when service outcomes are poor. For high quality outcomes, the effect reverses. That is, customers give more praise for a good service outcome when a person ($M = 5.47$) rather than a machine ($M = 5.27$, $F(1, 807) = 2.36$, $p = .13$) delivers the service. While results are in the expected direction, they do not provide statistical support for H6b. Contrary to the proposition in H7b, however, this effect is stronger when *task criticality* is high ($M_{PSC}= 5.65$, $M_{SST} = 5.29$, $F(1, 807) = 3.52$, $p = .06$) and almost vanishes when *task criticality* is low ($M_{PSC}= 5.29$, $M_{SST} = 5.25$, $F(1,807) = 0.06$, $p = .80$). Contrary to the proposition in H7b, the results do not indicate that the moderating effect of the service channel diminishes when task criticality is high. Instead, I find a significant interaction effect between the *service outcome* and *service channel* when *task criticality* is high ($F(1, 393) = 3.69$; $p = .06$), and a marginally significant effect when *task criticality* is low ($F(1, 414) = 2.79$; $p = .10$).[29]

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[29]   It is important to note that, in line with previous research, the effect vanishes almost completely when including the mediators affect, attribution and satisfaction are in the analysis ($F(1, 804)= 0.39$, p =.53).
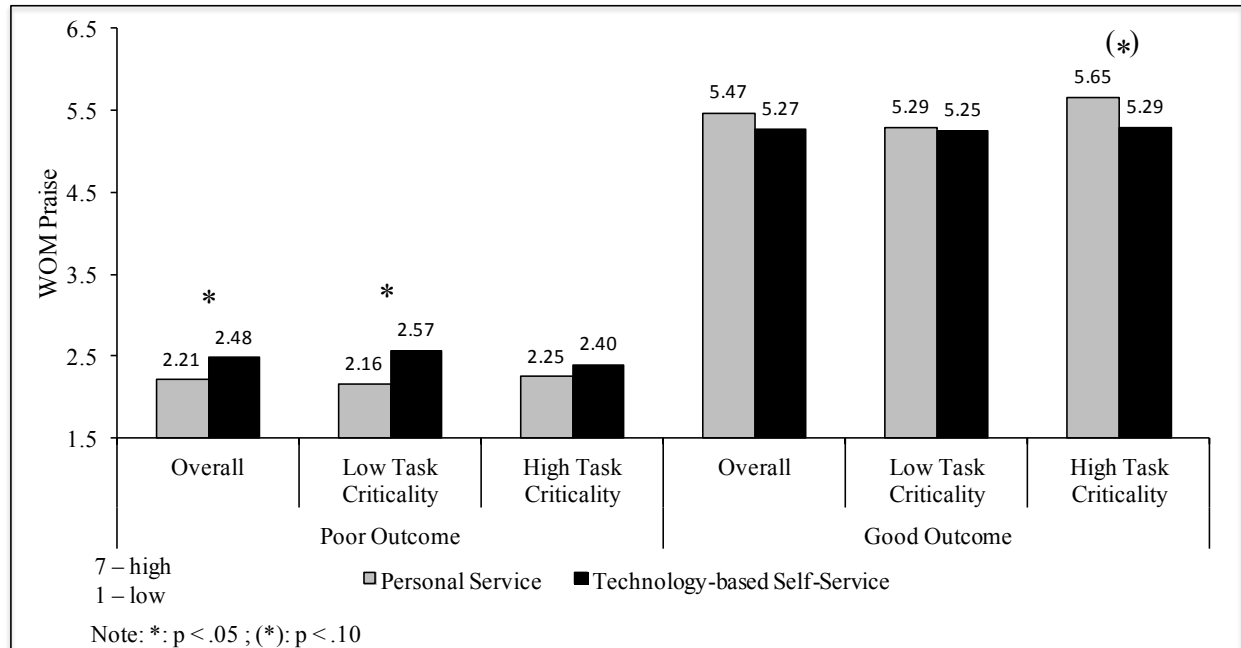
Figure 4.5: Mean Differences in WOM Praise for Personal vs. Technology-Based Self-Service.

In H6c and H7c, I propose that the *service channel* also moderates the impact of the *service outcome* on customers' *repurchase intentions*. In support H6c, the results reveal a statistically significant interaction of *service channel* and *service outcome* ($F(1, 807) = 4.34$, $p = .04$). Planned contrasts show that when the *service outcome* is good, customers are more inclined to use the provider again when using a personal service ($M = 5.86$) rather than when using a technology-based self-service ($M = 5.56$, $F(1, 807) = 4.37$, $p = .04$). It is important to note, however, that effects are again stronger when *task criticality* is high ($M_{PSC} = 6.07$, $M_{SST} = 5.52$, $F(1,807) = 7.20$, $p = .01$). As expected, *repurchase intentions* do not differ significantly between service channels when the service outcome is poor ($M_{PSC} = 1.98$, $M_{SST} = 2.11$, $F(1,807) = 0.77$, $p = .38$).[30] Regarding H7c, results do not indicate that the moderating effect of the service channel

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[30]   Results again do not reveal any statistically significant main or interaction effects of task threat. The two-way interaction of service channel and task threat ($F(1, 807) = 3.45$, $p = .06$) and service quality and task threat ($F(1,807) = 2.39$, $p = .12$) are marginally significant, however. Planned contrasts show that effects are in the expected direction. When outcome quality is low, participants display lower re-usage intentions when the service task is critical ($M=1.97$) than when it is not critical ($M = 2.11$, $F(1, 807) = 0.92$, $p = .34$). When the outcome quality is high, customers show higher re-usage intentions when they experience a critical task ($M = 5.80$) rather than a non-critical task ($M = 5.63$, $F(1,807) = 1.48$, $p = .22$).The results also show that self-service customers generally have lower future intentions when task threat is high ($M = 3.75$) than when task threat is low ($M = 3.92$, $F(1, 809) = 1.90$, $p = .17$). In contrast, customers reveal higher future intentions for a personal service when task threat is high ($M = 4.02$) than when task threat is low ($M = 3.82$, $F(1,809) = 1.55$, $p = .21$).

diminishes when task criticality is high. Contrary to this expectation, results reveal a significant interaction effect of the *service outcome* and the *service channel* when *task criticality* is high ($F(1, 393) = 3.70$; $p = .06$) and no channel effect when *task criticality* is low ($F(1, 414) = 1.01$; $p = .32$). These mean differences are detailed in Figure 4.6. Given that the customers' attitudes drive their behavioral intentions, I include the mediators *affect* and *attribution* as well as customer *satisfaction* as additional covariates to examine customers' behavioral intentions. As before, all proposed effects decrease in size. This suggests that – as expected – *affect*, *attribution* and *satisfaction* mediate the relationship of service outcome on the customers' behavioral intentions.
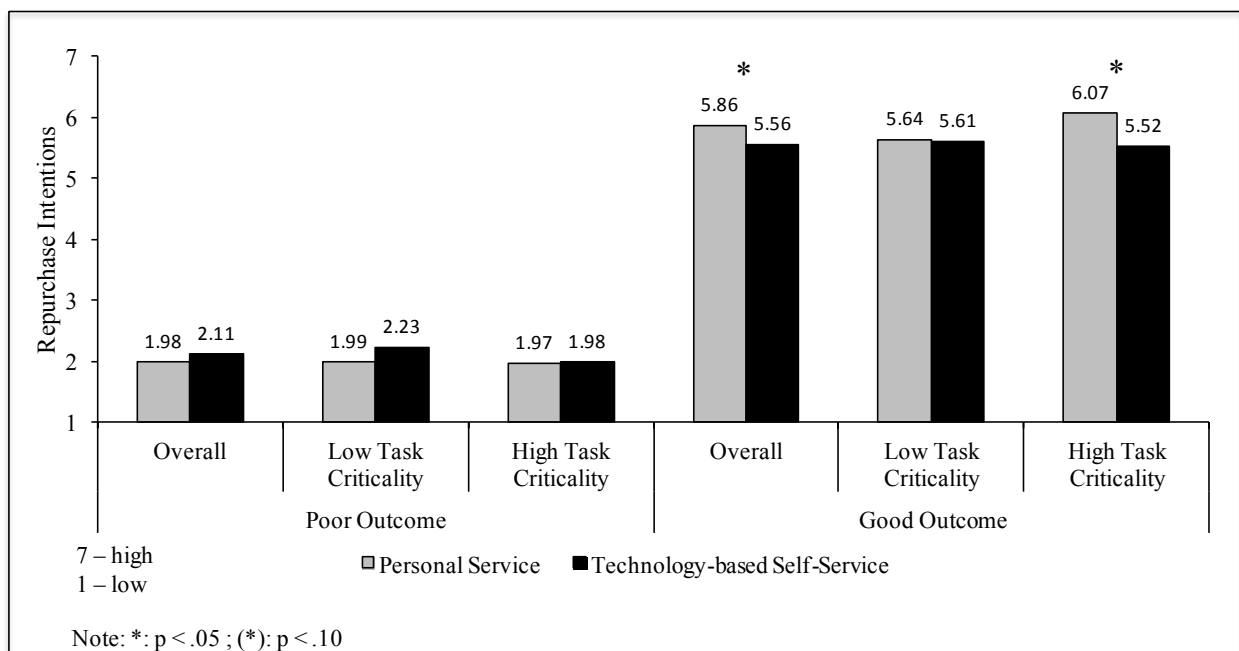
Figure 4.6: Mean Differences in Repurchase Intentions for Personal vs. Technology-Based Self-Service.

Mediation. I relied on the procedure recommended by Preacher and Hayes (2008) to test the indirect effect of the customers' responses to service outcomes. Following the previous theoretical discussion, I expect that the strength of the mediation of affect depends on the *service channel* and the level of *task criticality*. To test this moderated mediation, the estimation of the conditional indirect effects was conditioned on the levels of the moderators. Given that all moderators are binary, I estimated the indirect effects for the individual levels of the moderators *service channel* and *task criticality*. In addition to normal-theory tests that rely on the assumption

of normality (which cannot be assumed for an indirect effect *a x b*), Preacher and Hayes (2007) recommend using bootstrap confidence intervals for the conditional indirect effects. I used 5,000 bootstrap samples to estimate the significance of the conditional indirect effects. Statistical significance requires the confidence interval does not contain zero. Table 4.3 summarizes the results for the moderated mediation of *affect*.

As expected, the indirect effect of *affect* is statistically significant for all levels of the moderators *service channel* and *service task*. The coefficients show that the affective route is generally stronger for personal service customers than for self-service customers. Follow-up tests show that the difference between self-service and personal service coefficients is statistically significant from zero (Δ coef. = .19, z = 3.24, p = .001). Results also reveal that the affective route is stronger when task criticality is high. The difference between coefficients is also statistically significant from zero (Δ coef. = -.10, z = -1.74, p = .08).

Table 4.3: Tests of Moderated Mediation.

Mediator	Level Moderator 1	Level Moderator 2	Observed Coefficient	Bias	Product of Coefficients SE	Product of Coefficients Z	Percentile 95% CI Lower	Percentile 95% CI Upper	BC 95% CI Lower	BC 95% CI Upper
							Bootstrapping Confidence Intervals			
Affect	SST	Low Task Criticality	**0.9766**	**0.0013**	**0.0757**	**12.90**	**0.8305**	**1.1286**	**0.8306**	**1.1290**
		High Task Criticality	**1.0791**	**0.0022**	**0.0822**	**13.13**	**0.9229**	**1.2450**	**0.9205**	**1.2424**
	PSC	Low Task Criticality	**1.1691**	**-0.0001**	**0.0809**	**14.45**	**1.0112**	**1.3279**	**1.0137**	**1.3302**
		High Task Criticality	**1.2715**	**0.0008**	**0.0890**	**14.29**	**1.1036**	**1.4482**	**1.1045**	**1.4514**

Notes: SST - Self-Service Technology; PSC - Personal Service Channel; SE - standard error; CI - confidence interval; BC - bias corrected; 5,000 bootstrap samples. Indirect effect is statistically significant if the confidence interval does not include zero; significant effects highlighted in bold.

4.5 Summary and Discussion of Findings

Summary

This study is the first to empirically demonstrate that customers respond more affectionately to personal service encounters than technology-based self-service encounters and that this effect translates into important differences in customer satisfaction and behavioral intentions (i.e., WOM praise and repurchase intention) between service channels. Drawing from previous research on (self-) threat and the person-sensitivity bias, this research goes beyond the previous study of this thesis by demonstrating an important limitation to these channel effects. Accordingly, results of the present study demonstrate that differences in customers' responses to self-service and personal service encounters cease to exist when the service outcome is poor and hence perceived as threatening to the customer's self-esteem. Moreover, findings are that task criticality attenuates channel differences only when service outcomes are poor. When service outcomes are good, results reveal that criticality mostly strengthens the different responses of customers to self-service and personal service encounters. The results of this study thus underline that the person-sensitivity bias, proposed in social psychology (Moon and Conlon 2002) and applied in the context of price communications (Campbell 2007), does not *always* extend to the service context.

Discussion

The results of this study support the extension and applicability of the person sensitivity bias to the service field in many instances. By and large, findings of this study demonstrate that customer react more affectionately to personal service encounters than to technology-based self-service encounters. In line with expectations and the theoretical model, results of this study demonstrate that customers attribute less responsibility to a service provider and show significantly less positive affect than personal service customers <u>when service outcomes are good</u>. Mediation analyses reveal that the strength of affect as a mediator of the service quality – satisfaction link also differs significantly between service channels and service task. Thus, the affective route is significantly stronger for personal service customers and when task criticality is high.

Results also demonstrate that the customer's affect and attribution directly translate into differential satisfaction judgments – especially when a service outcome is good: Thus, when the service outcome is good, self-service customers are less satisfied with the service provider than personal service customers. When the service outcome is poor, results show that self-service customers are significantly more satisfied with a provider. This, however, only holds true when the service task is not critical. As expected, the perceived level of self-threat constitutes an important limitation to the impact of the service channel on customer satisfaction.

This study also goes beyond the previous study of this thesis by demonstrating that the differences between self-service and personal service customers do not stop at differential satisfaction judgments, but also translate into differential behavioral intentions. When service outcomes are good, self-service customers display significantly lower intentions to use a provider again than personal service customers. In addition, personal service customers also have higher intentions to reuse a service when task criticality is high, whereas self-service customers display higher repurchase intentions when task criticality is low. This finding reflects recent research, which suggests that most customers prefer a self-service to a personal service when task complexity or task criticality is low (Simon and Usunier 2007). Accordingly, customers may assume that a machine or software does not offer enough sophistication and support and / or consider a person more trustworthy and competent to deliver a critical task adequately.

This study also provides first empirical evidence that the service channel influences customers' WOM behavior. While results do not reveal any channel differences in customers' WOM activity itself, they indicate that WOM valence is more detrimental for low quality outcomes when using a personal service instead of a self-service. Thus, personal service customers are more negative in their WOM than self-service customers. Given that satisfaction levels do not differ between service channels when a service outcome is poor, this result is rather surprising and contrary to what was hypothesized. However, previous research suggests that negative WOM is highly emotion-laden and fast-spread (e.g., Schoefer and Diamantopoulos 2008; Sweeney, Soutar, and Mazzarol 2005), while positive WOM is carefully considered and more rationally driven (e.g., de Matos and Rossi 2008). One possible explanation for this result may thus be that a customer's affective response to a poor service outcome dominates the positivity of the WOM. As noted previously, customers always react more compassionately to humans than machines. This may

hence explain why customers' WOM praise differs between service channels especially when customers' experience more emotional-laden low service outcomes.

While previous research suggests that customers should disregard differences between persons and objects in highly critical situations (Moon and Conlon 2002), results of this study do not provide universal evidence for this proposition. Instead, results demonstrate that task criticality does not affect customers' differential responses to personal and self-service channels when the service outcome is good. As discussed in the theoretical section of this study, customers do not perceive high-quality outcomes as threatening to their self-image. Task criticality may hence not reduce person versus object differences in these instances as it merely increases customers' affectionate response to the outcome. Following the notion that customers react more compassionately to personal service encounters than technology-based self-service encounters may thus provide an explanation why channel differences are more pronounced when task criticality is high *and* service outcomes are good. Another – related – explanation might be that the customers' affective response is highly intertwined with their attribution of responsibility. Previous research shows that emotions strongly affect human perceptions and judgments (e.g., Forgas and Bower 1987). Results of this study show that customers' affect is generally higher for personal services and when task criticality is high. Similarly, results show that personal service customers attribute significantly more responsibility to the provider when quality and task criticality are high. This suggests that customers feel more delighted with a good outcome to a critical service task in personal service encounters and hence also give more credit to the employee (provider). This does not only explain why personal service customers are more positive in their WOM, but also why customers show higher repurchase intentions and satisfaction levels when both task criticality and service quality are high.

Finally, the results of this study demonstrate that channel differences cease to exist when service outcomes are poor. Customer *affect*, *attribution*, *satisfaction*, and *repurchase intentions* hardly differ between service channels when the service performance is poor. As discussed previously, the model on perceived self-threat provides an explanation for this result. In this study, the poor service outcome was – among others – manipulated through a poor test performance at the end of the course. As Park and Maner (2009) note, performing poorly on a test poses a threat to the psychological self that evokes distress and elicits behavior to maintain one's self-esteem. Thus, the low quality outcome in this study's research setting does not only affect the objective quality

level, but also the customers' levels of perceived self-threat. Results of this study demonstrate that differences between persons and objects, i.e. differences between self-service and personal service channels, do not prevail in such highly threatening situations. Instead, customers engage in self-serving attributions and highly affectionate responses to enhance or maintain a positive view of their self. Rather than task criticality, the level of perceived self-threat thus seems to constitute an important boundary to the person-sensitivity bias proposed in previous research. It is important to note, however, that poor service outcomes do not always and necessarily increase the customers' level of perceived threat in any service setting. For instance, a long wait at the grocery store or a car rental counter may be a source of anger and dissatisfaction, but not a source of threat to the customers' self-esteem. Results of this study may hence not apply to all service settings equally well. I will discuss this aspect in more detail in the limitations section of this study.

4.6 Contributions and Implications

Findings of this study have a number of important implications for service research and management practice.

From a managerial point of view, understanding the differences in the customers' psychological and behavioral responses to high-touch or high-tech service channels is important. It enhances managerial decisions on whether or not and when to replace humans by machines. With the current strive for reduced costs and increased productivity, managers mostly consider humans and machines interchangeable. The results of this study raise questions about the applicability of this claim. Following the ideas of Selnes and Hansen (2001), this study underlines that personal services may be an important driver for customer satisfaction and loyalty intentions when tasks are critical to the customer and employees can provide a high-quality service. The results, however, also show that personal services can have rather detrimental effects and increase customers' negative WOM when service performance is poor. This suggests that managers should stimulate the provision of a high-quality service through well-trained and motivated service personnel. When a high service quality cannot be assured, however, results of this study

imply that a self-service channel may not only be the more efficient but also the more effective way to deliver the service.

From a theoretical point of view, the results of this research provide further evidence that the person sensitivity bias extends to the service domain. In line with this bias, results of this study demonstrate that customers generally evaluate high-touch service encounters in more extreme manners. That is, customers are more satisfied with a good performance but also less satisfied with a poor performance when a human rather than a machine delivers the service. This study establishes an important limitation to this effect, however. In line with Moon and Conlon's (2002) suggestion, customers do not differ in their psychological and behavioral responses when situations are highly threatening. This view has been challenged by Campbell (2007), who finds that restricting the customers' information processing increases person versus object differences through the highly affective response of the customer. However, through the inclusion of the self-threat model (Campbell and Sedikides 1999), this study provides sound theoretical and empirical support why this effect does not extend to the service context. Thus, this research demonstrates that perceived self-threat increases the customers' self-serving attributions regardless of the service channel in use. While customers still differ in their affective response depending on their service channel (in line with Campbell's suggestion), a lack of differential attributions explains why person vs. object differences cease to exist between service channels when self-threat is high.

Moreover, this research has important implications for the growing literature on multi-component models and the increasing importance of affect for customer satisfaction and behavior (e.g., Homburg, Koschate, and Hoyer 2006). In particular, this study shows that affect first and foremost mediates the effect of service outcomes on customer satisfaction. Moreover, findings are that this mediation gives rise to the differential effects of the service channels on customer satisfaction and behavioral responses. The findings of this study also suggest that affect might color the customers' subsequent attributions of responsibility. This suggests that affect and attribution are more strongly intertwined than previously expected.

Finally, this research also finds that social response theory (Moon 2000, 2003; Reeves and Nass 1996) does not extend to self-service encounters – at least not in the current state. According to

this theory, humans respond to computers in a social manner and thus also attribute responsibility in a social (self-serving) manner. This effect increases with the similarity of interacting "partners" (Moon 2003). Considering that this effect also increases with the mere perception of social presence (e.g., by being told to interact with a person: Morkes, Kernal, and Nass 2009; through the use of an avatar: Holzwarth, Janiszewski, and Neumann 2006), suggests that technology-based self-service encounters are not "social" enough to elicit the same behavior customers would show when interacting with a person. However, it is likely that service customers would also respond to self-service encounters more socially once their design incorporates more social cues. In the current study, I do not include and test the impact of social cues or various levels of personalization within the SST context. However, following the notion of social response theory, social cues or personalization might constitute another limitation to the person-sensitivity bias and might hence be a fruitful area for future research.

Limitations and Implications for Future Research

This research is subject to a number of limitations, which leave room for future research. First, this study lacks generalizability. This study examines the impact of service channels using an educational service and a controlled experimental setting. Although the experimental setting is appropriate to establish causal effects, future research needs to demonstrate the generalizability of the findings in a more diverse field setting. Moreover, many of the effects may be specific to educational services used as a setting for this study. Educational services are highly participative and rely heavily on the customer's compliance for success. Especially a poor test performance poses a high psychological threat to the customer. As I conclude that self-threat constitutes a boundary to the person-sensitivity bias, while task criticality does not, this claim needs further empirical investigation. Future research could, for instance, examine whether or not financially threatening or risky situations also attenuate person versus object differences. While customers may perceive financial services as critical or risky, it is likely that a poor investment does not pose a direct threat to the customer's self-esteem. It is thus likely that the findings of this study only generalize to situations that pose a psychological threat to the customer.

Future research could thus examine further aspects of a service that increase customers' level of self-threat and their impact on the channel effects uncovered in this research. For instance, it is

likely that the level of customer participation during the service process impacts the level of threat that customers perceive. Consider a financial investment again: If the customer does not put a lot of effort into the service, but merely relies on the recommended investment of the provider, this should have a very different effect than a service setting, where the customer is actively involved in the process and iteratively comes to an agreement with the provider. Once customers become more involved, a poor performance could become more threatening to their self-esteem and hence pose a further limitation to the channel differences documented in this study.

Second, this study focuses on a rather utilitarian service. That is, in the current experiment, respondents imagine using an educational service to prepare themselves for their job promotion. Previous research suggests that both, affective and cognitive responses of customers may be different for the type of product or service they use (e.g. Homburg, Koschate, and Hoyer 2006). Hedonic products and services may thus elicit more affectionate responses than the service examined in this study. Although, this study finds that affect is a strong mediator of the effect of service quality on the customers' satisfaction and also gives rise to the moderating effect of the service channel, it is likely that these effects would be even stronger for hedonic services. Future research could thus examine whether these effects extend to hedonic settings, such as retail shopping. While business press reports first attempts of firms to introduce SSTs in hedonic settings, such as the replacement of shopping assistants through machines (Caterinicchia 2007), reports of successes fail to appear.

Finally, this study does not include important customer characteristics that may help to identify important customer segments that respond to service channels differently. As noted in the theory section, the self-threat model (Campbell and Sedikides 1999) proposes that the perceived level of threat depends on an individual's achievement orientation, self-esteem, or risk aversion, for instance. Given that this study concludes that self-threat poses an important limitation to the differential effects of service channels, it is likely that this effect will not apply to all customer segments equally. Future research could thus examine how important customer characteristics attenuate or strengthen the impact of the service channel on customers' responses to a service encounter.

5. Customer Retention in Technology-Infused Service Settings

In the last decades, information technology has continuously changed the way customers experience a service and their relationship with a service provider. Today, 62% of U.S. bank customers prefer to conduct their financial businesses online (American Bankers Association 2011), 59% of U.S. customers prefer to shop their retail or groceries on the Internet (Nielsen 2012), and 68% of airline customers worldwide check-in for their flight online, via mobile phone, or self check-in kiosk at the airport (SITA 2012). Through the introduction of such technology-based self-service channels, customers have become "active participants" rather than a "passive audience" in service delivery (Prahalad and Ramaswamy 2000).

Although, business press is loaded with praise for self-service technologies, anecdotal evidence from business practice suggests that some businesses had to learn that technology is not always a suitable substitute for human interactions. Professor of psychiatry, Richard Friedman (2008), for instance, notes that "internet-based therapy (...) seems like a poor substitute for a real human bond with all its nonverbal cues and face-to-face exchanges. After all, if there is no excitement or emotional charge, you've probably got a sterile therapeutic relationship that is more likely to liberate you from your money than from your conflicts." Similar to Prof. Friedman, a number of researchers have questioned the enthusiasm for self-service channels and call for an in depth investigation of the long-term effects of self-service technologies on customer relationships (Dabholkar and Bagozzi 2002; Meuter et al. 2005; Selnes and Hansen 2001). No study has answered this call thus far.

The present paper fills this void. In particular, this study investigates the differential effects of self-service and personal service usage on customer retention over time. In doing so, this study

makes a number of significant contributions to the extant literature: First, this study offers a new way of looking at customer retention in multichannel settings. Drawing from the concept of value, I discuss the differential effects of self-service versus personal service channels on customer relationships over time. As a central pillar of the service-dominant logic (S-D logic; Vargo and Lush 2004, 2008), the concept of value-in-use provides a general framework for the integration of established theories and research findings. Second, and in a related point, this research demonstrates how S-D logic provides a unifying framework for theory application and hypothesis development for empirical research. In particular, this research shows the benefits of examining customer relationships from a S-D logic vantage point by fully explicating when and how self-service channels can create valuable customer experiences. Third, this study extends previous media choice and media effectiveness research to customer-firm interactions. While previous media research has focused on team collaboration within organizations, this study demonstrates that theories on media choice and media effectiveness are helpful in characterizing various service channels and in discussing their impact over time. Finally, I empirically test the hypothesized impact of self-service and personal service channel usage on customer retention by applying survival analysis to a unique longitudinal dataset that allows me to investigate the use and effects of personal and self-service channels over time. This study is the first to fully account for the (moderating) effect of time in self-service settings.

From a managerial standpoint, the current study provides a deeper insight into the long-term effectiveness of self-service channels. Based on the theoretical discussion and empirical findings, this study gives recommendations on how managers can improve the value customers can derive from both, self-service and personal service channels and from their relationship to a service provider over time.

The remainder of this article proceeds as follows. I begin by presenting the theoretical foundations of this research. Based on a S-D logic perspective, I first contrast the value a provider offers to a customer in self-service and personal service channels and then examine the value customers can subsequently derive from these differential value propositions. I then discuss the impact of both service channels and their interplay on customer defection by drawing from theories on media richness and channel expansion. Based on this theoretical framework, I derive hypotheses regarding the consequences of self-service usage. I test these hypotheses using longitudinal customer usage data ($n = 5,467$) of a roadside assistance service in the automotive

industry. The study concludes with theoretical contributions and managerial recommendations on how customer experiences and relationships can be improved in multichannel self-service settings.

5.1 Theoretical Basis: The Value of Self-Service

To fully understand how technology-based self-service channels affect customer relationships to a service provider over time, one needs to consider the value customers can derive from both personal and self-service channels over the duration of their relationship with the provider. That is, it is important to understand when and how information technology can add or create valuable customer experiences and thus enhance customer relationships in the long-run. I find extensive support for the importance of customer-derived value in relationship management and satisfaction literature (e.g., Oliver 1999). As Kim and Son (2009, p. 53) explain, "loyalty – which indicates a favorable attitude toward maintaining a long-term relationship with the provider – results from cognitive perceptions about the current value of using the service". Customers will thus only remain in a relationship, when they consider this behavior beneficial and believe that they can derive value from the provider's offering.

Despite its importance, the concept of value remains rather vague in current research (Davis, Spohrer, and Maglio 2011; Grönroos 2011). Value has been described as a comparison of costs and benefits (e.g., Campbell, Maglio, and Davis 2011), a means to an end (e.g., Beuningen et al. 2009), as well as a consumption-related emotion (e.g., Chan, Yim, and Lam 2010). There is, however, general agreement on the importance of the concept of value-in-use (e.g., Grönroos 2011; Vargo and Lusch 2008; Vargo and Akaka 2009). Accordingly, if customers cannot create value by using a product or service, i.e. derive a value-in-use, they will not be willing to pay high prices or even stop buying altogether in the long run. Grönroos (2011) thus proposes that the conventional concept of value-in-exchange, i.e. the financial value obtained by the firm, is achieved through a customer's value-in-use.

The concept of value-in-use is a fundamental pillar of the service-dominant logic (S-D logic) of marketing (Vargo and Lusch 2004, 2008). According to S-D logic, value creation is not confined

to the firm or separated from the customer. Instead, Vargo and Lusch (2008) propose that <u>value is always co-created</u>. In other words, value is created with the customer through a unique combination of the customer's and the provider's resources (e.g., through a customer's skills to use a self-service technology and the provider's knowledge embedded in the self-service technology that ensures an easy-to-use design). Customer and provider are hence essentially <u>resource integrators</u>. If we wish to understand the value customers can derive from an offering, we thus need to take into account that firms do not deliver or distribute value (as often assumed in relationship marketing literature) – they make <u>value propositions</u>. That is, according to S-D logic, firms create and deliver resources that enable customers to derive value, while customers are the ones who determine value by incorporating the firm's offering into their own lives. Given the dependence on the unique resources and circumstances of a customer's value creation, S-D logic also posits that value is <u>uniquely and contextually derived</u>.

In order to understand customer value and loyalty to a service provider in self-service settings this study thus examines 1) the offering a firm is making (i.e., the value proposition) and 2) the customer's unique resources and circumstances that determine the value that is co-created at last (i.e., the value-in-use). I discuss the different capabilities and characteristics of personal and self-service channels from a media richness point of view and integrate channel expansion theory to understand when and how customers can create unique value from these different service offerings. Figure 5.1 provides an overview of the theoretical foundation and underpinnings of this study. I will discuss these aspects in detail in the following.
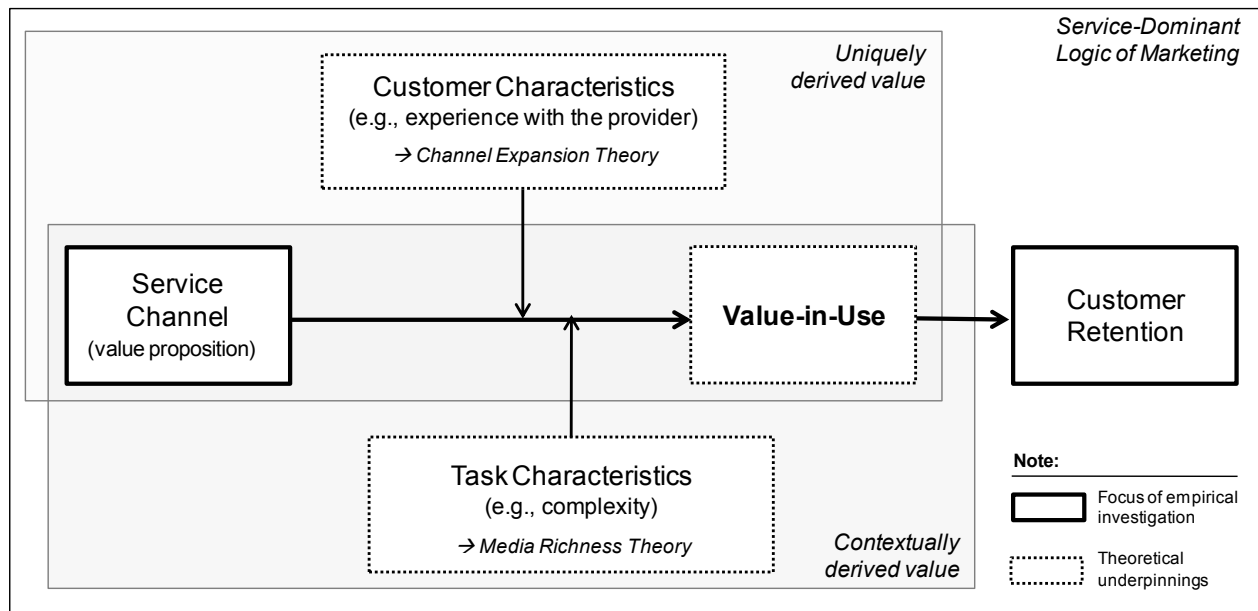
Figure 5.1: Theoretical Underpinnings of Study 3.

As a preliminary step in understanding and differentiating a firm's value proposition and the resources provided to the customer in self-service and personal service channels, I contrast the relationship of the service representative, the customer, and the technology for each channel. According to the archetypes of customer contact by Froehle and Roth (2004), self-service encounters are essentially technology-generated customer contacts that entail a mere interaction between customer and technology. In these service encounters, a service representative is no longer involved, as the information technology allows customers to deliver the service completely by themselves.[31] In S-D logic terms, then, customers are not only *co-creators* of value in self-service channels, but also active *co-producers* of the core offering itself (Vargo and Lusch 2008). In contrast to self-service channels, personal service encounters always involve the presence of a service representative and entail an immediate interaction between customer and service employee. While both parties do not need to be co-located, a personal service channel always entails a customer's awareness of their communication partner.[32]

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[31]   It is important to note, that many service providers do offer personal assistance when self-services are first introduced. Usually this is only a preliminary step until customers are experienced and fully able to conduct the service on their own. Self-service gas pumps are a good example for such an evolution from personal to self-service.

[32]   I assert that personal service channels are merely defined by customers' awareness of their human counterpart during service delivery. I thus do not only consider face-to-face service encounters as personal service channels, but also regard technology-mediated service encounters (e.g., telephone) as personal service channels – as long as they entail a customer's awareness of the presence of a human counterpart and an immediate interaction between the two. This

In both, self-service and personal service channels, service providers offer distinctive resources to their customers. To examine these in detail and contrast a service provider's value propositions in self-service and personal service channels, I draw from media richness theory (MRT; Daft and Lengel 1986; Daft, Lengel, and Trevino 1987). According to MRT, media can be characterized by their ability to convey communicative cues, give immediate feedback, support language variety, and allow personalization. Clearly, these media characteristics are also closely related to the intimacy of an exchange (Rice 1993) and the idea of social presence, which posits that media differ in their ability to convey the presence of communicating participants (Short, Williams, and Christie 1976).

Following this differentiation, self-service channels can be characterized and contrasted to personal service channels by their lower personalization, the reduced number of cues transmitted simultaneously, and the lower symbol set offered. The fact that self-service channels always entail a customer's sole interaction with information technology underlines that these service channels are inherently more standardized and allow less customization and personalization than traditional personal service channels (Cyr et al. 2007; Davis, Spohrer, and Maglio 2011). Online accessible "frequently asked questions" (FAQ), for instance, allow customers to get an answer to common problems encountered by customers. As these FAQs are very standardized, they do not allow customers to interpret any other cues (e.g., trustworthy behavior, comforting voice) than the ones given in the written text online. Moreover, this self-service does not allow personalized attention to the individual question at hand and does not (necessarily) offer immediate feedback to the specific problem. As the example illustrates, self-service channels are rather lean, highly standardized, and rarely include personalized touches. However, given their inherent (media) characteristics, self-service channels usually offer customers easy accessibility (e.g., nearby ATM or online vs. a bank's branch), great availability (e.g., 24/7 vs. a bank's office hours), and thus increased flexibility and high efficiency of information acquisition (e.g., Barnes, Dunne, and Glynn 2000; Choudhury and Karahanna 2008; Curran, Meuter, and Surprenant 2003).

In contrast, personal service channels are highly interactive (Venkatesan, Kumar, and Ravishanker 2007), which greatly supports personalization, immediate feedback, and language

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assertion is supported by research on computer-mediated communication. In particular, Morkes and colleagues (1999) find that once humans are aware of a human communication partner, they act more sociable, show more mirth, and spend more time on a task.

variety. For the example above, relying on a personal service channel for problem solving would mean that customers, who can call-in to discuss their problem or even visit the service branch of the provider to talk to a service representative, can explain their problem in detail. Through an immediate feedback and an interactive give-and-take between customer and employee, both parties can reach a mutual understanding of the problem and how it can best be solved. As the example illustrates, the personal service channel allows tailoring the service to the customer's specific needs and wishes (i.e., offers high personalization) and enables service employees to anticipate customer needs more easily through the support of language variety and the greater number of communicative cues transmitted. As the interpersonal nature of the exchange allows individual attention and feedback to occur (Barnes, Dunne, and Glynn 2000), personal service channels also offer social benefits for customers in terms of "familiarity, personal recognition, friendship, and social support" (Gwinner, Gremler, and Bitner 1998, p. 102).

Value-in-Use – When and how Self-Service and Personal Service Channels can Create Valuable Customer Experiences

Current research on media effectiveness proposes to not only consider the capabilities and characteristics of a medium, but also the unique circumstances and the person using it (Dennis, Fuller, and Valacich 2008). In its original form, MRT (Daft and Lengel 1986) introduced a number of characteristics that defined a medium. This richness scale was considered static and hence (pre-) defined the effectiveness of a medium to accomplish a given task. In particular, Daft and Lengel (1986) proposed that equivocal tasks, which require the exchange of complex knowledge and are ambiguous in their interpretation, are best solved through rich media (i.e., media which allow transmitting a greater number of communicative cues, language variety, immediate feedback, and personalization). Moreover, the theory predicts that users will encounter a lower outcome-quality when relying on lean media for complex and ambiguous tasks. In support of this prediction, previous research on team collaboration has demonstrated that while teams could perform complex tasks through lean media, it took them longer to reach a shared understanding and solve a task (Walther 1992). A recent study by Vickery and colleagues (2004) further supports this notion. In particular, this research finds that an appropriate match of media richness and service type results in improved customer loyalty and firm performance in complex industrial (B2B) service settings. The authors explain that rich media can create personal linkages

between customer and service provider through the rich interaction and socialization of both parties. In support of this notion, recent research also demonstrates that rich media are not only used to accomplish a certain task more efficiently, but also to satisfy relational goals of communicating partners (Sheer and Chen 2004).

The above reasoning suggests that customers should be able to derive most value from self-service channels when these lean and highly standardized channels are used for easy and repetitive tasks. More precisely, MRT's predictions on media effectiveness imply that the customers' beliefs about duration appropriateness are unlikely to be met when self-service channels are used to accomplish rather complex tasks. The same is reasonable for personal service channels and simple tasks. Simple tasks merely require media that are high in transmission rather than processing capabilities (Zigurs and Buckland 1998). Hence, using personal service channel that allows an individual give-and-take to process information would overcomplicate service processes (Vickery et al. 2004). Consider a banking transaction. If a customer conducted a simple transaction through an assisted teller in a bank's branch, this would increase the customer's effort in initiating and accomplishing the task (i.e., getting back and forth to the branch, reaching an available teller, explaining the task) and in consequence unnecessarily increase the customer's transaction costs. Clearly, using personal service channels for such an easy task not only decreases the customers' contact beliefs (i.e., inappropriate duration, too much information, unnecessary intimacy), but also deprives customers of the benefits self-service channels offer (e.g., easy accessibility, increased availability). Taken together, the above reasoning suggests that customers should derive most value from rich, personal service channels when tasks are complex and ambiguous and from lean, standardized self-service channels when tasks are easy and repetitive.

More recent extensions of MRT underline, however, that even the perceived richness of a medium is context-specific (e.g., Carlson and Zmud 1999; Dennis, Fuller, and Valacich 2008). That is, the richness of a medium is no longer considered static or predefined. Instead, researchers posit that even very lean media can be perceived as rich over time, once customers learn how to use it correctly and more efficiently (Walther 1992). Following this line of thought, channel expansion theory posits that a user's perceived richness of a medium does not only depend on its characteristics, but also on the user's experience with it (Carlson and Zmud

1999).[33] Instead of merely stating that one medium is inherently better than another, recent research thus proposes that "communication performance will be enhanced when different media are used at different times" (Dennis, Fuller, and Valacich 2008, p. 576). This suggests that next to task characteristics, unique customer characteristics and circumstances will also determine the value-in-use a customer can derive from a certain service channel.

I find support for this idea in service research. Accordingly, it has been argued that the value customers perceive from a service channel strongly depends on the complexity of the service task at hand (Simon and Usunier 2007) and the unique characteristics of a customer (e.g., Beuningen et al. 2009; Looney, Akbulut, and Poston 2008). Beuningen and colleagues (2009), for instance, show that novice customers' self-efficacy increases their perceptions of service performance and the overall value they can derive from a technology-based self-service channel. Hereby, self-efficacy refers to "a perception of one's ability to organize and execute courses of action to accomplish a particular task" (Looney, Akbulut, and Poston 2008, p.832). This suggests that even when tasks are more complex, customers can derive value from self-service channels when confident in their own skills and abilities. This notion is supported by Campbell, Maglio, and Davis (2011), who underline that customers' skills and capabilities are especially important for value-creation in self-service settings.

However, customers do not only derive an economic value in service encounters, e.g. through a more customized service, better quality, and more control. As Chan and colleagues (2010) point out, customers can also derive relational value (i.e., enjoyment through relationship building) from service encounters. The extent of such value creation, however, again strongly depends on the customers' unique characteristics. Chan, Yim, and Lam (2010), for instance, find that customers from a highly collectivist cultural background can derive greater relational value through their participation in service production than their individualist counterparts. This suggests that other, related customer characteristics, such as an individual's need for interaction with service personnel (e.g., Meuter et al. 2005), might also impact a customer's value creation.

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[33]   Carlson and Zmud (1999) differentiate four knowledge-building experiences: Users' unique experience with a particular channel, topic, context, and interaction partner. All four aspects influence a user's (communication) skills and abilities and thus the perceived richness of a medium. While the original theory has focused on e-mail communication, it has recently been validated in a number of further channels such as instant massaging (D'Urso and Rains 2008). D'Urso and Rain (2008) also note, however, that stable medium characteristics (i.e., immediacy of feedback, number of cues transmitted, natural language, and personalization) remain critical for richness perceptions, as experience factors mainly proved to impact user's perceptions of the personalness of a medium in their study.

Moreover, customers in high need for interaction might even derive more value from a personal service – even when it is used for a rather simple and repetitive task. In contrast, some customers are known to simply enjoy "doing it by themselves" (i.e., using self-service channels), as it enables them to derive experiential benefits (Campbell, Maglio, and Davis 2011; Lusch, Vargo, and O'Brien 2007). As suggested in media effectiveness research, Chan, Yim, and Lam (2010) also propose, but have not tested, that time or experience with a provider might also affect the co-creation of both economic and relational value.

Table 5.1 summarizes the previous discussion on the value-in-use customers can derive from a provider's value proposition in self-service and personal service channels. Taken together, the above reasoning highlights the notion that the value customers can co-create in a particular service channel (i.e., the value-in-use) differs markedly, when considering the differences between the customers' resources (i.e., ability, motivation, knowledge) and the unique service circumstances (e.g., complexity of the service task). I find support for this notion in previous research. For instance, in an early study on the impact of customer contact on service satisfaction, Bearden, Malhotra, and Uscátegui (1998) most generally propose that satisfaction should be enhanced when the level of customer-firm contact matches a customer's schema of anticipated contact. Similarly, Lusch, Vargo, and O'Brien (2007) propose that co-production opportunities, as offered in self-service channels, should always match a customer's desired level of involvement. More recently, Collier and Kimes (2013) have even suggested that customers' allocated resources in a self-service context, such as the cognitive load surrounding the technology, should match the required resources of a task. When discussing how both self-service and personal service channels can impact a customer's relationship to a service provider, I will thus keep the individual characteristics and resources of a customer, the resource requirements of a task, and the unique capabilities of a service channel in mind.

Table 5.1: Value in Self-Service and Personal Service Channels

	The Value-Proposition *what the firm offers*	**The Value-in-Use** *when the customer can benefit*
Self-Service Channel	**communicative cues and language variety**: efficiency of information exchange as coordinated interaction efforts are not neccessary → task orientation (e.g., Choudhury and Karahanna 2008)	tasks are easy, lean, and repetitive; service is not too complex, critical, or new for the customer (e.g., Campbell, Maglio, and Davis 2011; Selnes and Hansen 2001; Simon and Usunier 2007)
	immediacy: often automated responses; more efficient than potentially unanswered phones and walks to empty offices → accessibility and flexibility (e.g., Curran, Meuter, and Surprenant 2003; Wallace, Giese, and Johnson 2004)	customers have a high role clarity, ability, and motivation to use a self-service; high self-efficacy, expertise (e.g., Beuningen et al. 2009; Looney, Akbulut, and Poston 2008; Meuter et al. 2005)
	personalization: usually few personal touches or social cues → self-orientation with increased control (e.g., Cyr et al. 2007; Davis, Spohrer, and Maglio 2011)	customers enjoy "doing it themselves" and wish to be in control (e.g., Campbell, Maglio, and Davis 2011; Davis, Spohrer, and Maglio 2011; Lusch, Vargo, and O'Brien 2007)
Personal Service Channel	**communicative cues and language variety**: broader symbol set, rich in relational information, higher in social context cues → relational orientation (e.g., Cyr et al. 2007)	tasks are more equivocal and ambigous; service is more complex and critical or rather new for the customer (e.g., Selnes and Hansen 2001; Vickery et al. 2004)
	immediacy: interactive nature; immediate feedback to gain / achieve mutal understanding; restricted to office hours → individualized attention (e.g., Venkatesan, Kumar, and Ravishanker 2007)	customers do not have the skills, motivation, and abilities to deliver a service or solve a task alone and/or via technology (e.g., Meuter et al. 2005)
	personalization: high through interactive give-and-take, highly personalized interactions → other orientation with shared responsibilities (e.g., Barnes, Dunne, and Glynn 2000; Selnes and Hansen 2001)	customers enjoy or need human interaction, a need to get to know or gain trust to the provider, reduce perceived risk and anxiety (e.g., Chan, Yim, and Lam 2010; Dabholkar 1996; Meuter et al. 2005)

5.2   Conceptual Model and Hypotheses

The Impact of Self-Service and Personal Service Channels on Customer Retention

Scholars have observed that customers need to solve a variety of tasks in service settings, ranging from rather simple, repetitive tasks to more complex and demanding tasks (Selnes and Hansen 2001). Following my reasoning above, it becomes clear that these different tasks pose different requirements to the capabilities of the service channel and the customers' skills and abilities to derive a value-in-use. Most generally, self-service channels are characterized by their low personalization and the reduced number of cues transmitted, whereas personal service channels are high in personalization, language variety, and immediacy of feedback. In order to avoid overcomplification, key tenets of MRT thus imply that self-service technologies lend themselves for rather easy and repetitive tasks, while personal service channels should offer the best performance for rather complex tasks (see Table 5.1). This suggests that customers, who choose between different channels of service delivery to experience the most appropriate service channel for their different tasks and their own capabilities, should be able to derive most value from these channels and hence be most satisfied with the service outcome.

A number of research disciplines provide further support for the idea that "two is better than one". Multichannel research, for instance, demonstrates that offering multiple service channels instead of merely one, increases in customer loyalty (e.g., Campbell and Frei 2010; Hitt and Frei 2002; Wallace, Giese, and Johnson 2004). Interestingly though, a few studies have also shown that once usage of online channels increases, customer loyalty decreases (Neslin et al. 2006). Service science arrives at a similar conclusion and posits that self-service channels are not <u>always</u> suitable. In their study on when particular service designs can create value, Campbell, Maglio, and Davis (2011) thus assert that self-service channels are particularly suited for relatively simple interactions that are highly repetitive, while personal service channels might be more important when it is not just about gathering information. In further support for this notion, media choice and effectiveness research finds that rich and personal channels are often used and particularly lend themselves to accomplish relational goals rather than the mere exchange of information (Sheer and Chen 2004; Vickery et al. 2004). Following this vantage point, service research has also put forward the idea that customer defection should be lowest for customers that use both,

personal as well as self-service channels (Selnes and Hansen 2001). That is, personal service channels should be more meaningful and satisfying for customers, when customers use these channels for more complex tasks while relying on self-service channels for simple tasks. Indeed, Bendapudi and Berry (1997) demonstrate that the expertise of a service worker creates both trust and dependency on the provider. As this expertise, however, is more likely to be revealed in demanding tasks suggests that customers should value personal service most for complex than for easy tasks.

Taken together, previous research indicates that customers, who experience the appropriate service channel for the demands imposed by their portfolio of tasks and for their unique preferences, skills, and abilities, should achieve the best service outcome and derive the most valuable experiences with their provider. Customers, who use only one particular service channel, however, should run the risk of an unsatisfactory outcome and most likely derive a lower value from their relationship with a service provider overall. As the appropriate customer contact has not only been shown to impact performance outcomes, but also customers' future intentions (Froehle and Roth 2004), these findings imply that customers who experience the best of both worlds should be most loyal to their provider. Customers who continuously use one service channel for all their service demands, on the contrary, should be deprived of some of the benefits the different channels can offer when applied to accomplish the appropriate task. Consequently, I propose that

> **Hypothesis 1 (H1):** The ratio of self-service vs. personal service use influences a customer's likelihood of defection in a U-shaped manner, with high levels of self-service or personal service usage being associated with the highest chance of defection and intermediate levels of self-service and personal service usage being associated with the lowest chance of defection.

The Moderating Effect of Time

As noted above, the context and circumstances of a service define the richness and hence the appropriateness of a medium (Walther 1992). Indeed, the customers' perception of a medium may change over time as their own individual characteristics, capabilities, and experiences

change (D'Urso and Rains 2008). Channel expansion theory (Carlson and Zmud 1999) suggests that customers who continuously use a lean medium to conduct the same task will become accustomed to the peculiarities of this medium and expand their perception of its capacity as well as their own ability to accomplish this task. Users who continuously communicate via e-mail, for instance, may learn how to display varying levels of formality and also learn how to interpret an increasing number of cues (e.g., through the exchange of similes and the like). Similarly, Walther (1992) proposes that – although it might take longer – users can establish close relationships even through rather lean media. Consequently, I argue that the value a particular service (channel) provides for the customer over time changes in the eyes of the customer, i.e., its value depends on the context. As customers become experienced in performing a particular task through a certain channel, they continue to improve their task performance and efficiency. This again will increase the value-in-use the customer derives from this particular service channel.

A recent study by Wang, Harris, and Patterson (2012) supports this notion. In their exploratory study on the customers' choice of self-service technologies, the authors find that positive past experiences with a self-service channel boosted the customers' confidence and self-efficacy to successfully deliver a service by themselves. The authors conclude that past experience is a strong determinant of the customers' attitude towards and actual use of a particular service channel. Taken one step further, previous marketing research also suggests that customer familiarity and experience might be central in understanding customer retention in service settings. Accordingly, mere experience with the provider creates trust and close bonds to an organization above and beyond what personal interactions accomplish through social bonding (Bendapudi and Berry 1997). Consequently, customers who have continuously used a particular service of the provider may not only consider this service as an effective way to solve their task, but also establish a close and trusting relationship with their provider. The mean of interaction thus becomes less crucial for their retention decision as other bonding mechanisms are activated.

Analogous to the reasoning above, it is likely that the way a service is delivered (self-service vs. personal service) is more important for customers who are not experienced with their provider and his service offers than for those who know how to effectively use various service channels and already experience a close relationship. Consequently, I expect the impact of the self-service ratio on customer defection to be most important at the beginning of a customer relationship and subsequently decrease in impact over time:

Hypothesis 2 (H2): The longer a customer has been with a particular provider, the less strong the effect of the self-service ratio on that customer's chance of defection.

5.3 Data

Research Setting. The setting of this study is a roadside assistance service in the automotive industry. The service can be contracted for a flat fee, which allows customers to obtain information either through a web search within their navigation system or call a service employee who provides the desired information and sends it directly into the navigation system (e.g., address of a nearby automatic teller machine or restaurant). Industry examples for such roadside assistance services are BMW's "Connected Drive", Chrysler's "OnStar", or Volvo's "OnCall".

Although roadside assistance services have not been focus of any previous self-service study, they offer two major advantages. First, as Selnes and Hansen (2001) point out, examining customer loyalty in a service context, where personal services have predominated the offering in the past and self-services are just now being introduced, poses the threat that customers are already bonded to the service provider. Effects on customer loyalty thus cannot be clearly distinguished between the impact of self-service usage and past bonding to the firm. As roadside assistance services of car manufacturers are relatively new services, I am able to examine the effect and trade-offs of personal services and self-services on customer relationships more closely. Second, the provider of interest (car manufacturer) charges a flat fee for his roadside assistance services that include both self-services and personal services. There are no incentives for customers to migrate to a possibly cheaper self-service channel that might bias the customers' retention decision. Oftentimes, service providers give price discounts for customers who actively use their self-service instead of their personal service offering. For example, many banks offer a 1-cent bonus for every transaction the customer completes online or airlines offer their customers cheaper electronic tickets for their flight. These incentives bias the effect of self-service usage on customer defection. The absence of incentives allows me to examine the effects and trade-offs of personal services and self-services on customer relationships in a more controlled environment.

Description of the Data. I test the proposed model on a customer database of a major European car manufacturer and provider of roadside assistance services, including monthly time-discrete usage data from September 2007 to September 2009. A random sample of 30,000 customers was drawn, however, to avoid left truncation[34], I limit the data in this study to six cohorts, with the earliest cohort starting September 2007 when observations start. Additionally, I only include active customers in the analysis, as many customers purchase the service as a bundle with their navigation system without the intention to use it. To avoid including customers in the analysis that use the service initially when the car dealer introduces the service to them at the point of sale, I define active customers as customers who make use of the service at least once every six months during the entire observation window. The resulting sample consists of 5,467 customers and 105,715 observations respectively. The structure of this study's data is illustrated in Figure 5.2.
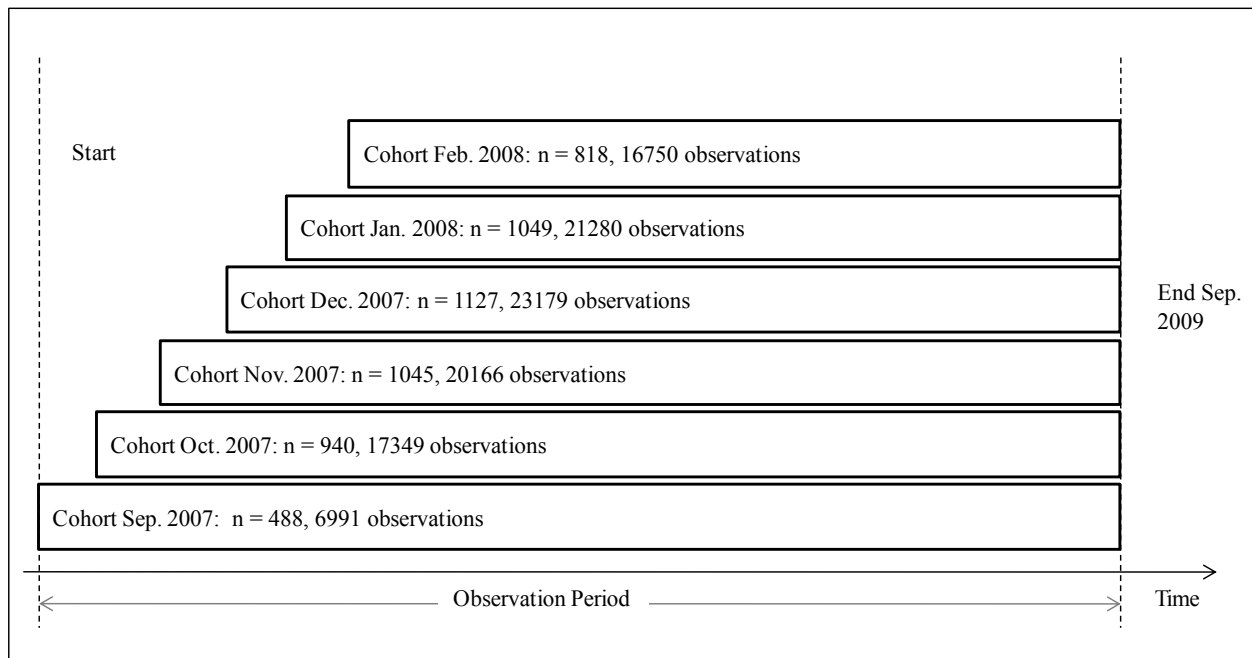

Figure 5.2: Structure of the Data of Study 3.

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[34]   As Bolton (1998) points out, left truncation leads to biased results in standard Cox models, as loyal customers are over-represented.

The roadside assistance service includes both interpersonal calls as well as various online services. As all services are included in a flat fee, price does not affect the service channel used by a customer. The database includes individual usage patterns such as monthly usage of online services and monthly calls to the provider's call center, as well as detailed information on the start of the service contract or the age and model of car the customer owns. To examine the long-term effects of self-service usage, I rely on measures of online service usage for self-services, calls to the call-center for personal services, and information on whether or not the customer has withdrawn from the service contract as of September 30, 2009. Of all 5,467 customers in the final database, 2,274 cancel their contract within the observation period.

Variable Operationalization. I measure the central predictor *Self-Service Ratio* as a ratio of the customers' self-service usage in relation to their overall use of personal- and self-services. To make the analyses less dependent on extreme levels of self-service usage ($M = 5.69$; $SD = 13.19$; *Max.* = 310) in the database, I use the natural logarithm of both self-service and personal service usage. I also use a time-varying measure for the *Self-Service Ratio* that is updated each month. To estimate whether or not this ratio needs to be balanced on the long- rather than the short-run, I estimate two models. Model 1 uses a *Self-Service Ratio* that uses monthly usage data, whereas Model 2 uses a *Self-Service Ratio* that is based on a 90-day moving average of customers' self-service and personal service usage. Accordingly, I divide the 90-day moving average of self-services used by the 90-day moving average of all services used for Model 2. Just as with the *Self-Service Ratio* for Model 1, the *Self-Service Ratio* for Model 2 is updated each month. To examine the U-shaped effect of the *Self-Service Ratio*, I also include *Self-Service Ratio^2* in the model, which is simply the square of the initial Self-Service Ratio measure (on a one- or three month basis for Model 1 and Model 2 respectively).

Following previous longitudinal studies on customer defection and retention (e.g., Nitzan and Libai 2011), I also include the variable *Delta-Use* in the upcoming analysis. The variable reflects changes in the customers' usage behaviors, which might be indicative for the customers' satisfaction and future-intentions (Nitzan and Libai 2011). As Bolton and Lemon (1999) demonstrate, customers dynamically change their evaluation of a service by putting the benefits they derive from previous usage in relation to the associated economic costs (i.e., by evaluating the payment equity). The authors show that customers are more satisfied with the provider if they perceive an exchange with a provider as highly equitable. As the economic costs remain constant

in the present research setting, customers should perceive a lower payment equity if they decrease their usage levels. Consequently, decreases in the customers' *Delta-Use* should lower their satisfaction and loyalty to a provider. I measure *Delta-Use* as the proportion of a month's overall (i.e., self-service and personal service) usage level to a 90-day moving average of the customer's overall usage in the three preceding months.

In addition to a customer's change in usage levels, I also include a customer's absolute level of usage in the analysis. According to previous research the frequency of usage – also referred to as the contact frequency (Dagger, Danaher, and Gibbs 2009) or frequency of interaction (Homburg and Stock 2004; Nicholson, Compeau, and Sethi 2001) – reflects the depth of a customer-firm relationship (Bolton, Lemon, and Verhoef 2004). Frequent interactions have been found to increase a customer's perceived relationship strength as they increase the customer's relational bonds to the provider (Dagger, Danaher, and Gibbs 2009). Additionally, frequent usage can create significant switching costs for customers (e.g., Blattberg, Getz, and Thomas 2001; Bolton, Lemon, and Verhoef 2004) as it familiarizes customers with the peculiarity of their provider and consequently increases the customer's effort to reach the same level of familiarity and comfort with new providers (e.g., Campbell and Frei 2010; Chen and Hitt 2002). I therefore include the variable *Frequency* in the analysis, which I measure as a 90-day moving average of all services used over a three-month period. Again, the variable *Frequency* is a time-varying measure, just as the variables *Self-Service Ratio* and *Delta-Use*. I include all time-varying measures with a one-period time lag in the analysis.

In contrast to these time-varying measures I further include the constant variables *Duration*, *Age of Car*, and *Car Group* as control measures in the analysis. The variable *Duration* simply captures the number of days between the date of the observation begin and the date of the official start of a customer's contract. As mentioned earlier, I pool six cohorts in the analysis. The variable *Duration* basically controls for the cohort a customer belongs to.

Although specific to this study's research setting, I also need to control for the construction year of the car a customer owns, as this is strongly intertwined with the customer's service contract. Accordingly, customers who wish to sell their car and buy an automobile of a competitor will also need to cancel their contract for the roadside assistance service of interest. As the chance of selling a car and thus quitting the service contract increases with its age, I include the variable

Age of Car in the analysis. I measure this variable as the number of years since the construction of the automobile.

Finally, I include the car model a customer owns in the analysis. An additional survey of customers randomly drawn from the present database indicates that the customers' characteristics differ significantly across car models. Thus, customers owning big luxury car models tend to be older and less technology enthusiastic. Customers owning less expensive models or sporty convertibles on the other hand tend to be younger and more technology enthusiastic, for example. These individual characteristics might strongly impact an individual's hazard of defection.[35] Although I do not have access to these individual level customer characteristics in the final database, this additional information suggests that I do have high within-group correlation on a car-model level, which does have an impact on an individual's hazard of defection. To account for this unobserved heterogeneity I include the variable *Car Group* as a shared risk factor – or frailty – in the final model specification. The measurement of the predictor and control variables of this study is described in Table 5.2.

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[35]   Previous marketing literature indicates that especially young and technology-affine customers are prone to try and use self-services (e.g., Meuter et al. 2005). This, we believe, does not only refer to the first time usage of self-services, but also to try service alternatives by competitors. Thus for young and technology-enthusiastic customers the perceived effort to learn how to use an alternative service by a competitor, i.e. switching costs, will be lower than for older, less technology-enthusiastic customers.

Table 5.2: Variables for Model of Defection in Service Settings.

Independent Variables*	Measured as	Impact on Defection
$SSRatio_{i,t}$ **	proportion of monthly self-service usage$_{t-1}$ to sum of self-service and personal usage$_{t-1}$ per month	-
$SSRatio_{i,t}^2$ **	the square of the initial Self-Service Ratio measure	+
Delta Use$_{i,t}$	proportion of month's overall usage level to average usage of the three preceding months	(-)
Frequency$_{i,t}$	number of all services used each month, lagged moving average over three-month period	(-)
Duration$_i$	number of days between observation start and start of contract	(-)
Age of Car$_i$	number of years since construction	(+)
Shared Frailty	included on car group level	

  *   Subscript "i" = Variable does not change over time, subscript "i,t" time-varying variable that is updated each month
**   Estimation of two models for Δt = 30 days and 90 days

5.4 Methodology

I use survival analysis to model customer defection in self-service settings. In particular, I use Cox's (1972) proportional hazard model and an extended Cox model with shared frailty (Kleinbaum and Klein 2005). Hazard models are especially suited for duration data as they take right censoring into account (Helsen and Schmittlein 1993) and allow time-varying measures of variables (Nitzan and Libai 2011). In comparison to a binary-choice model, the hazard model considers additional information such as detailed survival times and censoring, whereas a binary-choice model only takes a (0, 1) outcome into account. Hazard models thus continuously offer greater stability and predictive accuracy for duration data (Bolton 1998; Helsen and Schmittlein 1993). Given these advantages, a number of empirical studies in previous marketing research

have relied on hazard models to analyze defection and profitable lifetime duration in customer relationships (e.g., Bolton 1998; Nitzan and Libai 2011; Reinartz and Kumar 2003).

One of the most commonly used hazard models is the proportional hazard (PH) model. In contrast to parametric hazard models, the proportional hazard model leaves the underlying survivor function unspecified. This offers the great advantage to avoid a misspecification of the model while the model still provides reasonable results as it approximates the correct parametric form (Kleinbaum and Klein 2005). Additionally, the PH model enables incorporating the dynamic effects of variables on survival time through the inclusion of time-dependent covariates in an extended Cox model (Bowman 2004). At its basis, the proportional hazard model describes the hazard rate $h_i(t)$ of an individual i as:

$$h_i(t,X) = h_0(t)\, e^{\sum \beta_i x_i} \tag{1}$$

where $h_0(t)$ describes the baseline hazard function of time that remains unspecified and $\beta_i x_i$ describes the impact of the explanatory X variables. Hereby estimates of β_i are obtained through partial likelihood estimation. 'Partial' means that the Cox model does not consider probabilities for all subjects, but restrains the likelihood estimation to only those subjects who fail. However, as the PH model does not consider the times at which failures occur, but rather the ordering of failures, I need to handle tied failures (i.e., failures at the same time) in the dataset. I do this using the Efron approximation (Efron 1977). This approach is more accurate than the commonly used Breslow approximation (Cleves et al. 2008).

As can be seen from Equation (1), one of the main assumptions of the proportional hazard model is that the X's are time-independent. Accordingly, the proportional hazard model assumes the hazard ratio (HR) - defined as a comparison of any two specifications of the X's (i.e., predictors) - remains constant over time. I check this proportional hazard assumption with two widely recommended tests (Box-Steffensmeier and Zorn 2001): First, I rely on a goodness-of-fit testing approach using scaled Schoenfeld residuals (Grambsch and Therneau 1994). The underlying idea of this test is to check if Schoenfeld residuals of the explanatory variables are unrelated to

survival time. I implement this test using Stata's estat phtest command. Second, I also implement time-dependent / time-varying covariates (TVCs) to assess the PH assumption. For this approach, I extend the proportional hazard model to include interactions of the covariates with a function of time (t, $ln(t)$ and t^2). Hereby, I fit one model per covariate and function of time to test each covariate separately as well as one model including all covariates to test covariates jointly. Again it is assumed, for the PH assumption to hold, that covariates are unrelated to survival time and thus interactions of covariates with a function of time to be insignificant.

Results of both tests imply that some of the variables violate the proportional hazard assumption. To account for this issue, I extended the standard Cox model to include interaction terms between offending covariates and time (X_i x t) in the final analysis to avoid a misspecification and increase the accuracy of the estimates. To guide my decision on which covariate to add as a time-varying effect, I place most emphasis on the results of the scaled Schoenfeld residuals and use the results of the time-dependent covariate tests only in cases when in doubt.[36] Table 5.3 provides an overview of the results of the evaluation of the proportional hazard assumption.

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[36]   Using interactions with time to test the PH assumption as well as to correct for violations of it has received criticism (e.g., Box-Steffensheimer and Zorn 2001; Grambsch and Therneau 1994). Basing the decision of whether a covariate violates the PH assumption on TVC tests alone, is often misguided as correlations of covariates and their interactions with functions of time may bias conclusions (Box-Steffenshimer and Zorn 2001, p. 978).

Table 5.3: Evaluation of the Proportional Hazards Assumption.

	Tests based on reestimation with Time-Varying Covariates[1]					Tests based on Schoenfeld Residuals	
	X_i x t	X_i x t^2	X_i x $ln(t)$	Model 1 Overall (t)	Model 2 Overall (t)	Model 1 roh(χ^2)	Model 2 roh(χ^2)
CarAge	.019***	.0007***	.18**	.0317***	.0288***	.18 (24.00)**	.18 (37.36)***
Duration	.001***	.00003***	.02***	.0012***	.0013***	.23 (65.15)**	.22 (92.96)***
Frequency	.002***	.00006***	.03***	.0003	.0007**	.03 (2.08)$^+$	.05 (8.81)***
DeltaUse	-.001**	-.00004**	-.02**	.00008	.0012	-.005 (0.06)	.02 (0.98)
1mo SSRatio	-.004	-.0004	.07	0.1370 $^+$		.04 (1.73)	
1mo SSRatio^2	-.012	-.0006	-.04	-0.1376 $^+$		-.05 (2.18)$^+$	
3mos SSRatio	.015	.0003	.25		.2005**		.06 (5.95)**
3mos SSRatio^2	.003	-.00002	.10		-.1882**		-.07 (6.30)**

[1] Note that main effects were included in the analysis, however, for testing the PH assumption only coefficients and p-values of time-interactions (TVC's) are displayed

*** Significant at $p < .001$.   ** Significant at $p < .01$.   * Significant at $p < .05$. $+ p < .15$

To account for an unobserved heterogeneity shared by groups of customers, I also incorporate a 'shared frailty' in the Cox model. In survival analysis the frailty α describes an unobservable risk factor or random effect that enters multiplicatively on the hazard function. A shared frailty model hereby assumes that the unexplained heterogeneity or frailty is shared among individuals, i.e. it is common for a group of individuals. The shared frailty α_j hence accounts for within-group correlations in the hazard. Based on the findings of the additional survey discussed previously, I include a shared frailty on a *Car Group* level. This way I allow individuals within each car group to be correlated and share the same frailty, whereas individuals across different car groups may differ in their frailty. The hazard function conditional on the frailty can be expressed as

$$h_{i,j}\left(t \mid \alpha_j, X\right) = h_0(t) \ \alpha_j \ e^{\sum \beta_i x_{i,j}} \tag{2}$$

where α_j is the shared frailty of an individual i belonging to group j and the shared frailty is gamma distributed (with mean 1 and variance θ). As a shared frailty model requires a sufficient amount of data (Cleves et al. 2008), I pool the six cohorts instead of estimating the model for each cohort separately. However, to test the robustness of this study's findings, I will also estimate the model for each cohort separately without the inclusion of a shared frailty.

The final specifications for Model 1 and Model 2 are given in Equation (3), with the *Self-Service Ratio* measured on a monthly and on a 3-month level in Model 1 and Model 2 respectively. The hazard of defection for a customer i belonging to group j at time t is

$$h_{i,j}(t) = h_0(t)\, \alpha_j\, \exp\left(\begin{array}{l} \beta_1\ \textit{Self Service Ratio}_{i,j,t} + \beta_2\ \textit{Self Service Ratio}^2_{i,j,t} + \\ \beta_3\ \textit{Delta Use}_{i,j,t} + \beta_4\ \textit{Frequency}_{i,j,t} + \beta_5\ \textit{Duration}_{i,j} + \beta_6\ \textit{Car Age}_{i,j} \end{array} \right) \qquad (3)$$

where h_0 describes the baseline hazard, α_j the shared frailty on car group level and the subscript "*ijt*" indicates a time-varying measure of the variables *Self-Service Ratio*, *Delta-Use* and *Frequency*. As mentioned earlier, I also include interaction terms with time for those predictors that violate the proportional hazard assumption. This is the case for the variables *Duration*, *CarAge*, *Frequency*, *Self-Service Ratio* and *Self-Service Ratio²* for both Model 1 and Model 2. I include these interaction terms with a linear function of time f(*t*).

5.5 Results

I obtain results using Stata's stcox command. The effective sample size is 5,311 subjects for Model 1 and 5,414 subjects for Model 2 due to missing values. Table 5.4 summarizes the resulting coefficients and *p*-values for Model 1 and Model 2. As theta is significantly different from zero for both models ($\theta = .032$, $p < .001$ and $\theta = .048$, $p < .001$ for Model 1 and Model 2 respectively), I must conclude that some car groups are in fact more "frail" than others. Note that all resulting estimates are thus conditional on the unobserved frailty.

Table 5.4: Coefficients (Standard Errors) of the Cox Model with Frailty.

	Hypothesized Impact	Model 1	Model 2
Main Effects			
CarAge		-.0350 (.102)	.0377 (.073)
Duration		-.0214 (.002)***	-.0207 (.001)***
Frequency		-.0148 (.002)***	-.0194 (.002)***
DeltaUse		-.0701 (.005)***	-.0761 (.005)***
1mo SSRatio	-	- 2.141 (1.125)$^{+}$	
1mo SSRatio^2	+	2.008 (1.051)$^{+}$	
3mos SSRatio	-		-3.724 (.861)***
3mos SSRatio^2	+		3.263 (.824)***
Time-Varying Effects[1]			
CarAge x Time		.0307 (.007)***	.0276 (.005)***
Duration x Time		.0013 (.0002)***	.0013 (.0001)***
Frequency x Time		.0003 (.0001)*	.0004 (.0001)***
1mo SSRatio	+	.1417 (.085)$^{+}$	
1mo SSRatio^2	-	-.1422 (.079)$^{+}$	
3mos SSRatio x Time	+		.2069 (.067)**
3mos SSRatio^2 x Time	-		-.1938 (.063)**
Shared Frailty - theta		.0327 (.029)***	.0485 (.034)***
Model Fit			
Log-Likelihood		-7452.5285	-11928.913
AIC		14927	14923
R^2_{pv}		.31	.31
R^2_{pe}		.42	.43

[1] Note that time-varying effects were only included, if predictor violated the PH assumption

*** Significant at $p < .001$.   ** Significant at $p < .01$.   * Significant at $p < .05$.   + $p < .07$

As can be seen in Table 5.4, the final models display a satisfying level of model fit. It is important to note, however, that there is no commonly agreed upon measure to illustrate a model's fit for hazard models. In this study, I focus on a measure that most closely resembles a measure of explained variance commonly used in linear regression to ease interpretation. I thus estimate the models' fit by relying on the measure of explained variation R^2_{pv} proposed by Royston (2006) and endorsed by Hosmer, Lemeshow, and May (2008). According to this work, the explained variation R^2_{pv} is defined as

$$R^2_{pv} = \frac{R^2_{pe}}{R^2_{pe} + \frac{\pi^2}{6}\left(1 - R^2_{pe}\right)} \qquad \text{where} \qquad R^2_{pe} = 1 - \exp\left(-\frac{X^2}{e}\right)$$

Hereby, R^2_{pe} describes a measure of explained randomness (O'Quigley, Xu, and Stare 2005) that is based on the likelihood ratio statistic X^2 for comparing the fully fitted model with the null model divided by the number of events e. The resulting R^2_{pe} and R^2_{pv} estimates for both models of this study are also given in Table 5.4.

The Effect of Personal vs. Self-Service Usage

I hypothesized that the *Self-Service Ratio* has a U-shaped effect on a customer's hazard of defection, with intermediate levels of both self-service and personal service usage having the lowest hazard of defection (H1). I tested this assumption by introducing the squared term *Self-Service Ratio²* to the analysis. As Table 5.4 illustrates, the signs of the resulting coefficients (negative for the linear term and positive for the squared term) are in the proposed direction for both models. However, the effect is only significant for Model 2 (*p* < .001 for both the linear and squared term). This result demonstrates that a self-service ratio that is balanced over a three-month (rather than a one-month) period significantly lowers the hazard of defection. More precisely I find that for a given frailty level, customers with a 3-month *Self-Service Ratio* of .57

have the lowest hazard of defection[37]. The higher or lower the *Self-Service Ratio* from this point-estimate, the higher the hazard of defection. This result strongly supports hypothesis H1.

The fact that the variable *Self-Service Ratio* does not have a significant effect on the hazard of defection in Model 1 demonstrates that the time horizon on which the ratio is measured is crucial for its impact on defection. In comparison to Model 2, I measured the *Self-Service Ratio* in Model 1 on a lagged monthly level instead of the 3-month-level, all else being equal. While the coefficients of both the linear and the squared effect of the variable *Self-Service Ratio* are again in the proposed direction (-2.141 and 2.008), they are marginally not significant in statistical terms ($p = .057$ and $p = .056$ respectively). However, I believe that this does not harm hypothesis H1, but merely demonstrates that a customer's ratio of self-services used needs to be balanced on a three-month time horizon, rather than on a monthly level.

To further demonstrate the importance of the variable *Self-Service Ratio*, I conduct a likelihood ratio test that compares a "traditional" usage model, including the variables *Frequency*, *Delta-Use* and above mentioned control variables, to the full model, including the *Self-Service Ratio* measured on a three-month time span. The test statistic illustrates a significant improvement of the model through the inclusion of the variable *Self-Service Ratio* ($\chi^2(4) = 37.78$, $p < .001$) and thus underlines the importance of a customer's self-service ratio in understanding customer defection.

Overall the analyses provide strong support for the main hypothesis H1. Accordingly, customers who use self-services and personal services at an intermediate level within three months are less likely to defect, whereas customers who rarely use self-services and customers who mostly use self-services within the same time-span are more likely to defect. This underlines the assumption that customers who experience and take the best of both service channels, are more likely to remain with their provider.

The Moderating Effect of Time

In hypothesis H2 I proposed that the central variable *Self-Service Ratio* should be most important in the beginning of a customer-firm relationship and then continuously decrease in importance

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[37]   Following the notion that the minimum of a U-shaped effect can be estimated with *min(x)* = - b/2a, which in the present
         case equals –(-3.725)/(2 x 3.263) = .57

over time, as customers gain more experience with their service provider and his channel peculiarities. As noted above, one of the main assumptions of a Cox model is that the hazards are proportional. The proportional hazard (PH) assumption hence demands that predictors remain constant and are unrelated to survival time. I tested this PH assumption and found that a number of predictors violate it. Accordingly I included interaction terms of the offending predictors and time in the final models.

Results of this study are in support of hypothesis H2. As can be seen in Table 5.4, the direct impact of the variables *Self-Service Ratio* and *Self-Service Ratio²* as well as their interaction with time are statistically significant. While the results indicate that the *Self-Service Ratio* directly impacts a customer's hazard of defection in the proposed U-shaped manner, I also find that this effect reduces in strength with time. The signs of the interaction coefficients thus aim in the opposite direction (.20 and -.19 for the linear and squared term in Model 2 respectively) and are statistically significant (both $p = .002$). These results strongly support hypothesis H2.

The Effect of Observed and Unobserved Heterogeneity

Observed Heterogeneity. In line with previous research, this study finds that the high *Frequency* of services usage (-.02, $p < .01$) as well as increases in usage levels (*Delta-Use:* -.08, $p < .01$) lower the hazard of defection. The inclusion of time-interactions, however, demonstrates that the impact of frequency of usage significantly decreases over time (.0004, $p < .01$).

Additionally, this study finds that customers in later cohorts have a lower hazard of defection (-.02, $p < .001$). As I included the variable *Duration* as a constant to control for the cohort the customer belongs to, it is not surprising to find that this effect also decreases with time (.001, $p < .001$). Although specific to this study's service setting, I further find that the *Age of Car* significantly increases a customer's hazard of defection *over time* (.03, $p < .001$). That is, the longer customers own a car, the more likely they are to sell their car and consequently quit their service contract.

Unobserved Heterogeneity. I account for unobserved heterogeneity on a group level by estimating a shared frailty model. Hereby, I assume that customers owning the same model of car (*Car Group*) share a common risk or frailty. As a likelihood-ratio test of $H_0: \theta = 0$ confirms that

theta is significantly different from zero ($\theta = .05$, χ^2 (2) $= 19.93$, $p < .001$), I must conclude that there is significant within-group correlation. All reported estimates above are thus conditional on the frailty.[38] As a subject's frailty can deepen the understanding of the effects, I obtain estimates for the frailty at an individual level and plot the survivor function at the lowest, mean (baseline), and highest frailty level. Hereby, I re-center the *Self-Service Ratio* to produce a baseline survivor function that resembles a customer with a three-month Self-Service Ratio of .57 (the minimum of the U-shaped effect). Figure 5.3 illustrates the resulting survivor functions for various frailty levels.
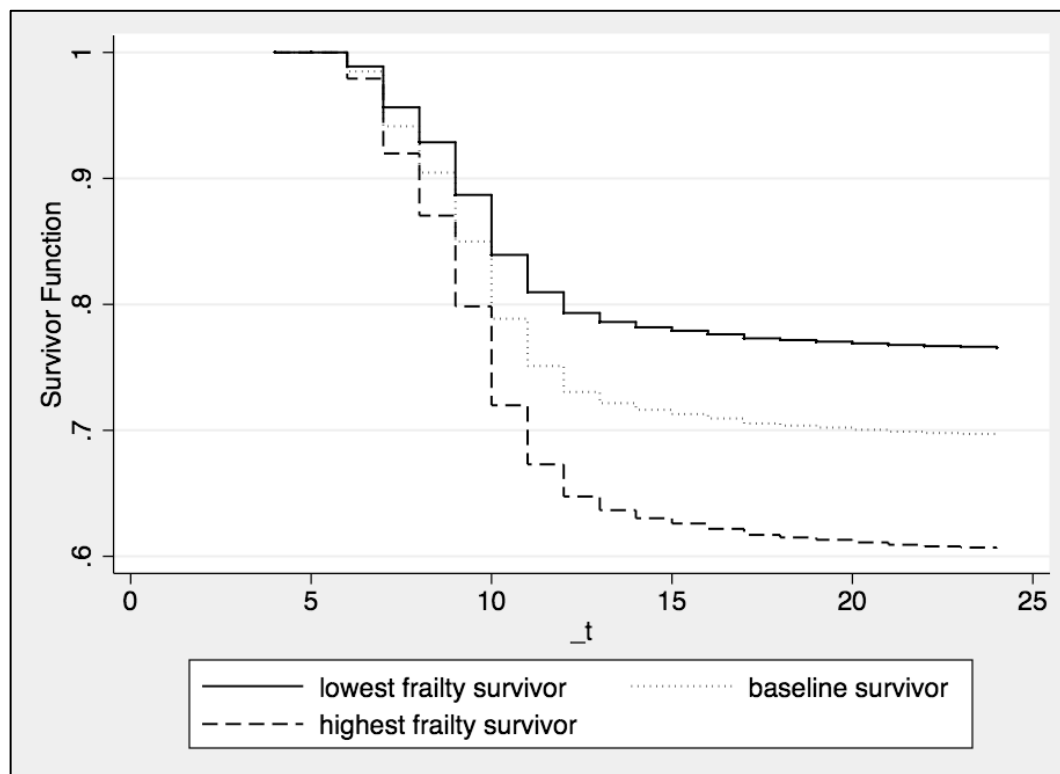
Figure 5.3: Survivor Functions across Frailty Levels.

The comparison of the survivor functions at the three frailty levels shows that customers with a high frailty level have a far inferior survival experience when duration with the provider exceeds 10 months than customers with low frailty levels.

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[38] i.e., theta is held fixed at its optimal level. Accordingly, a Cox shared frailty model first optimizes theta and then fits a standard Cox model via penalized likelihood. For more information see Cleves et al. (2008) and Therneau and Grambsch (2000).

Robustness Checks

I re-analyzed the proposed model with all main and time-varying effects for each cohort separately to test the robustness of the found results. Table 5.5 summarizes the resulting coefficients and model fit statistics for each individual cohort. Respective sample sizes of each cohort are also displayed. Note that the small sample sizes preclude the inclusion of a shared frailty on a car group level in these analyses, as shared frailty models require a sufficient amount of data to model within-group correlations (Cleves et al. 2008). To still account for a possible within-group correlation, however, I adjusted the standard errors of the estimated parameters for the clusters in the *Car Group* variable as proposed by Cleves et al. (2008, pp.156).

The results of the robustness checks give confidence in the proposed model and the previous results. In all analyzed cohorts, both the linear and the squared term of the variable *Self-Service Ratio* are in the proposed direction and the results do have statistical significance in support for H1 in four out of six cohorts. The interaction term of the variable *Self-Service Ratio* and time also supports the proposition that the variable's main effect reduces over time. Again, these interaction effects have statistical significance in support for hypothesis H2 in four cohorts. The fact that the effects are not significant across all cohorts might be an indication for a lack of statistical power as the number of events rather than the number of subjects determines the statistical power of the analysis in survival models (Hsieh and Lavori 2000). Thus, despite these shortcomings, the results of these robustness checks strongly support the proposed model and hypotheses.

Table 5.5: Coefficients (Standard Errors) for the Cox Model based on Individual Cohorts.

	Cohort 1 (n=479)	Cohort 2 (n=935)	Cohort 3 (n=1039)	Cohort 4 (n=1122)	Cohort 5 (n=1031)	Cohort 6 (n=808)
Main Effects						
CarAge	-.140 (.174)	-.104 (.255)	-.105 (.161)	-.077 (.089)	-.021 (.124)	-.032 (.193)
Frequency	-.013 (.003)***	-.017 (.007)*	-.035 (.005)***	-.027 (.009)**	-.022 (.003)***	-.018 (.005)***
DeltaUse	-.041 (.011)***	-.066 (.017)***	-.142 (.011)***	-.063 (.032)*	-.099 (.019)***	-.086 (.012)***
3mos SSRatio	-.482 (1.59)	- 5.569 (2.64)*	- 2.441 (.059)***	- 4.194 (1.601)**	-.717 (1.27)	- 5.36 (1.85)**
3mos SSRatio^2	.023 (1.51)	5.093 (2.19)*	1.573 (.633)**	2.958 (1.544)*	.628 (1.16)	5.11 (1.26)***
Time-Varying Effects						
CarAge x Time	.031 (.012)**	.036 (.010)***	.038 (.007)***	.030 (.010)**	.041 (.007)***	.028 (.012)*
Frequency x Time	.0004 (.0002)*	.0006 (.0002)**	.0002 (.0004)	.001 (.0003)**	.00007 (.0003)	.0005 (.0004)
3mos SSRatio x Time	-.105 (.118)	.348 (.192)$^+$	.174 (.082)*	.268 (.114)*	-.038 (.082)	.267 (.131)*
3mos SSRatio^2 x Time	.135 (.107)	-.345 (.172)*	-.134 (.069)*	-.210 (.105)*	.022 (.070)	-.022 (.086)**
Model Fit						
Log-Likelihood	- 1168	- 1817	- 1679	- 1627	- 1732	- 1240
AIC	2350	3648	3372	3269	3479	2494

*** Significant at $p < .001$.   ** Significant at $p < .01$.   * Significant at $p < .05$. $^+ p < .07$

5.6 Discussion and Implications

This research is the first to investigate customer defection in a technology-based self-service setting using data from a longitudinal customer database and considering interactions between service channels and time. Results of this study give food for thought on the enthusiasm about self-services in current business practice and research. This study shows that customer defection most likely occurs when customers use one channel of service delivery, be it a self-service or a personal service. This research thus underlines the importance of offering various channels of service delivery; moreover, it underlines the importance of a personal touch in service encounters even in times of ever-increasing technology advancements and the tempting cost-efficiency when making full use of them.

Theoretical Contributions

This study contributes to research and the advancement of theoretical knowledge in several ways. First and foremost, this study is among the first to take a rather holistic view on customer retention in self-service settings. Based on S-D logic (Vargo and Lusch 2004; 2008) that places "high priority on understanding customer experiences over time" (Lusch, Vargo, and O'Brien 2007, p.11), this research emphasizes and discusses a customer's value creation in self-service and personal service channels. This study's theoretical discussion on when and how customers can derive valuable experiences from self-service and personal service offerings offers a new way of looking at customer retention in multichannel settings. Although it is clear that ultimately, customers will be loyal as long as they consider a provider's offer valuable (e.g., Oliver 1999; Kim and Son 2009), previous research on customer retention has not considered theoretical aspects of value creation, and in particular, the different value propositions providers offer to customers in different service channels and the unique value-in-use customers can subsequently derive from these offers. Previous research, however, has emphasized the need for a theoretically sound and comprehensive customer experience framework in self-service settings (Verhoef et al. 2009). Building on the previous theoretical discussion, I find first empirical evidence that customers who experience the best of both worlds (i.e., the service provider's self-service and personal service offers) are more loyal than those that restrict themselves to one particular offer alone. In addition, findings of the empirical investigation stress the importance of time, i.e.,

customers' experience and expertise with a particular channel, for value-creation and retention decisions. Both findings underline the importance of considering both, the different value propositions service providers offer in various channels and the unique value customers can derive from these propositions over time. This rather holistic approach and conceptual framework may easily be applied in and extended to other settings and service contexts, in which customer-provider relationships are such that differential value propositions exist, which might even require different customer resources and capabilities for value-creation. Consider for example, remote versus location-based (i.e., onsite) service offers (Wünderlich, Wangenheim, and Bitner 2013). While first attempts have been made to understand customer reactions to service separation (Keh and Pang 2010), they disregard that providers themselves should play a vital role in actively managing the customers' experiences and the co-creation of value. Drawing from S-D logic, this study stresses the importance of an active customer experience management rather than a (reactive) relationship management and provides a first framework that advances current knowledge on customer experiences and customer retention in (multichannel) service settings.

Second, this research contributes to media effectiveness research by extending its focus to customer-firm interactions in service encounters. While most prior research on media effectiveness has focused on the context of team collaboration within organizations (e.g., Maruping and Agarwal 2004), the present study shows that media richness and channel expansion theory can help advance the current understanding of customer-firm interactions as well. One important aspect of a service is that customers are an integral part of service provision and actively co-create the value of their service experience or even actively co-produce parts of the service (Vargo and Lusch 2008). Accordingly, customers, firms, employees, and partners collaborate in the service process by exchanging knowledge, regardless of whether it is a technology-generated service or a service delivered through human interaction (Lusch, Vargo, and O'Brien 2007). This study shows that examining customer relationships in service settings from a media richness perspective helps advance our understanding of the unique characteristics and capabilities of a service channel and which service channel should be most valuable for customers to accomplish a given task.

Third, this research adds to recent discussions in multichannel literature on whether or not customers should be encouraged to be multichannel (e.g., Neslin et al. 2006; Neslin and Shankar 2009). In particular, it has been argued that customers should be encouraged to be multichannel

when it increases customer loyalty, while it should be discouraged when it merely increases customers' convenience without adding to the firm's share of wallet (Neslin and Shankar 2009). The current study shows that there is no clear-cut answer to this question. Instead, both the theoretical discussion and empirical investigation demonstrate that customers should be encouraged to be multichannel at the beginning of a customer relationship. This offers the advantage for customers to experience the best of both worlds, while providers can make full use of the benefits both self-service and personal service channels offer. This study, however, also shows that this multichannel behavior is less important the longer a customer has been with a particular provider. That is, once customers are experienced and self-efficient enough to make full use of their preferred channel (i.e., create a high value-in-use), a tendency to move towards one particular channel should not have detrimental effects on their loyalty to a provider. Instead of taking a black-or-white view on the efficiency of particular service channels, this study advances knowledge in multichannel research by stressing the importance of customers' unique resources and capabilities to derive value from a particular channel at a certain point in time.

Finally, this study contributes to the current discussion about service productivity. Currently, research strongly supports the premise that service productivity and costs can be improved by standardizing processes and transferring work to the customer through self-service (Rust and Huang 2009, 2012). Here, this study's discussion from a value-in-use perspective clearly demonstrates that tailoring the mode of service delivery to the unique context, i.e., the task at hand and the customers' unique capabilities, should enhance service productivity through the best fit of customers' resources and the provider's value proposition rather than a particular mode of service delivery. While previous research has only underlined the possibility of productivity improvements through self-service options, this study highlights that personal service offerings might in fact enhance a provider's productivity as well. As Vickery et al. (2004) demonstrate, personal service channels can enhance service operations through the fast accomplishment of rather complex tasks. Using self-service channels for such tasks might not only be very dissatisfying for customers, but also prove rather ineffective. This study thus underlines the call by Rust and Huang (2009) prompting practitioners to find the optimal balance between self-service and personal service channels.

Managerial Contributions

Recent research has put forward the question whether the enthusiasm about technology-based self-service in current business practice is justified (e.g., Meuter et al. 2005). While both business press and research highlight that self-service channels offer great benefits for providers, this empirical study clearly shows that ignoring long-term consequences of self-service offerings on customer relationships may lead to rather costly consequences for service providers. Accordingly, the present study shows that migrating customers to cheaper self-service channels increases the likelihood of customer defection. This study's results, however, also demonstrate that the enthusiasm about self-service channels is not completely uncalled-for, as customers who only rely on personal service channels also proved to have a higher chance of defection. Customers using both modes of service delivery within a three-month time span, however, show the lowest likelihood of defection in the present analyses. This effect was also most pronounced at the beginning of a customer-firm relationship. Following the previous theoretical discussion on when and how information technology can create valuable customer experiences, I thus advise managers to tailor the mode of service delivery to the task at hand. As the previous theoretical discussion underlines, I suggest that especially easy and repetitive tasks should be offered via self-service options, whereas demanding and complex tasks should be delivered in person. While more experienced customers might be able to derive value from self-service channels in complex circumstances as well, I recommend that especially in the beginning of a customer-firm relationship both service channels should be utilized. This way, providers and customers get the best of both worlds: On the one hand, customers can enjoy convenient access through self-service channels while still relying on the competence of the service worker for rather complicated tasks; providers on the other hand can benefit from the cost-efficiency of a self-service while also increasing the customer's social bonds to the firm through meaningful, personal interactions that help establish the customers' trust to the service provider. Most generally, however, managers should consider when and how their service offers create valuable customer experiences. Following Lusch, Vargo, and O'Brien (2007), this study thus underlines the importance of mapping the customers' experience process instead of merely pushing customers to "cheap" service channels. Research has developed a number of tools and frameworks that can guide such work. Campbell, Maglio, and Davis (2011), for instance, have developed a resource-mapping framework for the co-creation of value that can guide managers' decision on when and how to

shift the provider-customer boundary from self-service to full-service effectively. In a similar vein, recent research by Patricio, Fisk, and Falcao e Cunha (2008, p.331) has introduced an approach to design multichannel service experiences "across the different stages of service usage and across the different channels".

One important aspect managers need to account for in their service design is customer heterogeneity. As the present study demonstrates, customers who make frequent use of the provider's service and increase their usage levels are at a lower risk of defection. Furthermore, I find that some customer groups are inherently frailer than others. This suggests that additional customer characteristics strongly affect the customers' defection decisions. Indeed, previous research demonstrates that customers differ in their readiness to try self-service offers as their task-specific self-efficacy beliefs (Looney, Akbulut, and Poston 2008) as well as their ability, motivation, and role clarity (Meuter et al. 2005) differ. These readiness variables also strongly depend on individual customer characteristics. For instance, numerous studies underline that especially young customers are prone to try self-service technologies (e.g., Meuter et al. 2005; Weijters et al. 2007). While this usually refers to a customer's first-time self-service usage, this study's findings might be indicative that some customer characteristics also impact the customers' post-adoption beliefs and hence their loyalty to the provider. Accordingly, young customers who are still unaccustomed to one specific service channel might not only be more interested to try new service innovations such as an technology-based self-service, but also display lower anxiety to try competitors' offers (i.e., switching costs might be lower). This suggests that managers should make full use of information on their customers' characteristics and usage histories to segment their customer base and address each segment differently. This also implies that managers should pay close attention to what tasks different customer segments are willing to perform by themselves (i.e., via self-service, see Campbell, Maglio, and Davis 2011). New customers who merely display interest in self-service channels for the variety of their tasks, for instance, could be addressed to experience the value of personal service channels as well. Customers who have been with the provider for a while and merely show interest in personal service channels, on the other hand, should be informed about the benefits self-service channels can offer and also be acquainted with their usage. However, given that the customers' unique capabilities play a central role in the value they can derive from a particular channel, it is important to note that mangers also need to learn how to unlock these capabilities (Davis,

Spohrer, and Maglio 2011) and actively foster customer learning for resource integration (Hibbert, Winklhofer, and Temerak 2012).

Overall, this research emphasizes the importance for managers to understand how customers experience their relationship with a provider through a variety of channels and over time. Rather than optimizing individual service channels in terms of service quality or service productivity, service providers should concentrate on a more holistic view of a customer's service experience and the unique value customers can derive from all channels over the duration of their relationship to the provider.

Limitations and Implications for Further Research

Although this research gives some first insight into the long-term effects of self-service usage on customer relationships, I believe there are several aspects that could help to develop this understanding even further. First, this research focuses on the proportion of self-service and personal service used and its impact on customer defection. The underlying assumption of the U-shaped relationship between the two variables relies on the basic idea of varying degrees of a task's complexity and ambiguity. Drawing from theories on media richness and channel expansion, I propose that some tasks are more suited for self-service channels than others. While the results of this study emphasize this idea, I did not measure task complexity or ambiguity itself. Hence, future research could examine the appropriateness of various tasks for different means of service delivery and the impact the of task's delivery mode on customer relationships. In particular, it might be interesting to distinguish varying tasks by looking at various degrees of task complexities, the perceived risk of the task for the customer (Wünderlich, Wangenheim, and Bitner 2013) or, more generally, the criticality of different tasks as suggested by Keh and Pang (2010).

Second, despite the fact that this study has included a shared frailty to account for customer heterogeneity, I think it might be helpful to segment customers based on demographic and attitudinal data. This way service firms will gain a deeper understanding of the individual success factors for customer retention across customer segments and how these different segments can be addressed more effectively. Here, it might be fruitful to assess the implications of the proposed conceptual framework in an intercultural setting. Research has demonstrated that individual

cultural orientations of customers influence their expectations and motivations within service settings. Customers with a rather individualistic value orientation, for example, have been shown to be more concerned about economic value rather than the creation of relationships (Chan, Yim, and Lam 2010). Consequently, these customers prefer their own rewards, efficient communication and time savings, whereas more collectivistic oriented customers might value personal interactions to achieve a common goal. It would be interesting to know how these aspects transfer to this study's framework and also impact customer relationships and defection decisions in self-service settings.

Finally, future research should analyze the defection decision of customers for a face-to-face service encounter in comparison with a technology-based self-service. Since the setting of this study is rather restrictive with a comparison of a voice-to-voice and a screen-to-screen service, I believe the found results will be even stronger for a more traditional service setting.

6. General Discussion, Conclusions, and Future Research

The overarching goal of this thesis is an improved understanding of customers' psychological and behavioral responses to technology-based self-service encounters. By relying on a unique longitudinal dataset as well as a series of scenario-based experiments, this thesis examines how the use of technology-based self-services influences customer satisfaction, loyalty intentions, and long-term retention. Existing research has mostly focused on the benefits of technology-based self-services and on the determinants of customer acceptance and adoption of SSTs. The customers' responses to technology-based self-service encounters, however, remain a highly neglected area of research, especially in comparison to traditional personal services. From a theoretical perspective, it is important to understand if customer satisfaction, loyalty, and retention are harder to achieve when customers interact with a technology instead of a person. From a managerial perspective, examining and contrasting the customers' responses to technology-based self-services and personal services over time and across service tasks provides valuable insight into the true cost-effectiveness of technology-based self-services and also, when the introduction of self-services is most appropriate. Thus, through a thorough examination of customers' psychological and behavioral responses to technology-based self-service encounters versus personal service encounters, this thesis provides valuable theoretical insights and managerial implications.

6.1   Summary of Key Findings

In the outset of this thesis, I asked whether or not humans and machines are interchangeable in service delivery. While current business practice might suggest so, this thesis draws a different picture. In a series of three experiments and one longitudinal field study, I demonstrate that 1) customers respond differently to personal and self-service channels and 2) that personal services remain critical for the provision of meaningful and high-quality services, especially at the beginning of a customer-firm relationship.

Study 1 represents an initial attempt at understanding the role of the service channel in a customer's service evaluation. In particular, the study addresses the questions 1) whether customers' satisfaction with a service provider differs between personal and technology-based self-service channels and 2) why and under which circumstances satisfaction levels may differ. In line with the theory of a person-sensitivity bias, results of this study demonstrate that customers tend to evaluate personal, "high-touch" services in more extreme manners than technology-based, "high-tech" services. Accordingly, when service outcomes are good, customers are more satisfied with a provider when using a personal service instead of a self-service. When service outcomes are poor, however, customers are more satisfied (or less dissatisfied) when using a technology-based self-service instead of a traditional personal service. By drawing from attribution theory, this study further demonstrates that differences in satisfaction levels between service channels arise as customers make different causal inferences for an outcome when using a technology-based self-service instead of a traditional personal service. In particular, the results reveal that customers, who use a personal service, overestimate the power of the service employee to cause an outcome and assume that a service employee causes an outcome intentionally. Personal service customers consequently attribute more responsibility to the provider than self-service customers regardless of the service outcome. Technology-based self-service customers, on the other hand, are more egocentric and hence consistently attribute more responsibility to themselves or – when outcomes are poor – to external, situational factors.

A follow-up experiment provides an important limitation of this effect. By drawing from literature on interdependence versus independence and extending the previous experiment to an intercultural level, this follow-up experiment shows that the channel effects mostly arise in highly

independent, i.e. Western, cultures, but not in more interdependent, i.e. Eastern, cultures. Results reveal that one reason for this limitation is the fact that these customers assign responsibility for an outcome differently. In particular, this follow-up experiment shows that interdependent customers do not assume that human behavior is merely intentional, but also consider that the behavior of service employees is restricted through contextual factors, such as the roles and capabilities management assigns to the service worker. As a consequence, interdependent customers generally attribute less responsibility to the employee and more responsibility to external factors such as chance, especially when service outcomes are poor and pose a potential threat to social harmony.

Study 2 examines how the service task affects customers' responses to technology-based self-service and personal service encounters. Following the recent trend of multi-component studies, this study shows that service outcomes induce both, affective and cognitive customer reactions, which impact the customers' attitudinal and behavioral responses to a service encounter. In particular, findings of *Study 2* demonstrate that customers react more compassionately to outcomes of a personal service encounter than a technology-based self-service encounter. That is, personal service customers display lower levels of positive affect (i.e., higher levels of negative affect) than self-service customers when the service outcome is poor; when performance is high, personal service customers display higher levels of positive affect than self-service customers. *Study 2* demonstrates that this effect is most pronounced when task criticality is high and the service outcome is good. The study further demonstrates that this affectionate response leads to important behavioral consequences. Accordingly, personal service customers are not only more satisfied with the provider, but also display higher repurchase intentions when service outcomes are good. While results of *Study 2* do not provide evidence that customers differ in their WOM intensity after using a self-service or a personal service, they indicate that the customers' WOM can be considerably more negative and damaging for poor outcomes when a person instead of a machine has delivered the service. Finally, *Study 2* shows that the person-sensitivity bias does not extend to situations that are threatening to the customer's self-esteem. That is, the customers' differential psychological and behavioral responses to self-service and personal service encounters do not arise when the service outcome threatens the customers' self-esteem. This effect is even more pronounced when task criticality is high. Thus, *Study 2* provides evidence that the criticality of a service task strengthens the different customer responses to self-service and

personal service channels when performance outcomes are good, but not when they are bad and considered threatening to the customers' self-esteem.

Study 3 investigates the long-term effects of technology-based self-service channels on customer relationships. In particular, this study examines 1) how the customers' self-service to personal service usage ratio affects their defection behavior, and 2) how this effect changes over the customer's duration with the provider. By applying survival analysis to a unique longitudinal customer database, *Study 3* provides evidence that customers who use both self-service as well as personal service channels of a provider have the lowest chance of defection. On the contrary, customers, who merely use <u>one</u> particular channel of the provider – that is, either a self-service or a personal service – are most likely to defect from the service provider. The ratio of self-services to overall service usage thus impacts customer defection in a U-shaped manner, with intermediate levels of self-service and personal service usage being associated with the lowest likelihood of defection. This study further demonstrates that this effect mitigates with time. Thus, the ratio of personal and self-services used becomes less important with time – or the longer a customer has been with that particular provider. Taken together, results of this study highlight the importance of considering the long-term effect of self-services and the interactions between service channels and time.

6.2   General Discussion

Theoretical Contributions

This thesis makes a number of important contributions to existing literature and advances theoretical knowledge in several ways:

All studies of this dissertation provide evidence that humans and machines are *not* interchangeable in service delivery. Previous research has called for an in-depth investigation of the (long-term) consequences of technology-based self-services on customer satisfaction and retention (e.g., Dabholkar and Bagozzi 2002). In particular, researchers have questioned if customer satisfaction and retention are harder to achieve when customers interact with a machine

instead of a person (Parasuraman and Grewal 2000). To date, most research has underlined the appeal of self-services for service providers and customers and has focused on determinants of the customers' acceptance and adoption of these service channels (e.g., Meuter et al. 2005). An examination of the consequences of technology-based self-services, however, is still a mostly neglected area of research. The studies of this thesis collectively demonstrate that customers differ in their satisfaction judgments between self-service and personal service channels and underline the importance of offering both service channels – at least in the beginning of a customer-firm relationship - to foster customer retention. The unique approach of this thesis to contrast customers' psychological responses to human versus non-human service channels and to examine the interaction of both service channels over time hence advances current knowledge on the consequences of technology-based self-services.

This thesis does not only advance our understanding <u>if</u> customers respond differently to self-service and personal service encounters, but also provides novel theoretical frameworks to understand <u>why</u> customers' responses differ between service channels and over time. All studies of this thesis demonstrate that a number of established theories from social psychology and media effectiveness research can be applied to the service context in order to gain a deeper understanding of the customers' responses to personal versus technology-based self-service channels and to comprehend how differences in customers' responses to these channels are shaped:

Studies 1 and *2* provide first empirical evidence that the person-sensitivity bias (Moon and Conlon 2002) extends to the service context. The studies show that customers who use a personal service instead of a technology-based self-service are subject to the person-sensitivity bias and hence respond to "high-touch" encounters in more extreme manners. That is, customers are more satisfied with a good service outcome but also less satisfied with a poor outcome when a service employee rather than a machine delivers the service.

Studies of this thesis also provide empirical evidence for the theoretical notion that both, affect and cognition (i.e., causal inferences), give rise to the person-sensitivity bias uncovered in this thesis. While previous service research has mostly neglected the impact of affect on customer evaluations and behavior (Homburg, Koschate, and Hoyer 2006), this thesis demonstrates that

customer affect mediates the relationship between service outcome and customer satisfaction. Moreover, the findings of this thesis indicate that affect is a stronger mediator in the context of personal services than in the context of technology-based self-services. Customers' affective and emotional response to a service outcome thus shapes the customers' differential responses to human versus non-human service channels.

This thesis further demonstrates that the customers' cognitive inferences for the cause of a service outcome also shape the differential responses of customers to self-service and personal service channels. While causal attributions have been discussed in a number of studies in the service field (e.g., Bendapudi and Leone 2003; Meuter et al. 2005), they have not been focus of any previous study on technology-based self-services. This present research explicitly differentiates customers' causal inferences on the basis of Weiner's (1986) classification scheme for the locus of attribution (i.e., self, other, or chance) and contrasts customers' inferences for good, neutral, and poor service outcomes between self-service and personal service channels. This fine-grained approach advances theoretical knowledge by demonstrating that customers' causal inferences are much more nuanced than proposed in previous research: Existing literature on human-machine interactions proposes that humans react similarly to humans and to computers and hence also engage in social (self-serving) attributions when interacting with a computer (Moon and Nass 1998). Meuter and colleagues (2000), suggest that this effect extends to the context of technology-based self-services. However, these studies only consider the attribution to the self or the counterpart and neglect the possibility of external, situational factors that might have contributed to or even caused a particular outcome. The research presented here underlines the importance of including this option. Accordingly, results of this thesis reveal that customers find it hard to infer a bad internal motive on behalf of the technology when service outcomes are poor. As a consequence, self-service customers tend to blame a poor outcome on situational factors, whereas personal service customers tend to blame the provider. While both self-service and personal service customers engage in self-serving attributions, results reveal that customers nonetheless differ significantly in their attribution of blame for a poor outcome when interacting with a machine instead of a human. The fine-grained differentiation of customers' – external – causal inferences thus advances our understanding of human-machine interactions in general and the customers' response to self-service encounters in particular.

In *Study 3*, this thesis offers a novel way of looking at customer retention in multichannel settings by illustrating the different value propositions service providers offer in self-service and personal service channels and by identifying the unique value customers can derive from these propositions over time. While previous research acknowledges that customers will only remain with a provider as long as they consider the service provider's offer valuable (e.g., Oliver 1999; Kim and Son 2009), it has not considered theoretical aspects of value creation and a customer's value-in-use when examining customers' retention with a provider. Moreover, self-service research has not contrasted the customers' value creation between self-service and personal service channels, although researchers have called for a theoretically sound and comprehensive customer experience framework for self-service settings (Verhoef et al. 2009). Through an integration of media richness and channel expansion theory, the present research provides a thorough examination of the distinct channel capabilities and the value customers can derive from personal and self-service channels over time. Based on this conceptual framework, the study provides first empirical evidence that those customers, who experience the value of self-service and personal service are more likely to remain with the provider than customers, who restrict themselves to one particular service channel.

Finally, this thesis also adds to existing literature by explicating <u>when</u> customers respond differently to technology-based self-services and personal services and hence under which circumstances SSTs may harm customer satisfaction or retention:

To date, only few studies have examined the importance of the service <u>task</u> in the self-service context empirically (Simon and Usunier 2007). Nonetheless, self-service research proposes that customers generally prefer a self-service to a personal service when the service task is complex (Simon and Usunier 2007) and recommend that self-services should not be introduced for service tasks that are critical to a customer (Keh and Pang 2010; Selnes and Hansen 2001). While the present research supports this notion, it also furthers the understanding of the impact of the service task on the customers' responses to personal and self-service encounters. In particular, *Study 2* of this thesis provides first empirical evidence that the criticality of a service task strengthens differences between self-service and personal service customers' satisfaction when service outcomes are good. When service outcomes are poor, however, findings are that task criticality mostly attenuates the reported channel effects. Findings of this study hence

demonstrate that customers may not only prefer a personal service to a self-service when tasks are critical, but also appreciate a good service outcome more when a person rather than a machine delivers it.

The (long-term) effect of technology-based self-services over <u>time</u> is yet another widely neglected area of research, as already noted by Dabholkar and Bagozzi (2002) or Meuter et al. (2005). To date, businesses have enthusiastically introduced self-services in order to improve their productivity. However, while research underlines the importance of building long-term relationships instead of taking a single transactional view, no study to date has contrasted and examined the impact of technology-based self-services and personal services on customer relationships in the long run. This thesis closes this gap and advances current knowledge by demonstrating that self-services can harm customer relationships when used exclusively at the beginning of a customer-firm relationship. Findings also indicate, however, that self-services can improve customer relationships when used in conjunction with personal services. These results clearly reinforce the idea set forth by Selnes and Hansen (2001), who propose that self-services might not always harm customer loyalty when used to supplement personal services. The fact that *Study 3* finds that a balance of self-service and personal service usage over a three-month time horizon reduces the likelihood of customer defection, at least at the beginning of a relationship, hereby strongly underlines the advantage of examining longitudinal data.

Clearly, these findings also add to the current discussion on service productivity. Currently, research strongly supports the premise that service productivity and costs can be improved by standardizing processes and transferring work to the customer through self-services (Rust and Huang 2009). Results of this thesis demonstrate that this view may be too simplistic. Instead of pushing customers to "cheap" service channels, this research highlights the notion that service productivity can be optimized through the best fit of customers' resources and the provider's service offer. This implies that personal services, too, can improve service productivity. In fact, Vickery et al. (2004) demonstrate that personal service channels can enhance service operations through the fast accomplishment of rather complex tasks. By building on previous media effectiveness research, this thesis provides theoretical support for this notion and highlights the call by Rust and Huang (2009), prompting practitioners to find the optimal service productivity through a balance of self-services and personal services.

Managerial Contributions

Findings of this thesis also have important implications for current management practice.

To date, both business practice and research highlight the benefits of self-services, such as an increased operational performance and reduced costs (e.g., Rust and Huang 2009, 2012). Given these apparent advantages, more and more businesses actively push customers to self-service channels (White, Breazeale, and Collier 2012). This thesis demonstrates that this approach may not always be beneficial for the firm. The analyses of this thesis indicate that technology-based self-services may harm customer retention and can also lower the customers' satisfaction with the service provider. In particular, results of this thesis reveal that customers, who use both, a self-service and a traditional personal service at the beginning of a customer-firm relationship, are more likely to remain with the provider than customers who merely rely on one service channel. From a managerial point-of-view, this suggests that migrating customers to technology-based self-service channels at the beginning of a customer-firm relationship can lead to costly rather than cost-cutting consequences. To avoid the possible dark side of technology-based self-services, managers should hence allow customers to experience their relationship with a provider through a variety of service channels - especially when they are new to a provider. This approach allows the firm and the customer to experience the best of both worlds: On the one hand, customers can benefit from the convenient accessibility and flexibility of self-services, while enjoying the personalized attention in personal service encounters. On the other hand, firms can establish trust and social bonds to the customer through a personal interaction in traditional encounters, while reducing their operational costs through efficient self-service channels.

This thesis also demonstrates that not all service tasks lend themselves equally well for the introduction of a self-service. In particular, results show that the unique characteristics of a technology-based self-service make this channel most suitable for easy and repetitive service tasks. Personal services, in contrast, allow individualized attention to customer needs and an interactive give-and-take of customer and service employee. This suggests that these channels are more suitable for complex and critical service tasks. Empirical evidence of this thesis emphasizes this notion by demonstrating that a self-service may in fact harm customer satisfaction when used for a critical service task. Accordingly, results show that self-service customers are less satisfied with a service provider than personal service customers when service outcomes are good and the

service task is critical. From a managerial point-of-view, these findings have two important implications. First, management should offer personal services for the delivery of complex and critical tasks. As suggested by Selnes and Hansen (2001), relying on personal services for such tasks makes the personal interaction between service employee and customer more meaningful and hence enhances customer satisfaction and loyalty. Second, management should ensure the provision of a high-quality service in personal service channels as poor service outcomes can have much more detrimental effects on customer satisfaction and loyalty intentions when the service is delivered in person. Results of this thesis thus highlight the importance of providing a high service quality in personal service encounters through well-trained, highly motivated, and empowered service employees. Clearly, such an approach also depends on the individual competitive strategy of a provider. When high service quality cannot be assured or is not feasible, this thesis underlines that self-service channels may not only be the more efficient but also the more effective and satisfying way to the deliver the service.

In conclusion, this thesis highlights that managers need to understand the tasks their customers need to solve and tailor the mode of service delivery (and the capabilities of the channel) to the task at hand, rather than automating whatever is possible. Moreover, managers should consider the unique circumstances, such as the duration of the customer – firm relationship, and keep in mind that

<p align="center">"self service is just one channel to consider but not an exclusive one"</p>

<p align="right">- Emling 2005</p>

6.3 Conclusions and Directions for Future Research

Technology-based self-services have profoundly found their way into the business practice of the 21st century service economy. Researchers consider the invention of SSTs as the most important consequence of advancements in information technology (Rust and Huang 2009). Results of this thesis suggest, however, that personal service encounters and technology-based self-service encounters are not completely interchangeable. In conclusion, this thesis recommends that technology-based self-service encounters should <u>not always</u> and <u>not completely</u> replace the

personal interaction between customer and service employee. However, as with any research, this thesis is subject to a number of limitations, which leave opportunities for future research.

First, while this thesis demonstrates that the impact of technology-based self-services on customer satisfaction and retention depend on the time with the provider or the particular service task, it does not account for the fact that self-service technologies often only constitute a small portion of a customer's overall service experience. Consider a visit to the grocery store, for instance. Supermarkets increasingly introduce self check-out scanners that allow customers to scan and pay for groceries all by themselves. While this is a common example for self-service technologies as it replaces human labor with machines and transfers work to the customer, it is clear that a customer's whole service experience at the supermarket may still include personal touches. Supermarkets, for instance, often greet customers personally when entering the supermarket and offer personal assistance when customers try to find a special item or wish to get more detailed information about a product. Recent research suggests viewing a service as a sequence of events and proposes that peaks in service performance shape customers overall satisfaction (Verhoef, Antonides, and de Hoog 2004). With this in mind, it might be fruitful for future research to examine 1) if the provision of an SST within a service sequence affects customers' overall satisfaction and 2) when and how service providers can benefit from the provision of SSTs in a sequence of service events. It is plausible, for example, that personal interactions are recalled more easily (as they induce stronger affective responses of the customer) and hence exhibit a stronger influence on the customers' overall service evaluation than technology-based self-services. Technology-based self-services, on the contrary, may only be an important contributor to a customer's overall service evaluation when they are easily recalled as a "happy ending" of the service sequence.

Second, and in a related manner, this thesis does not examine the impact of different self-service designs. Technology-based self-services can take many forms, however. They range from online services, such as online educational services, to self-service kiosks, such as a self check-in kiosk at the car rental agency. While this thesis includes several different forms of a self-service in the different empirical studies and demonstrates that customers' responses to such self-services differ from personal services regardless of their specific design, future research should account for such design differences and examine their impact on customer evaluations more clearly. Keh and Pang (2010), for instance, demonstrate that customers respond differently to services that are separated

from the provider's location than to services where both parties are co-located. These results suggest that customer may also evaluate a self-service differently when conducted from a home computer versus a kiosk at the provider's location. Moreover, a recent study by Holzwarth, Janiszewski, and Neumann (2006) demonstrates that the use of an online avatar enhances the customers' satisfaction with a retailer and increases purchase intentions. These results might be indicative that a personalization and "humanization" of technology-based self-services may also offset many of their detrimental effects and in fact enhance customer satisfaction to a point where hardly any differences between personal service and self-service remain.

Third, this thesis does not account for the service climate and the relationship norms predominant in a particular service industry. Most generally, researchers distinguish two relationship norms (Aggarwal 2004; Heyman and Ariely 2004): On the one hand, businesses can adopt communal relationships with their customers. This relationship norm is based on communal sharing, cooperation, and relational concerns. On the other hand, businesses can adopt an exchange relationship. This norm is based on calculation, market pricing, and instrumental orientation. As Mayser (2011) notes, members of an exchange relationship are more inclined to keep track of the individual inputs when working on a joint task, whereas members of a communal relationship are more likely to help each other. Like a friendship, communal relationships between service provider and customer are hence more intrinsically oriented and prescribe "the cooperative acts and relational concerns of a collectivist value orientation" (Chan, Yim, and Lam 2010, p. 52). In *Study 1* this thesis demonstrates what a feeling of "closeness" or "connectedness" can induce. Accordingly, results show that an interdependent orientation of Indian customers attenuates the differential responses to self-service and personal service encounters. As communal relationships may also foster such a connectedness between provider and customer, it is likely that the introduction of technology-based self-services affects the customers' service evaluation and retention differently when the service industry is predominated by communal relationships rather than exchange relationships.

Customers may also perceive the introduction of technology-based self-services differently in general, when the relationship with the provider is dominated by social norms rather than market norms. Accordingly, customers may consider the personal interaction with the service employee more important and central, when customer and provider share a communal relationship. An introduction of (cost-efficient) technology-based self-services may thus be considered as a harm

to the "friendship" and hence degrade the customers' overall service evaluation. Customers in exchange relationships, however, are used to more calculative and utility-maximizing efforts of the provider. In such service relationships, technology-based self-services may not lower customers' overall service evaluation as long as customers see the immediate benefit of these channels for themselves.

Finally, while this thesis finds that some customers perceive a self-service as generally better and are inherently more likely to defect form a multichannel service provider than others, it does not fully account for important customer characteristics and their impact on the examined channel differences. Previous research suggests, however, that some customers are more likely to try and adopt a technology-based self-service. For instance, previous research has demonstrated that especially technology-enthusiastic and socially-averted customers prefer interacting with a machine instead of a person (e.g., Dabholkar 1996; Meuter et al. 2005). Clearly, these preferences also reflect the customers' expectations towards a self-service in general. *Study 1* of this thesis demonstrates that customers with high expectations towards a self-service often engage in a confirmation bias. That is, their (high) expectations often color their subsequent perceptions of a self-service encounter. Future research could advance this knowledge and its managerial implications by examining which customer characteristics foster such behavior. Social psychology research suggests, for instance, that self-enhancing tendencies of humans are stronger the higher an individual's self-esteem and achievement orientation (Campbell and Sedikides 1999).

Appendix

Appendix 3.1: Instructional Check.

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Service Evaluation

Modern theories of service evaluation recognize the fact that the way customers perceive and evaluate a service does not take place in a vacuum. Individual characteristics and experiences, along with situational variables can greatly impact a customer's evaluation. In order to facilitate my research on service perceptions and evaluations I am interested in knowing certain factors about you, the customer. Specifically, I am interested in whether you actually take the time to read the instructions; if not, then some of my manipulations that rely on changes in the instructions will be ineffective. So, in order to demonstrate that you have read the instructions, please ignore the question about the criticality of different services below. Instead, click on the button "powered by unipark" at the end of the screen and press continue to proceed to the next section of this survey.

Which of these following services do you consider critical?
You can select more than one answer.

☐ hospitality services (e.g., restaurant, hotel)

☐ transportation services (e.g., taxi, flights, car rental)

☐ medical services (e.g., doctor)

☐ entertainment services (e.g. cinema)

☐ educational services (e.g., university courses)

☐ finanical services (e.g., retirement planning, loans)

☐ Other:

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Continue

Appendix 3.2: Study 1 - Sample Characteristics (Overall).

	N	M	SD	Min.	Max.
Age	1192	35.73	12.76	16	70

	Frequency	**Percent**	**Cumulative**
Gender			
- female	637	53.44	53.44
- male	555	46.56	100.00
Education			
- some high school	7	0.59	0.59
- high school graduate	105	8.81	9.40
- Some college, no degree	377	31.63	41.02
- Associates degree	131	10.99	52.01
- Bachelors degree	404	33.89	85.91
- Graduate degree, Masters	132	11.07	96.98
- Graduate degree, Doctorate	36	3.02	100.00
Annual net income			
- less than $10,000	211	17.70	17.70
- $10,000 - $19,999	144	12.08	29.78
- $20,000 - $39,999	298	25.00	54.78
- $40,000 - $69,999	322	27.01	81.80
- $70,000 - $99,999	115	9.65	91.44
- $100,000 - $149,999	50	4.19	95.64
- $150,000 - $199,999	13	1.09	96.73
- $200,000 - $299,999	6	0.50	97.23
- $300,000 or more	1	0.08	97.32
- no answer	32	2.67	100.00
Main source of income			
- Mechanical Turk	122	10.23	10.23
- Other	1'070	89.77	100.00

Appendix 3.3: Additional Findings on the Effect of Prior Channel Expectations.

		Self-Service Encounter (n=591)						Personal-Service Encounter (n=601)					
		PSC Expectations						PSC Expectations					
		Low		High		Total		Low		High		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Low Quality.	Low	1.42	0.11	1.39	0.09	1.41	0.07	1.55	0.09	1.22	0.07	1.40	0.06
SST	High	1.55	0.11	1.33	0.09	1.44	0.07	1.42	0.10	1.26	0.09	1.35	0.07
Expectations	*Total*	1.49	0.08	1.36	0.06	1.42	0.05	**1.48**	**0.07**	**1.24**	**0.06**	1.37	0.05
Medium Quality.				n = 196						n = 196			
	Low	4.36	0.22	4.03	0.26	4.19	0.17	3.96	0.18	4.04	0.21	4.00	0.14
SST	High	4.43	0.23	4.49	0.25	4.46	0.17	4.31	0.23	4.22	0.26	4.27	0.17
Expectations	*Total*	4.40	0.16	4.26	0.18	4.33	0.12	4.12	0.14	4.11	0.16	4.12	0.11
High Quality.				n = 188						n = 211			
	Low	6.16	0.18	6.64	0.08	**6.44**	**0.09**	6.57	0.07	6.72	0.08	6.64	0.05
SST	High	6.62	0.11	6.74	0.07	**6.68**	**0.07**	6.67	0.08	6.68	0.12	6.68	0.07
Expectations	*Total*	**6.42**	**0.10**	**6.69**	**0.06**	6.56	0.06	6.62	0.05	6.70	0.07	6.65	0.04

Note. SST - Self-Service Technology; PSC - Personal Service Channel; Expectations split at median. Means not adjusted for covariates. Significant mean differences of ANOVA in bold. Interaction effect of PSC x SST Expectations not significant.

Appendix 3.4: Impact of Channel Expectations on Outcome Satisfaction.

Low Quality Condition

Self-Service Technology

Personal-Service Channel

Medium Quality Condition

Self-Service Technology

Personal-Service Channel

High Quality Condition

Self-Service Technology

Personal-Service Channel

Notes: Satisfaction measured from 1 (low) to 7 (high).
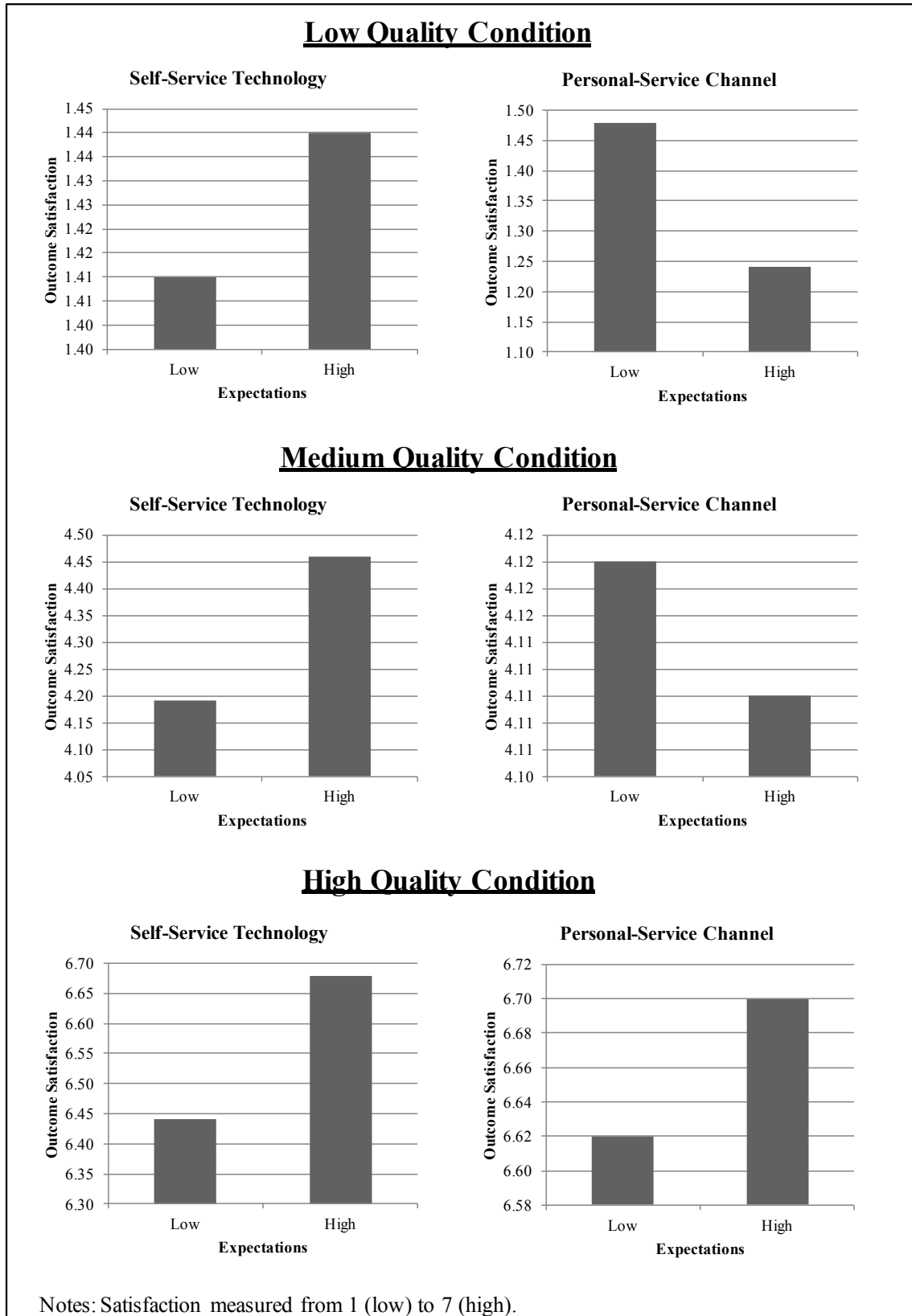
Appendix 3.5: Tests on Model Assumptions of Follow-Up Study.

ANOVAs are based on the assumption of normality and homogeneity of variances (Howell 2007). All of these are met in the current study. Thus, the central dependent variable *satisfaction with the provider* is fairly normally distributed with a skewness of -.48 and a kurtosis of 1.92. Similar results are obtained for the mediating variables *attribution to firm*, *self*, and *chance*. Tests by Levene (1960) and by Brown and Forsythe (1974) also provide evidence that variances are fairly homogeneous (within quality conditions and) across all experimental conditions for these central constructs: low quality: $F_{satisfaction}$ (3, 388) = 1.56, p = .20, $F_{attribution-firm}$ (3, 388) = 1.32, p = .27, $F_{attribution-chance}$ (3, 388) = .88, p = .45; med.-quality: $F_{satisfaction}$ (3, 376) = .626, p = .60, $F_{attribution-firm}$ (3, 376) = .512, p = .67, $F_{attribution-chance}$ (3, 376) = .539, p = .66; high-quality: $F_{satisfaction}$ (3, 395) = .330, p = .80, $F_{attribution-firm}$ (3, 395) = .227, p = .88, $F_{attribution-chance}$ (3, 395) = .524, p = .67).[39]

Only the mediating variable *attribution to self* seems to have slightly unequal variances across treatments in the high and low quality condition (low quality: $F_{attribution-self}$ (3, 388) = 3.59, p = .01; med.-quality: $F_{attribution-self}$ (3, 376) = .97, p = .41; high-quality: $F_{attribution-self}$ (3, 395) = 4.10, p = .01). However, given that the critical cell sizes do not exceed the recommended cell size ratio of 1.5, this violation is not considered critical. Independence of observations is again given through the between-subjects-design of the study.

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[39]   Results based on Brown and Forsythe (1974) *t*-tests based deviations of observations from sample median.

Appendix 3.6: Additional Results of the Follow-Up Study.

To test the assumption that cultures with high interdependence levels attribute responsibility differently than cultures with low interdependence levels, I collapsed the data from the main experiment of *Study 1* and the data from the follow-up experiment. I relied on the country measure as a proxy for participants' self-construal as an interdependent person.[40] Mean comparisons of interdependence levels across countries show that Indians view their self more interdependent ($M = 5.40$) than their American counterparts ($M = 4.78$, $F(1, 2362) = 208.68$, $p < .001$). Given that the respective samples differed in their demographic characteristics and service expectations, I controlled for the participants' *age, gender,* as well as *SST* and *personal service channel* (PSC) *expectations* in the upcoming analyses. As this follow-up study is most interested in the impact of the participants' self-construal as an interdependent versus independent self, I examined a number of 2 (interdependent vs. independent culture) by 2 (service channel) by 2 (participation high vs. low) ANCOVAs with the central scales *satisfaction with the provider*, *attribution to firm*, *self*, and *chance* as the respective dependent variables. I included interaction terms of the respective country (i.e., self-construal) and the remaining experimental treatments (*service channel*, *participation*).

Implications of High-Quality Outcomes

Figure A3.6-1 illustrates the results for a high quality outcome. As can be seen, Indians (i.e., interdependents) generally attribute more responsibility to chance ($M_{USA} = 2.70$, $M_{India} = 3.58$, $F(1, 772) = 49.76$, $p < .001$) and themselves ($M_{USA} = 3.67$, $M_{India} = 4.28$, $F(1, 772) = 31.85$, $p < .001$) and less to the service provider ($M_{USA} = 5.77$, $M_{India} = 5.36$, $F(1, 772) = 22.12$, $p < .001$) than their American counterparts (i.e., independents). Interestingly, however, satisfaction judgments of Indian respondents tended to be lower than those of American participants regardless of the service channel used ($M_{USA} = 6.54$, $M_{India} = 5.87$, $F(1, 772) = 84.04$, $p < .001$).

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[40]   The inclusion of country as an additional experimental factor did cause minor problems in the assessment of model assumptions. Accordingly, Levene's test was mostly significant for all central variables satisfaction and attribution to firm, self, and chance, indicating a violation of the homogeneity of variances assumption. However, a simulation of the inflation factor indicated that violations were minor and could be mitigated through the fairly equal cell sizes. Overall, the inflation remained less than one percentage point. That is, at maximum, the simulated *p*-value reached .059 for a nominal .05 level.

Figure A3.6-1: Interaction of Service-Channel and Interdependence for High-Quality Outcomes.

Implications of Low-Quality Outcomes

When the service outcome is poor, participants from India attributed more responsibility to themselves (M_{USA}= 3.30, M_{India}= 3.65, $F(1, 767) = 8.50$, $p = .004$), more to chance (M_{USA}= 2.09, M_{India}= 3.21, $F(1, 767) = 95.95$, $p < .001$), and less to the provider (M_{USA}= 5.46, M_{India}= 5.02, $F(1, 767) = 15.64$, $p < .001$) than less interdependent (i.e., American) participants.

Additionally, the participants' self-construal and cultural orientation also affected the differential impact of the service channel on the locus of attribution. As illustrated in Figure A3.6-2, Indians seem to have considerably stronger other-enhancing tendencies for poor quality outcomes when a personal service is used instead of a self-service. Accordingly, Indian participants attribute considerably more responsibility for a poor outcome to chance and their self and less to the provider than American participants when a personal service is used (*attribution to self*: M_{USA}= 3.14, M_{India}= 3.86, $F(1, 767) = 20.08$, $p < .001$; *attribution to chance*: M_{USA}= 1.89, M_{India}= 3.32, $F(1, 767) = 88.86$, $p < .001$; *attribution to firm*: M_{USA}= 5.59, M_{India}= 5.07, $F(1, 767) = 12.23$, $p < .001$), whereas the difference between cultures is almost non-existent in self-service settings (*attribution to self*: M_{USA} = 3.45, M_{India}= 3.44, $F(1, 767) = 0.01$, $p = .92$; *attribution to chance*: M_{USA}= 2.29, M_{India}= 3.10, $F(1, 767) = 24.35$, $p < .001$; *attribution to firm*: M_{USA}= 5.34, M_{India}= 4.98, $F(1, 767) = 5.21$, $p = .02$).

Results demonstrate that these differential attributions directly translate into significant differences in customers' satisfaction with a provider. Accordingly, participants from India are more satisfied with the service provider when the service outcome is poor (M_{USA}= 1.40, M_{India}= 2.69, $F(1, 767) = 155.87$, $p < .001$). As expected, this effect is even more pronounced in personal service settings (M_{USA}= 1.34, M_{India}= 2.80, $F(1, 767) = 111.24$, $p < .001$).

Attribution to Chance

Attribution to Firm

Attribution to Self

Satisfaction

Notes: All attribution variables and satisfaction with the provider measured from 1 (*low)* to 7 (*high*)
PSC: Personal Service Channel; SST: Self-Service Technology

Figure A3.6-2: Interaction of Service-Channel and Interdependence for Low-Quality Outcomes.

Appendix 4.1: Study 2 - Sample Characteristics (Overall).

	N	M	SD	Min.	Max.
Age	815	40.98	13.47	18	92

	Frequency	**Percent**	**Cumulative**
Gender			
- female	418	51.29	51.29
- male	397	48.71	100.00
Education			
- some high school	32	3.93	3.93
- high school graduate	298	36.56	40.49
- Some college, no degree	149	18.28	58.77
- Associates degree	78	9.57	68.34
- Bachelors degree	183	22.45	90.80
- Graduate degree, Masters	61	7.48	98.28
- Graduate degree, Doctorate	14	1.72	100.00
Annual net income			
- less than $10,000	63	7.73	7.73
- $10,000 - $19,999	80	9.82	17.55
- $20,000 - $39,999	191	23.44	40.98
- $40,000 - $69,999	239	29.33	70.31
- $70,000 - $99,999	134	16.44	86.75
- $100,000 - $149,999	39	4.79	91.53
- $150,000 - $199,999	15	1.84	93.37
- $200,000 - $299,999	3	0.37	93.74
- $300,000 or more	1	0.12	93.87
- no answer	50	6.13	100.00
Experience online educational services			
- yes	275	33.74	33.74
- no	540	66.26	100.00

Appendix 4.2: Study 2 - Operationalizations and Construct Reliability.

Constructs and Items	I-t-t	CA	CR	AVE
Satisfaction - Provider (adopted from Tsiros, Mittal, and Ross 2004)		.99	.99	.97
I feel satisfied with _____.	.99			
I am happy with _____.	.99			
I am pleased with _____.	.99			
WOM Activity (adopted from Harrison-Walker 2001)		.92	.92	.79
I would not miss an opportunity to tell others about my experience with ___.	.93			
I would mention my experience with ____ to others quite frequently.	.93			
I would talk about my experience with ____ in great detail, when telling others about this provider.	.93			
WOM Praise (adopted from Harrison-Walker 2001)		.96	.	.
I would only have to say good things about my experience with ____.	.			
I would be proud to tell others that I have used ____'s service.	.			
Repurchase Intentions (adopted from Hui et al. 2004)		.99	.99	.96
Based on the information in the previous scenario, would you use ___ again in the future?				
unlikely - likely	.99			
definitely no - definitely yes	.99			
not inclined to - inclined to	.99			
Affect (adopted from Campbell 2007)		.98	.98	.95
The scenario makes me feel: negative - positive	.98			
The scenario makes me feel: annoyed - pleased	.98			
The scenario makes me feel: unhappy - happy	.98			
Attribution Firm (adapted from Moon and Nass 1998 & Weiner 1985)		.80	.80	.50
Who was more responsible for the recent level of performance? Me - Provider	.83			
Who was more responsible for the outcome? Me - Provider	.80			
____'s expertise is the main reason for this outcome	.74			
____'s effort is the main reason for this outcome	.80			

Notes: I-t-t = Item-to-total correlation, CA = Cronbach's Alpha, CR = Composite reliability, AVE = average variance extracted.

Appendix 4.3: Study 2 - Correlations and Discriminant Validity following Fornell and Larcker (1981).

Construct	√AVE	1.	2.	3.	4.	5.	6.
1. Satisfaction	.94	1					
2. WOM Activity	.89	0.24	1				
3. WOM Praise	/	0.90	0.28	1			
4. Repurchase Intentions	.98	0.91	0.26	0.91	1		
5. Affect	.97	0.87	0.21	0.85	0.87	1	
6. Attribution	.71	-0.21	0.21	-0.21	-0.21	-0.17	1

Notes: Fornell-Larcker criterion suggests that discriminant validity is given when correlations between constructs are smaller than the square root of constructs' average variance extracted (AVE); correlations are depicted below the diagonal.

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