MANAGING CONSUMER RESISTANCE TO INNOVATIONS

VRIJE UNIVERSITEIT

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Machiel Jan Reinders

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promotor:　　　　　prof.dr. R.T. Frambach

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For me, innovation was and still is a very fascinating and multi-faceted object of study. I discovered this already when writing my master thesis about location-based services, a mobile service that became popular in the early 2000s. In addition, as a PhD student I learned about the ins and outs of consumer behavior and I became interested in the different psychological perspectives of how consumers think and behave. Combining my fascination for novelties and my interest in consumer behavior, I ended up with a thesis dealing with consumers' acceptance of and resistance to innovations. I enjoyed writing this thesis and although it took me much more time than I initially expected, I think there is a high probability that I would choose the same subject if I had to start all over again.

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Chapter 1   Introduction

The biggest problem is not to let people accept new ideas, but to let them forget the old ones.

John Maynard Keynes (1883 – 1946)

In this chapter we briefly introduce the topic of this dissertation and its relevance. First, we provide definitions of the key constructs of interest, followed by a more extensive discussion of the literature that deals with consumer resistance to innovations and the research topics on which this thesis is based. Subsequently, the central objective of this dissertation will be introduced and the three empirical studies that are presented in the following chapters of this thesis are introduced. Finally, we conclude with an outline of the dissertation.

1.1   Introduction

The last decades inevitably represent a period of tremendous technological change. Countless technological innovations have changed the way we live and work: from color television and personal computers to cell phones and online banking. These innovative products and services offer great opportunities for firms, in terms of growth and differentiation (Danneels and Kleinschmidt 2001). Innovation has long been viewed as a path to long-term corporate success. Companies that successfully introduce new products are more likely to succeed than those that do not (Bayus, Erickson, and Jacobson 2003). Innovations allow firms to establish competitively dominant positions, and afford new entrants an opportunity to gain a foothold in the market (Danneels and Kleinschmidt 2001). However, although essential for firms' survival, innovations are also associated with high risks and many new products fail to win over sufficient customers to become a commercial success. While estimates vary from 40% to 90%, depending on the product category, the criteria used to define success, and the stage at which products are included in the analysis, it is clear that innovations fail at a significant rate (Gourville 2006). One of the potential causes for such innovation failures is the resistance that these innovations encounter from consumers (Ram and Sheth 1989). The forms of this resistance may vary from passive resistance or ignorance (Bagozzi and Lee 1999) to active rebellion (Fournier 1998). However, although consumer resistance is an important concept in order to gain further insight in how innovations are accepted and diffused in the market, most studies have focused on successful innovations and their rate of diffusion through the market and only a minority of them have made an attempt to investigate consumer resistance towards innovations (e.g., Ram and Sheth 1989; Szmigin and Foxall 1998). Moreover, these studies have predominantly been theoretical, with little effort devoted to empirical testing of the concept (for a recent exception, see Kleijnen, Lee, and Wetzels 2009). Furthermore, only a few of these studies have focused on strategies that might help to overcome consumer resistance to innovations.

This dissertation examines how consumers react to new products or services and why they accept or resist them. More specifically, in three different empirical studies we try to deepen our insight into potential causes of resistance and circumstances that enhance or weaken its prevalence. In addition, based on the results of these empirical studies, this dissertation provides theoretical implications for advancement of the innovation adoption literature and gives insight into how managers can manage consumer resistance to innovations, by offering strategies that can be used to mitigate resistance and increase acceptance of innovations.

The remainder of this introduction chapter is organized as follows. We first look at the key constructs of interest for this dissertation and provide definitions of them. Subsequently, a brief literature review of consumer resistance towards innovations is provided. After presenting this theoretical background, we discuss the main objectives, contributions, and outline of this dissertation.

1.2 Definitions of Key Constructs

1.2.1 The Concept of Innovation

Innovations have been studied in a variety of contexts, including economics, management, technology, sociology, and engineering. Therefore, there is a wide range of approaches to conceptualize and operationalize the innovation construct. Innovation can refer to the act of introducing something new (i.e., the innovation process) or something newly introduced (i.e., an object). Literature on the diffusion of innovations has defined an innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers 2003). In accordance with this latter definition, in this thesis we focus on innovations as an object (i.e., a product, service, or technology) instead of innovation as a process. Note that in this definition the term 'perceived' is used, indicating that an innovation does not necessarily have to be objectively new, but that something can be regarded as an innovation as long as a particular target group perceives this product, service, or idea as new. According to Rogers (2003): "It matters little whether the idea is 'objectively' new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation."

1.2.2 Typology of Innovations

Previous research aimed to establish several classifications of innovations. In general, highly innovative products are seen as having a high degree of newness (Garcia and Calantone 2002). The measurements of innovativeness utilized in empirical analyses can be broken down into (a) a macro level, where the concern is measuring how the characteristics of an innovation are new to the world, the market, or an industry (e.g., Atuahene-Gima 1995; Mishra, Kim, and Lee 1996; Schmidt and Calantone 1998), and (b) a micro level, where innovations are identified as new to the firm or the customer (e.g., Danneels and Kleinschmidt 2001; More 1982). In addition, Garcia and Calantone (2002) made a distinction between incrementally new products and really new products. Chandy and Tellis (1998, 2000) made a further refinement of really new products into

technological breakthroughs, market breakthroughs and radical innovations. Whereas technological breakthroughs include innovations that bring new technologies to existing markets, market breakthroughs include innovations that bring existing or incrementally new technologies to new markets. In addition, a radical innovation will result in discontinuities in both the existing market structure and the existing technology structure. According to Chandy and Tellis (1998) radical innovations involve "substantially new technology and provide substantially greater customer benefits per dollar relative to existing products." Finally, from a consumer perspective, continuity of an innovation is assessed with respect to some existing product category (Moreau, Lehmann, and Markman 2001). As such, innovations not only may be assessed with respect to the extent to which they involve substantially new technology or the extent to which they offer substantially greater benefits for the consumer relative to existing products, but also the extent to which these innovations demand considerable changes to consumption or usage patterns (Veryzer 1998). In one of the chapters of this dissertation, the main focus will be on really new products (i.e., radical innovations) that demand considerable changes to consumption or usage patterns. These types of innovations are most vulnerable to consumer resistance because consumers are uncertain of the utility of the benefits of these innovations and are reluctant to change their behavior to attain these potential benefits (Alexander, Lynch, and Wang 2008; Hoeffler 2003).

1.2.3   Technological Innovations

In this dissertation we specifically focus on technological innovations. Technology stems from the Greek word technologia (τεχνολογια), which can be translated as "systematic treatment of an art or craft". Mick and Fournier (1998, p. 124) narrow down this definition as they refer to technology as "artificial things, and more particularly modern machines, that (a) require engineering knowledge for their design and production, and that (b) perform large amounts of operations by themselves." In this sense, electronic or digital products and systems can be regarded as technological products. During the last 150 years technology has developed at a rapid pace in a variety of domains (e.g., medicine, transportation, and communications). As a consequence, technology now infiltrates almost all aspects of life. Technology not only increasingly creates new products, but also plays an increasing role in the development and delivery of services (Bitner, Brown, and Meuter 2000). For example, self-service technologies (i.e., technological interfaces that enable customers to produce a service independent of direct employee involvement) challenge the notion that employee-customer interaction is an essential feature of service delivery (Meuter et al. 2000). However, the problem is that

the technological development of products and services is often ahead of the practice of the people who are meant to use them, leading to a gap between developer and customer (Higgins and Shanklin 1992). In addition, in their seminal work, Mick and Fournier (1998) indicate that new technologies are paradoxical in the sense that the same products produce both positive and negative feelings that may lead to emotions of conflict and anxiety. As such, technological innovations are likely to meet resistance by consumers, who are expected to adopt these products.

1.2.4 Innovation Adoption Process

The innovation adoption process concerns "the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (Rogers 1995, p. 21). This thesis focuses on consumer adoption of innovations, that is, the individual adoption process, rather than adoption by organizational or other institutional units. Literature recognizes a number of main factors that influence the individual adoption decision: the characteristics of the innovation itself (e.g., LaBay and Kinnear 1981; Tornatzky and Klein 1982; Rogers 2003), personal characteristics (e.g., Steenkamp, Ter Hofstede, and Wedel 1999; Im, Bayus, and Mason 2003), the social context (e.g., Fisher and Price 1992; Midgley and Dowling 1993; Van den Bulte and Lilien 2001; Goldenberg et al. 2009), and the marketing environment (e.g., Gatignon and Robertson 1991; Steenkamp and Gielens 2003). In addition, innovation decision theory suggests that the adoption of new products by consumers is the outcome of a cognitive process of information search and processing (Gregan-Paxton and Roedder John 1997; Olshavsky and Spreng 1996). Innovation adoption literature identifies five distinct mental stages through which a person progresses in this decision to adopt an innovation: awareness, consideration, intention, adoption and continued use (Rogers 2003; Frambach and Schillewaert 2002). Ideally, an individual passes from first knowledge of an innovation to forming a positive attitude toward the innovation to overt adoption behavior. However, in practice, knowledge of an innovation not always leads to a positive attitude, let alone to adoption behavior. As will be explained in the next paragraph, resistance towards innovations might occur in each of the stages of the adoption process.

1.3 Consumer Resistance to Innovations

Consumer resistance to innovations is a special case of general resistance to change. Very little attention has been paid to the role of resistance in the adoption process of new products and services. From a psychological perspective resistance is defined as an aversive motivational state, initiated when one perceives that one's freedom is threatened, and directing thought and action toward regaining the threatened freedom (Brehm 1966; Brehm and Brehm 1981). With regard to innovation resistance, Ram and Sheth (1989, p. 6) formulated the following definition: "Innovation resistance is the resistance offered by consumers to an innovation, either because it poses potential changes from a satisfactory status quo or because it conflicts with their belief structure."

Consumer resistance to innovations reveals itself in different forms. Most of the time innovation resistance occurs passively. Consumers resist innovations without deliberately considering these innovations for adoption. Literature distinguishes several drivers of this passive resistance towards innovations. First, passive resistance may be a consequence of habit (Bagozzi and Lee 1999). Sheth (1981, p. 275) terms habit "the single most powerful determinant in generating resistance." A typical human tendency is to strive for consistency and status quo, rather than to adopt new behaviors (Chernev 2004; Gourville 2005). This status quo bias leads consumers to value the advantages of products they own more than the benefits of new ones. In addition, new products are evaluated relative to the products they already own. People view any improvements relative to the products they already own as gains and treat all shortcomings as losses. Since losses tend to be exaggerated relative to equally sized gains, the potential losses from adopting an innovation weigh more heavily than the potential gains (Kahneman and Tversky 1979; Tversky and Kahneman 1991). Another driver of passive resistance might be information overload due to the enormous amount of information consumers are exposed to (Herbig and Kramer 1994). Malhotra (1984) and Keller and Staelin (1987) argue that consumers' processing capacity can become overloaded if they try to process too much information in a limited time. Information overload often occurs when an innovation evolves so fast (and multiple alternatives are available) that it is difficult for the consumer to organize all the information and make comparisons between the available alternatives (Hirschman 1987).

Innovations also can be resisted actively (e.g., Bagozzi and Lee 1999). In that case, a person decides not to adopt an innovation after evaluation of the innovation has occurred. Kleijnen et al. (2009) recently distinguished three forms of active innovation resistance that range from less intense or active to more intense or active:

postponement, rejection, and opposition. First, postponement might occur. Although consumers do not have a negative evaluation of an innovation per se, they may decide to delay the adoption, for example, until the circumstances for adoption are more suitable. Kleijnen et al. (2009) show that economic reasons (e.g., price) or a conflict with existing usage patterns at that point in time are the main reasons for postponement. Second, rejection implies a strong disinclination to adopt the innovation (Rogers 2003). Rejection occurs for instance when an innovation is in conflict with an existing belief structure or when an unfavorable image about the innovation is developed (Ram and Sheth 1989). In addition, the degree of perceived risk associated with using an innovation is one of the main barriers that promote rejection of innovations (Ram and Sheth 1989). Perceived risk represents a consumer's subjective perception of uncertainty about the consequences and outcomes of adopting an innovation (Ostlund 1974). Risk can be seen as a multidimensional construct consisting of different types of losses (Stone and Grønhaug 1993): financial, performance, physical, psychological, social, time or convenience losses. Finally, an innovation may not only meet rejection, but may even evoke consumers to engage in strategies to prevent the innovation's success, like protest or boycotting (e.g., Peñaloza and Price 1993; Kozinets and Handelman 1998). This form of resistance is called opposition (Kleijnen et al. 2009). Often, these behavioral responses stem from consumers' concern both with current business practices and with the societal impact of innovations (Herrmann 1993). This type of consumer resistance may range from collective actions, like boycotts, to individual actions, like complaining behavior, negative word-of-mouth or switching behavior (see Hirschman 1970).

1.4   Research Topics in Innovation Resistance

Given the background provided about innovation adoption and consumer resistance to innovations there are some interesting and relevant topics that are particularly relevant in research on consumers' reactions to innovations and await further empirical exploration. More specifically, we stated our interest in the following research topics: (1) consumers' reactions to radical innovation, (2) forced adoption of innovations, (3) post-adoption evaluation of innovations, and (4) technology-based service innovations. Before we introduce our specific research questions covered in the empirical chapters, a more general description of these topics will be provided.

First, radical innovation is a crucial driver of the growth and success of firms, and is even crucial to a nation's economic growth (Tellis, Prabhu, and Chandy 2009). However, for consumers, radical innovations do not only provide enhanced benefits, they also

represent unfamiliarity and complexity (Calantone, Chan, and Cui 2006). Ellen, Bearden, and Sharma (1991) state that it is not the new technology that is resisted, but the change(s) caused by the technology. Changing from an existing to a new product or service is not simply a matter of using or learning the new product or service, but it requires substantial changes in existing behavioral routines. In addition, radical innovations demand a high level of cognitive effort as a result of their incongruity and complexity compared to existing products (Goldenberg, Lehmann, and Mazursky 2001; Mandler 1982; Meyers-Levy and Tybout 1989). As such, potentially successful radical innovations may be rejected, not because of a lack of benefits, but rather because the product is new, complex and unknown to consumers (Alexander, Lynch, and Wang 2008; Hoeffler 2003). Given the increasingly important role of radical innovation, it is clear that more insight is needed into how consumer resistance to radical innovations can be reduced.

Second, the use of innovations is often involuntary. For example, once organizations adopt an innovation, they may force their employees to use it. Also in the public domain, consumers are increasingly imposed upon to use new technologies. Previous studies suggest that forcing consumers to use an innovation results in resistance toward that innovation, despite obvious benefits (e.g., Ram and Jung 1991). In a forced adoption context, consumers lose their freedom to choose to use an innovation for themselves, and, therefore, their perceptions of decisional control are reduced (e.g., Botti, McGill, and Iyengar 2003; Walton and Berkowitz 1985). In turn, a lack of control is one of the reasons for innovation resistance (Ellen et al. 1991; Lee and Allaway 2002). Although some form of forced adoption has been investigated in a business context as perceived voluntariness in the adoption of new technologies by individuals within an organization (e.g., Moore and Benbasat 1991; Agarwal and Prasad 1997), empirical studies of forced adoption decisions in a consumer context are scarce. Moreover, a conceptual foundation and empirical test for whether or not forced use of an innovation leads to resistance towards that innovation, and has negative effects on the company offering the innovation, is missing in the literature.

Third, the adoption process of innovations does not stop at first use or trial. In fact, even if individuals initially have low or no resistance, they can develop resistance towards the innovation after they have adopted the product or service (Ram and Jung 1991), for example, if the innovation does not perform as expected or the innovation failed to fulfill desired goals. Post-adoption resistance also occurs when consumers are

surprised by the difficulty of learning to use a new product and negative emotions are evoked (Wood and Moreau 2006). As a result of this post-adoption evaluation, discontinuance may occur. Discontinuance is a decision to reject an innovation after having previously adopted it (Rogers 2003). Especially when rewards or force are used to encourage or impose adoption, adopters are vulnerable to a negative evaluation after adoption and are subsequently likely to discontinue use of the innovation (Rogers 2003). Discontinuance negatively affects the diffusion and product life cycle of a new product, because of its effect on the product return rate, future brand loyalty, word-of-mouth communications, and desire to purchase other related technologies. Thus insight into post-adoption consumer evaluations of innovations gives new product managers important information.

Finally, many of the innovations introduced during the past few decades have been services rather than durable goods (Libai, Muller, and Peres 2009). Moreover, service companies increasingly encourage active participation by customers in the service process (Bendapudi and Leone 2003). At the same time, services are infused with new technologies (Bitner et al. 2000). As a result of both developments, technology-based service innovations have become a critical component of customer-firm interactions and understanding how consumers conceive new (technology-based) services becomes increasingly important (Meuter et al. 2005). Previous studies show that the intentional use of these technology-based self-services depends upon consumer evaluations in terms of the benefits and risks that they provide (Dabholkar 1996; Dabholkar and Bagozzi 2002), or in terms of the satisfaction or dissatisfaction with these automated services (Meuter et al. 2000). Nevertheless, little attention has been paid to possible factors that might raise resistance towards these service innovations.

1.5   Objectives and Contributions

The objective of this dissertation is to empirically investigate the emerging research topics that were described in the previous section. More specifically, the central objective of this thesis is to '*examine consumers' reactions to radical innovations and forced adoption of (service) innovations and to create more insight into how resistance towards these innovations can be managed*'. In this section we will elaborate further on the objective of this thesis by presenting an overview of the empirical chapters, their central research questions and each chapter's contributions to the literature.

1.5.1   Chapter 2: Bundling of Radical Innovations

In Chapter 2, we provide a solution for positioning radical innovations in the market in such a way that their resistance will be reduced and their evaluation will be improved. In this chapter, we will test the idea that bundling an existing product with a radical innovation may create a context that helps consumers to interpret new products more easily (Veryzer 1998). As such, we expect that product bundling, defined as the integration and sale of two or more separate products or services (cf. Stremersch and Tellis 2002), facilitates the comprehension and evaluation of the radical innovation. In turn, this may lead to increased adoption intention of the radical innovation. Hence the main objective of this chapter is to *examine whether bundling radical innovations with existing products may enhance the comprehension, evaluation and adoption intention of radical innovations*. In addition, in this study we will investigate to what extent the effect of product bundling is contingent on the perceived fit between the bundled products and on consumers' prior knowledge in the product domain.

This study makes several contributions to the literature. First, by focusing on the effect of bundling radical innovations on outcomes that represent key steps in the innovation adoption process, this chapter contributes to the understanding of how customers can learn about new products. Within innovation adoption research this is recently identified as a topic in need of more inquiry (Alexander et al. 2008). From this perspective, it also enriches the literature that aims to understand how the cognitive effort needed to evaluate radically new products can be reduced (e.g., Gregan-Paxton and Roedder John 1997; Moreau et al. 2001). Second, previous research suggested such a potentially beneficial role of bundling (Stremersch and Tellis 2002). This study develops and tests hypotheses that aim to demonstrate whether product bundling is an effective marketing strategy to launch radically new products.

1.5.2   Chapter 3: Forced Adoption of Technology-Based Self-Services

This chapter looks at the effect of "forcing" consumers to adopt innovations. More specifically, this chapter investigates the impact of forcing consumers to use technology-based self-service. Technology-based self-services (TBSS) allow customers to perform the service, or parts of the service, by themselves. Examples of TBSS include "on-site" options, such as touch screens in department stores, information kiosks at hotels, and automated teller machines (ATMs); but they also include "off-site" options, such as telephone and online banking and shopping on the Internet (Dabholkar and Bagozzi, 2002). Service providers increasingly try to stimulate the use of technology-based service options by making the traditional full-service encounter relatively unattractive (e.g.,

higher costs) or by completely replacing traditional service with TBSS, thus "forcing" customers to use an automated service. For example, users often have little to no control over the decision of a bank to replace its bank shops by automated teller machines and are forced to comply with the decision made by the management of this particular bank. Although social psychological literature has suggested that limiting consumers' perceived freedom of choice may result in negative effects (e.g., Linder, Cooper, and Jones 1967; Zuckerman et al. 1978), little is known about the effects of forcing consumers to use technology-based self-service and whether this may evoke consumer resistance. The main purpose of this chapter is to fill this gap by *investigating whether forced use of technology-based self-service has negative consequences, in terms of negative attitudes towards the self-service and the service provider, as well as behavioral responses, such as word-of-mouth and switching intentions*. We draw on theory related to perceived control and the forced adoption of innovations to develop a conceptual model that explains the effects of forcing consumers to use technology-based self-service. The major contribution of this study is the focus on the concept of forced choice in using a self-service. Previous literature looked at determinants of the use of self-service options (e.g., Dabholkar 1996; Meuter et al. 2000; Meuter et al. 2005), but did not address consumers' feelings in cases in which they are forced to use these new service technologies. In addition, this study not only looks at attitudinal consequences, but also investigates how attitudes affected by forced choice influence behavioral responses, such as word-of-mouth and switching intentions. We thus also study the possible harmful effects of a lack of choice on future behavior intentions.

1.5.3 Chapter 4: Expertise and Consumers' Post-Adoption Evaluation

Chapter 4 describes the role of consumer expertise in the evaluation of a new technology-based self-service after initial usage in a forced adoption situation. Consumer expertise is a frequently used variable in studies on the adoption of innovations (e.g., Moreau et al. 2001). Literature shows that prior consumer knowledge facilitates the adoption of new products because consumers with sufficient prior knowledge in a product domain are more capable of dealing with incongruity or complexity (Wood and Moreau 2006). However, in a forced situation where consumers do not have any choice, post-adoption evaluations become more relevant than adoption intentions. Different expectations with regard to using a new self-service between experts and novices will lead to different types of evaluation after initial use of the technology-based self-service in a forced adoption context. Therefore, the main objective of this study is to *examine the effects of consumer expertise on the post-adoption evaluation of a new technology-based*

self-service in a forced situation. Based on the literature, we offer a framework in which a distinction is made between "technology expertise" (e.g., Keaveney and Parthasarathy 2001; Meuter et al. 2005) and "service expertise" (e.g., Bell, Auy, and Smalley 2005). In addition, we explain how prior satisfaction with the service provider might play a role in the evaluation of the new TBSS.

This study contributes to the innovation adoption literature by focusing on how a new TBSS is evaluated after forced usage. Previous literature emphasizes use intention of TBSS (e.g., Dabholkar and Bagozzi 2002), or its initial trial (Meuter et al. 2005). However, in a forced adoption context, consumer evaluations of the innovation after use is more relevant than use intention. Furthermore, this study adds to the expertise literature in trying to unfold the role of expertise in the early use of innovations. Although consumer expertise is a frequently used variable in studies dealing with the adoption of innovations, its role in the adoption process is more complex than most literature implies (e.g., Moreau et al. 2001). This study explains that because expectations between experts and novices with regard to the process and outcomes of using a TBSS are different, evaluation of TBSS for both novices and experts can change after (forced) use of TBSS. In addition, although different studies have addressed the role of expertise with regard to (self-service) technology in the acceptance and use of TBSS (e.g., Keaveney and Parthasarathy 2001; Meuter et al. 2005), less is known about the role of expertise with regard to the service itself in evaluation of a new TBSS. This study aims to elucidate the role of both technology expertise and service expertise in the forced use of a new TBSS.

1.6   Outline

This thesis critically reviews studies in the field of marketing on consumer innovation adoption and resistance, and is based upon three empirical studies presented in Chapters 2, 3, and 4. Each chapter differs in terms of approach, theory, method, and data. Table 1 provides an overview of the chapters in terms of key concepts, main research questions, research context and research methodology.

Table 1.1   Overview of Empirical Chapters

	Chapter 2	Chapter 3	Chapter 4
Key concepts	• Radical innovation • Adoption decision process • Product bundling • Product fit • Product knowledge	• Technology-based self-service • Forced adoption • Perceived freedom of choice • "Fall-back" options	• Technology-based self-service • Consumer expertise • Post-adoption evaluations • Disconfirmation of expectations • Forced adoption
Main research questions	• Does product bundling reduce resistance to radical innovations and facilitate the comprehension, evaluation and adoption intention of radical innovations? • What role does perceived fit between the bundled products play? • What role does prior knowledge in the product domain play?	• Does forced use of technology-based self-service lead to negative consequences, in terms of consumer attitudes as well as behavioral responses? • To what extent does a fall-back option help to offset the negative consequences of forced use? • What is the role of consumers' previous experience with technology in a "forced use" situation?	• How does consumer expertise regarding technology affect the post-adoption evaluation of a new technology-based self-service (TBSS) in a forced use situation? • To what extent does service expertise moderate the effects of technology expertise on the evaluation of a new self-service? • What is the role of prior satisfaction with the service provider in the post-adoption evaluation of a new TBSS?
Research context	(Prototypical) radical innovations from the high technology and consumer electronics domains: • Babble • Digital Pen • Flacon	Railway context (ticketing and travel information): • Internet self-service • Ticketing machine/ touch screen monitor	Service innovation in public transport: • Smart card

Chapter 2   Using Product Bundling to Facilitate the Adoption Process of Radical Innovations[1]

Sticks in a bundle are unbreakable.

\- Kenyan proverb -

Generally, radical innovations are not easily adopted in the market. Potential adopters experience difficulties to comprehend and evaluate radical innovations due to their newness in terms of technology and benefits offered. Consequently, adoption intentions may remain low. This chapter proposes bundling as an instrument to address these problems. More specifically, this chapter examines how consumer comprehension, evaluation, and adoption intention of radical innovations may be enhanced by bundling such products with existing products. The results of an experimental study provide evidence of this effect, contingent upon the level of fit perceived to exist between the radical innovation and the product that accompanies it in the bundle. In addition, the effects of bundling on consumer appraisals of radical innovations are also shown to depend on the level of knowledge respondents possess regarding the product category of the radical innovation. More specifically, if bundled with a familiar product, novices tend to evaluate the innovative product more positively, but for experts no such an effect can be detected. Based on these results, managerial implications for the introduction of radically new products are provided.

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[1] This chapter is forthcoming as Reinders, Machiel J., Ruud T. Frambach, and Jan P. L. Schoormans, "Using Product Bundling to Facilitate the Adoption Process of Radical Innovations," *Journal of Product Innovation Management*.

2.1 Introduction

Introducing radical innovations is crucial for firms to enhance their competitive position and to safeguard their long-term success (McDermott and O'Connor 2002). Radical innovations are defined as new products that involve substantially new technology, offer substantially greater customer benefits relative to existing products, and demand considerable changes to consumption or usage patterns (Chandy and Tellis 2000; Veryzer 1998). Consequently, consumer acceptance of radical innovations depends upon whether, and if so, how consumers are prepared to change their mental models (Calantone, Chan and Cui 2006). Stated differently, radical innovations are likely to meet a high level of resistance. Innovation decision theory suggests that the adoption of new products by consumers is the outcome of a cognitive process of information search and processing (Gatignon and Robertson 1991; Gregan-Paxton and Roedder John 1997; Olshavsky and Spreng 1996). When confronted with new products, consumers first must gain some understanding of the innovation to form a favorable or unfavorable attitude towards it (Rogers 1995). Product comprehension and product evaluation thus represent essential preconditions for the acceptance of a new product. Previous literature shows that the level of incongruity of the innovation with existing product category schemas influences the nature of information processing and therefore affects the innovation decision process (Mandler 1982; Meyers-Levy and Tybout 1989). For radical innovations, which demand a high level of cognitive effort as a result of their incongruity with existing product schemas and complexity compared to existing products (Goldenberg, Lehmann, and Mazursky 2001; Mandler 1982; Meyers-Levy and Tybout 1989), this implies that consumer resistance may be high despite their benefits (Veryzer 1998).

Several strategies exist to reduce the incongruity of radical innovations with consumers' cognitive schemas. Extant literature shows that creating a context might help consumers interpret new products more easily (Veryzer 1998). However, to the best of our knowledge, no empirical research investigates how a radical innovation might derive value by being bundled with another product. Bundling refers to "the sale of two or more separate products and/or services in one package" (Stremersch and Tellis 2002, p. 56). As will be argued in the present study, bundling an existing product with a radical innovation may create a context that enables consumers to comprehend and evaluate the radical innovation more easily, and leads to increased adoption intention. Literature distinguishes between price bundling and product bundling. Price bundling represents the sale of two or more separate products or services in a package at a special price or discount, irrespective of the integration of the products in the bundle (Guiltinan 1987;

Simonin and Ruth 1995; Stremersch and Tellis 2002). In contrast, product bundling, which is the focus of this chapter, is the integration and sale of two or more separate products or services that can be offered at any price (Stremersch and Tellis 2002). Product bundling entails a marketing strategy that adds value by packaging complementary or related products (Harris and Blair 2006a; Sarin, Sego, and Chanvarasuth 2003; Stremersch and Tellis 2002), such as a computer system, which bundles hardware, software, network equipment, and peripheral devices such as a printer. A necessary condition of product bundles is therefore that the bundled products must fit with one another. Product fit is defined as the extent to which consumers perceive the two product categories of the bundled products to be compatible (Simonin and Ruth 1998). As will be argued in this chapter, high perceived fit between the bundled products facilitates knowledge transfer from the existing product to the new product and positively affects the adoption process of the radical innovation. Next to a high perceived fit, the interpretation of the meaning of new products is strongly related to consumers' prior knowledge in the product domain (e.g., Wood and Lynch 2002). We therefore investigate the effect of prior knowledge in the product domain as well.

This study makes several contributions to the literature. First, by focusing on the effect of bundling on outcomes that represent key steps in the innovation adoption process this chapter contributes to the understanding of how customers can learn about new products. Within innovation adoption research this is recently identified as a topic in need of more inquiry (Alexander, Lynch, and Wang 2008). In this perspective, it also enriches the literature that aims to understand how the cognitive effort needed to evaluate radically new products can be reduced (e.g., Gregan-Paxton and Roedder John 1997; Moreau, Lehmann and Markman 2001). Second, this study shows that product bundling is an effective marketing strategy to launch radically new products. Previous research suggested such a potentially beneficial role of bundling (Stremersch and Tellis 2002). This study develops and tests hypotheses pertaining to the influence of product bundling on different outcome variables related to a customer's innovation adoption process. This chapter shows that managers may effectively use product bundles to positively shape customers' evaluation and adoption intention of a radical innovation by communicating its benefits through its relationship with an existing product. By doing so, this study also extends recent work on consumer evaluations of product bundles (e.g., Harris and Blair 2006a, 2006b; Janiszewski and Cunha 2004; Yadav 1994).

The remainder of this chapter is organized as follows: First, hypotheses will be developed that relate product bundling to the comprehension, evaluation, and adoption intention of radical innovations. Second, the method and results of an experimental study

are presented. Third, the theoretical and managerial implications of the findings are discussed as well as the limitations of the study.

2.2 Hypotheses

2.2.1 Product Bundling and Comprehension of a Radical Innovation

Due to product newness, radical innovations require a substantial amount of learning (Olshavsky and Spreng, 1996) and comprehension tends to be low (Hoeffler 2003). To grasp the meaning of a radically new product requires seeing it in relation to other products (Graeff 1995, 1997). Analogical learning theory states that new product learning is facilitated by the transfer of knowledge from one domain to another (Gentner 1989; Gregan-Paxton and Roedder-John 1997). The assumption behind this theory is that existing knowledge structures serve to facilitate the achievement of learning about new stimuli based on the correspondence between the two. As such, products in a product bundle could serve as a reference standard or context for judgments of each other (Harris 1997). Stated differently, comprehension of a radical innovation might be enhanced by relating it to a familiar product by offering them together in a product bundle. Consumers may use the information from the existing product in a product bundle to make inferences about the new product. However, this will only be effective if the information in the existing product gives the consumer information about the new product. Literature on analogy and categorization shows that to use existing knowledge of a familiar product domain in order to understand something new, knowledge in that familiar domain should be allowed to align to the new domain, either by attributes that are linked or by some other kind of relation between the two products (Gentner 1989; Gregan-Paxton and Moreau 2003). Therefore, in order to comprehend a radical innovation in a product bundle, a high perceived fit between the bundled products is required. The perceived fit of the bundled products establishes a learning effect of the radical innovation in the product bundle. Consequently, it is expected that consumers will comprehend radical innovations more when offered in a product bundle with an existing product, which is characterized by a high perceived fit between the bundled products. In contrast, when the fit is moderate or low the bundle is not a true product bundle, and no such effect is expected. Therefore, the following hypotheses will be tested:

> H1a: Comprehension of a radical innovation is higher when this innovation is offered in a product bundle as opposed to when this innovation is offered separately.

H1b: Comprehension of a radical innovation is higher when this innovation is offered in a product bundle characterized by a high perceived fit between the bundled products as opposed to a bundle with a moderate fit.

2.2.2 *Product Bundling and Evaluation of a Radical Innovation*

Evaluation is an important stage in the adoption process as it determines whether a consumer will proceed towards adoption of the innovation; i.e., if the innovation is evaluated negatively, it is highly unlikely that subsequent adoption will occur (Olshavsky and Spreng 1996). Radical innovations tend to elicit negative evaluations, because they are incongruent with existing product concepts and this incongruity can be resolved only with substantial cognitive elaboration (Mandler 1982; Meyers-Levy and Tybout 1989). Adding familiar attributes to a product generally improves its evaluation (Mukherjee and Hoyer 2001). Similarly, adding an existing product to a radically new product in a product bundle is expected to improve the evaluation of the innovation as it reduces the perceived incongruity of the radical innovation with existing product categories. The perceived fit of the bundled products is again important. In general, consumers respond more positively to bundles with a high fit or relationship between the products (e.g., Guiltinan 1987; Harlam et al. 1995; Simonin and Ruth 1995), because a complementary product can enhance the value and utility of the other product when the two get used together (Nambisan 2002). In such a case, bundling an innovation with an existing and familiar complement should improve consumers' perceptions of the functionality of the new product (Stremersch and Tellis 2002). In turn, this enhanced functionality of the bundled products results in a more favorable evaluation by the consumer. In addition, bundling literature suggests that if consumers perceive a fit between the bundled products, they can transfer their attitudes from one product to the new one (Gaeth et al. 1990), affecting the evaluation of the innovation. On the other hand, when a strong fit between the bundled products is lacking, undesirable beliefs and associations are stimulated because consumers may question the quality and relevance of the product bundle (Aaker and Keller 1990). This would result in a more negative evaluation of the new product. Hence:

H2a: Evaluation of a radical innovation is higher when this innovation is offered in a product bundle as opposed to when this innovation is offered separately.

H2b: Evaluation of a radical innovation is higher when this innovation is offered in a product bundle characterized by a high perceived fit between the bundled products as opposed to a bundle with a moderate fit.

2.2.3 Product Bundling and Adoption Intention of a Radical Innovation

Adoption intention reflects a consumer's propensity to purchase an innovation. Product purchase probability is affected by consumers' perceived utility of the product (Calantone et al. 2006). Previous research suggests that product utility may be affected by bundling, as product bundling enhances the perceived functionality of the bundled products (Harris and Blair 2006b). Therefore, the adoption intention of a radical innovation may be stimulated by offering it within a bundle with an existing product. Again, consistent with the definition of a product bundle, it can be argued that the effect of bundling on adoption intention of the radical innovation is affected by the perceived fit between the bundled products. Literature on bundling shows that bundles that are composed of complements have a higher purchase intention than bundles of unrelated products (Gaeth et al. 1990; Harlam et al 1995). Therefore, the added value of the bundle is expected to positively affect consumers' preference for the radical innovation:

> *H3a: Adoption intention of a radical innovation is higher when this innovation is offered in a product bundle as opposed to when this innovation is offered separately.*

> *H3b: Adoption intention of a radical innovation is higher when this innovation is offered in a product bundle characterized by a high perceived fit between the bundled products as opposed to a bundle with a moderate fit.*

2.2.4 Prior Knowledge

Consumers rely on their knowledge when learning about new products. Individuals with prior knowledge in a product domain are more capable of dealing with the complexity involved in learning about new products (Wood and Moreau 2006). Experts who have substantial prior knowledge in a product domain can evaluate a new product that is related to that domain at both product category and attribute levels (Sujan 1985). These consumers can resolve the cognitive distance between the radically new product and existing products (Peracchio and Tybout 1996). Similarly, Graeff (1997) argues that people with high prior knowledge can use their knowledge to form personal interpretations and comprehend product information more easily. Product bundling, therefore, should have less effect in enhancing the comprehension of the radical innovation among these people. In addition, people with high prior knowledge do not need a product bundle to evaluate the radical innovation, because they can evaluate the innovation in itself. Therefore, the beneficial effect of product bundling as hypothesized in hypotheses 1 through 3 will be less effective for consumers with high prior knowledge in the product domain:

H4: Prior knowledge negatively moderates the positive effect of product bundling on the (a) comprehension, (b) evaluation, and (c) adoption intention of a radical innovation.

2.3 Method

2.3.1 Selection of Innovation Stimuli and Product Bundles

To empirically test the hypotheses, subjects must evaluate radical innovations that are offered either separately or bundled with existing products. To select appropriate radical innovations and appropriate product bundles for those innovations, the following procedure was employed. First, a list of different radical innovations or prototypes was identified by searching the Internet and product magazines. These innovations involved mainly high technology and electronics products. In total, 19 innovations were selected. Six product innovativeness experts (from both industry and academia) rated these innovations on the basis of the scale by Chandy and Tellis (2000), which assesses the radicalness of an innovation on a two-dimensional, seven-point semantic differential scale: (1) whether an innovation incorporates a substantially different core technology and (2) whether an innovation provides substantially higher customer benefits relative to a previous product generation in the category. Product innovations that scored significantly higher than the scale centre on both dimensions appear in this study. As a result, six different product innovations were selected. Their scores ranged from 5.7 to 6.3 (5.7 to 6.7) on the first (second) dimension. Inter-rater reliability was satisfactory (α = 0.84 and α = 0.82 for the first and second dimension, respectively).

In addition, for each of the six innovations selected, three different product bundles were composed. To ensure that these bundles reflect true product bundles, the perceived fit between the bundled items was checked based on a student sample (*n* = 77). Raters indicated how they perceive the fit between the bundled products using the semantic differential scale employed by Simonin and Ruth (1995) that measures the product complementarity of the bundled products. The bundles with a perceived low fit were eliminated in order to concur with the definition of a product bundle. This resulted in three product bundles with radical innovations in the experiment: the Babble, the Digital Pen, and the Flacon. Table 2.1 provides descriptions of the products and their bundles.

Table 2.1   Descriptions and pictures of products and bundles included in the study

Babble

The Babble is a device that filters sound. For example, one can have a private telephone conversation that cannot be heard by the environment. The Babble consists of a receiver and two speakers. The receiver filters sounds in its environment and produces a form of anti-noise, in such a way that other people are no longer distracted by environmental noises. This way it becomes possible to produce sounds in one part of a room, while people in the other part are not distracted. The device can be turned on and off with the push of a button so it works only when you truly need it.

Babble and LCD Television

The Babble is a device that filters sound. For example, one can have a private telephone conversation that cannot be heard by the environment. The Babble consists of a receiver and two speakers. The receiver filters sounds in its environment and produces a form of anti-noise, in such a way that other people are no longer distracted by environmental noises. This way it becomes possible to produce sounds in one part of a room, while people in the other part are not distracted. The device can be turned on and off with the push of a button so it works only when you truly need it.

The LCD television has a 20-inch screen and is equipped with scart and S-video connections. The TV can be secured onto a wall or mounted on a standard. The Babble makes sure that you, and not your environment, can enjoy the TV.

Digital Pen

The digital pen creates a new way to input data in your computer. This products works like a normal pen, but written text is converted into digital text. After text has been written on digital paper, the pen must be put into a docking station to convert the handwritten text into its digital form. The pen is delivered with the required software.

Digital Pen and Laptop

The digital pen creates a new way to input data in your computer. This products works like a normal pen, but written text is converted into digital text. After text has been written on digital paper, the pen must be put into a docking station to convert the handwritten text into its digital form. The pen is delivered with the required software.

The laptop has a processor of 2000 MHz. The video card and the working memory of 256 MB allow you to use the Internet, play games, work on documents and send emails. The computer has a hard disk with enough capacity that helps you to store your documents. With the Digital Pen you can import your texts quickly into the laptop. The product can easily be used in combination with applications like e-mail and word processing.

Table 2.1   (Continued) Descriptions and pictures of products and bundles included in the study

Flacon

Nowadays, a lot of people have lots of pictures and videos stored on their mobile phones, cameras and PCs. Most of the time, the amount of pictures is so huge that it is impossible to view all these pictures. The Flacon might be a solution for this problem. It is an innovative picture library and projector. Depending on the date or mood of the user, different types of pictures (photos) or videos are selected. Then, these pictures can be displayed by the projector on, for instance, a screen or a wall. The Flacon has a fashionable design.

Flacon and Digital Camera

Nowadays, a lot of people have lots of pictures and videos stored on their mobile phones, cameras and PCs. Most of the time, the amount of pictures is so huge that it is impossible to view all these pictures. The Flacon might be a solution for this problem. It is an innovative picture library and projector. Depending on the date or mood of the user, different types of pictures (photos) or videos are selected. Then, these pictures can be displayed by the projector on, for instance, a screen or a wall. The Flacon has a fashionable design.

The 4 megapixel digital camera has a 3x optical zoom with a flash. The camera weighs about 250 grams. You can make pictures as well as short movies with this camera. The camera has different options to adapt pictures to different circumstances. The camera is delivered with a USB cable to transfer pictures to a PC or the Flacon. With the Flacon you could project the pictures that you made with the camera.

2.3.2   Design and Procedure

To test the hypotheses, a 2 (no bundle; bundle) × 3 (innovation: Babble, Digital Pen, or Flacon) design was employed. In the experiment 400 subjects, randomly drawn from a professionally administered consumer panel that consists of 1,700 households from a medium sized Dutch city, were approached to participate in the study. In total, 201 consumers participated in the study (men = 93, women = 108; 50% response rate). Their age ranged from 19 to 66 years, with an average of 41 years. The sub-samples used in the experiment did not significantly differ in terms of demographics (i.e., age and gender) and prior knowledge.

Depending on the condition to which the subject was randomly assigned (no bundle, n = 102; bundle, n = 99), he or she read a description of either the radical innovation solely or a bundle that included the innovation. After examining the product (bundle) description, subjects listed their thought responses to the product (bundle) using the procedure employed by MacKenzie and Lutz (1989), and Mick (1992). These thought listings were used to measure the inferences consumers formed while reading the

information about the radical innovation and were mainly used in this study for illustrative purposes. Next, subjects completed the questionnaire designed to assess the measures related to the radical innovation. The experiment was executed online.

Stimuli. More than 90% of the subjects had never heard of the innovations, indicating that the stimuli were really new products. The measures from Veryzer (1998) and Chandy and Tellis (2000) were used to verify that the innovations represented radical innovations. Specifically, these measures assess whether the product offers significant user benefits and whether the core technology is different from the previous product generation. Subjects indicated that the stimuli offer substantial user benefits ($M = 4.52$ on a scale from 1 = no benefits to 7 = substantial benefits) and a new technology ($M = 5.39$ on a scale from 1 = not new at all to 7 = very new) (see also Table 2.2). These results are significantly different from the mid-points. We also assessed that participants understood the descriptions that are offered in the experiment, using the (7-point) scale employed by Hoeffler (2003).

Table 2.2   Descriptive statistics for the product stimuli

	Babble ($n = 71$)	Digital Pen ($n = 72$)	Flacon ($n = 58$)	*F*-Value
User benefits	$M = 4.86^a$	$M = 4.61^a$	$M = 3.98^b$	4.670*
	s.d. = 1.61	s.d. = 1.54	s.d. = 1.83	
Technology newness	$M = 5.55^a$	$M = 4.85^b$	$M = 5.88^a$	9.018**
	s.d. = 1.49	s.d. = 1.52	s.d. = 1.23	
Perceived bundle fit	$M = 4.08^a$	$M = 4.70^a$	$M = 4.34^a$	1.641
	s.d. = 1.47	s.d. = 1.28	s.d. = 1.47	

Note: Variables are measured on a 7-point scale (1=low; 7=high). Means with a different superscript indicate a significant difference ($p < .05$) (means are compared two at a time).

* $p < .05$; ** $p < .01$.

Perceived fit. In order to test the hypotheses on the effect of product bundling, respondents in the 'bundle' condition who perceive a high fit among the products (i.e., representing a true product bundle) were distinguished from those who perceive a moderate fit based upon a median split. Subjects indicated how they perceive the fit between the bundled products on a two-item, seven-point semantic differential scale adapted from Simonin and Ruth (1995). Results are shown in Table 2.2. Bundle fit was comparable with bundle fit in the pre-test. As a result, 52 subjects who perceive a high fit ($M = 5.5$) and 47 subjects who perceive a moderate level of fit between the bundled products ($M = 3.1$) were identified. Together with the unbundled condition, this provides us with three groups: high fit bundle, moderate fit bundle, and the unbundled radical innovation.

2.3.3 Measures

Below, the origin of the measures used in this study is discussed, followed by the psychometric properties of the scales. Details are provided in Appendix 2.1.

Product comprehension. To measure product comprehension, three items adapted from Raju, Lonial, and Mangold (1995) were used, for which subjects indicate their ability to use the new product, judge the quality of the new product, and understand the various attributes/features of the new product. In addition, two items adapted from Moreau et al. (2001) were used.

Product evaluation. The measure of product evaluation employed a 10-item, seven-point, semantic differential scale adapted from Mano and Oliver (1993), Rijsdijk and Hultink (2003), and Stayman and Batra (1991). This scale measures both cognitive and affective evaluations of the product.

Adoption intention. Adoption intention was measured by a single-item, seven-point scale adapted from Maheswaran and Meyers-Levy (1990) that assesses to what extent the respondent will consider buying the new product soon.

Consumer prior knowledge. Prior knowledge of the product category was measured using two items that rely on a seven-point Likert scale, adapted from Kleiser and Mantel (1994).

2.3.4 Unidimensionality, Reliability and Validity

For each multi-item scale the unidimensionality, reliability, convergent validity, and discriminant validity was assessed. Results are provided in Table 2.3, together with descriptive statistics of the measures and their correlations. The unidimensionality of each scale was explored with principal axis factoring using eigenvalue of 1.0. Two measures showed an eigenvalue larger than 1.0, one measure exhibited an eigenvalue of .98. A scree-plot procedure further indicated the existence of three measures. Taken together, these results largely provide support for the unidimensionality of the three constructs. The reliability of each scale was explored by computing the reliability coefficient. They all exceeded the recommended value of 0.7 (Nunnaly 1978). Additionally, the internal consistency and convergent validity of the scales was investigated by performing a confirmatory factor analysis on all items of the latent variables using the ML-estimation in Lisrel for all multi-item scales. The results indicated a satisfactory fit of the data ($\chi 2/df$ = 2.57, GFI = .90, CFI = .96, NFI = 0.94, RMSEA = 0.089; see the Appendix for purified scales). The chi-square to degrees of freedom ratio was below the recommended level of 3 (Bollen 1989). Both the CFI and NFI satisfied the minimum requirement of .90 (Bollen 1989). The RMSEA slightly exceeded the

recommended value of .08 (Browne and Cudeck 1993). Convergent validity was indicated by the fact that the items loaded significantly on their corresponding latent construct (t > 2.0) (Bagozzi, Yi, and Philips 1991). Discriminant validity among the scales was assessed in two steps. First, a baseline model (in which the correlations between pairs of constructs were freely estimated) was estimated for each possible pair of scales. Next, this baseline model was compared with a series of alternative models, in which the correlations between pairs of constructs were constrained to unity (cf. Anderson and Gerbing 1988). In each case, the constrained model exhibited a statistically significant increase in chi-square providing evidence of discriminant validity. Taken together, these results indicate a sufficient degree of unidimensionality, reliability, and validity of the scales.

Table 2.3   **Correlation matrix, descriptive statistics of measures and confirmatory factor analysis**

Construct	Comprehension	Evaluation	Adoption intention	Prior Knowledge
Comprehension	1.00			
Evaluation	.529*	1.00		
Adoption intention	.618*	.416*	1.00	
Prior knowledge	.191*	.487*	.104	1.00
# Items	4	6	1	2
Mean	4.09	4.86	3.41	1.58
SD	1.25	1.07	2.01	.50
Cronbach's alpha	.76	.90	n.a.	.87
Eigenvalue	5.23	.98	n.a.	2.1
Lowest t-value	7.17	12.09	n.a.	6.69
AVE	.93	.91	n.a.	.89
CR	.97	.99	n.a.	.94

Notes: * $p < .01$; AVE = Average variance extracted; CR = Composite reliability.

2.4   Results

2.4.1   Differences between Stimuli

Table 2.3 shows that there are significant differences across the three product stimuli (i.e., Babble, Digital Pen, and Flacon) on perceived user benefits and technology newness. More specifically, the Babble and Digital Pen are perceived to offer more user benefits than the Flacon, while the Babble and the Flacon are rated higher on

technological newness. Although perceived bundle fit of the Digital Pen is higher than that of the Babble and the Flacon, differences are not significant. Tests of the proposed relationships between bundling and product comprehension, evaluation and adoption intention for each product separately revealed consistent results. The results of the three products were therefore pooled and are presented below.

2.4.2 Effect of Product Bundling on Comprehension of a Radical Innovation

Hypothesis 1 is tested on the three subject groups (subjects who perceive a high fit between the bundled products, subjects who perceive a moderate fit between the products, and subjects from the unbundled condition). The results reveal that product comprehension differs significantly across the three conditions ($M_{high\ fit}$ = 4.50, $M_{moderate\ fit}$ = 3.55, $M_{unbundled}$ = 4.12; F (2,198) = 7.66, $p < .01$). A Bonferroni test indicates significant differences between subjects who perceive a moderate fit between the bundled products and the subjects in the high fit condition ($p < .01$) as well as the subjects in the unbundled condition ($p < .05$), supporting Hypothesis 1b, but no significant differences between subjects who perceive a high fit and those in the unbundled condition ($p > .05$). Although the difference in means is in the expected direction, this result does not support Hypothesis 1a. These findings point at the importance of product fit within the bundle. The observed effect of bundling on comprehension can be illustrated by the following comments from respondents: In the high perceived fit condition they note: "I can imagine using this combination," "This idea appeals to me," and "The situations where I can use this product are very recognizable," whereas in the unbundled condition they state: "Sounds very complicated" and "I cannot imagine anything with this idea". The moderate perceived fit condition prompts comments such as "Why such a combination?" and "I don't understand this combination."

2.4.3 Effect of Product Bundling on Evaluation of a Radical Innovation

Product evaluations differ significantly over the conditions ($M_{high\ fit}$ = 5.31, $M_{moderate\ fit}$ = 4.40, $M_{unbundled}$ = 4.83; F (2,198) = 9.91, $p < .001$), and a Bonferonni test reveals significant differences between subjects who perceive a high fit between the innovation and the bundled product and those in the unbundled condition ($p < .05$), as well as between subjects who perceive a moderate fit and those in the unbundled condition ($p < .05$). Therefore, when the fit between the bundled products is perceived as high, bundling a radical innovation enhances its evaluation. In addition, again reversed effects are found for moderate perceived fit between the bundled products. Taken together, these results support both Hypotheses 2a and 2b. Comments from respondents

illustrate the advantageous effect of bundling on evaluation (in the high perceived fit condition): "Handy," "Nice combination," and "This idea sounds great".

2.4.4 Effect of Product Bundling on Adoption Intention of a Radical Innovation

We also determine whether a product bundle with a radical innovation affects adoption intention of the innovation. The results are consistent with those for product evaluation ($M_{high\ fit}$ = 4.17, $M_{moderate\ fit}$ = 2.32, $M_{unbundled}$ = 3.52; F (2,198) = 12.04, $p < .001$). A Bonferroni test reveals significant differences among all three groups ($p < .05$). Therefore, when the fit between the bundled products is perceived as high, bundling a radical innovation enhances its adoption intention. Again reversed effects are found for moderate perceived fit between the bundled products. Taken together, these results support Hypotheses 3a and 3b.

2.4.5 Prior Knowledge

Hypothesis 4 predicts interaction effects between prior knowledge and bundling on the dependent variables. In order to investigate these, we first checked whether prior knowledge and perceived fit are related (consumers with high prior knowledge may perceive a higher fit). No significant correlations between the two constructs for any product stimuli were found. Second, respondents were divided into high and low prior knowledge groups based upon a median split. As expected, prior knowledge has a positive direct effect on product comprehension ($M_{low\ knowledge}$ = 3.50, $M_{high\ knowledge}$ = 4.51; $t = -6.173$, $p < .001$) and product evaluation ($M_{low\ knowledge}$ = 4.55, $M_{high\ knowledge}$ = 5.08; $t = -3.528$, $p < .01$). However, it has no significant effect on adoption intention ($M_{low\ knowledge}$ = 3.09, $M_{high\ knowledge}$ = 3.64; $t = -1.909$, $p > .05$).

Next, in order to test the hypothesis that prior knowledge moderates the effect of bundling on the product adoption process, 3 (high fit bundle, moderate fit bundle, and no bundle) x 2 (low and high prior knowledge) ANOVAs were conducted with product comprehension, product evaluation, and adoption intention as dependent variables. The first ANOVA (F (5,195) = 14.04, $p < .001$) shows a significant interaction between the bundling and knowledge conditions on product comprehension ($F = 3.85$, $p < .05$; see Table 2.4 and Figure 2.1A). The second ANOVA (F (5,195) = 14.04, $p < .001$) shows a borderline significant interaction between the bundling and knowledge conditions on product evaluation ($F = 2.60$, $p < .08$; see Table 2.4 and Figure 2.1B). A third ANOVA (F (5,195) = 14.04, $p < .001$) again shows a borderline significant interaction effect between the bundling and knowledge conditions on adoption intention ($F = 2.71$, $p < .07$; see Table 2.4 and Figure 2.1C). These results reveal that knowledgeable consumers do not benefit

from the bundling effect for comprehension of the radical innovation. For bundles that do not show a strong complementarity between the products (moderate fit), comprehension of the radical innovation is even found to be significantly lower. A similar trend is found for the evaluation of the radical innovation as well as for the intention to purchase the radical innovation (see Table 2.4). In sum, support is found for Hypothesis 4a and indicative support for Hypotheses 4b and 4c. Table 2.4 provides additional details about these findings.

Table 2.4 Descriptive statistics for low and high prior knowledge subjects on dependent variables

Subjects	No Bundle	Bundle		F-Value
		Moderate Perceived Fit	High Perceived Fit	
Low prior knowledge	(*n* = 47)	(*n* = 18)	(*n* = 20)	
Comprehension	$M = 3.35^a$ s.d. = 1.14	$M = 3.18^a$ s.d. = 1.08	$M = 4.16^b$ s.d. = 1.03	4.813*
Evaluation	$M = 4.39^a$ s.d. = 1.00	$M = 4.20^a$ s.d. = 1.08	$M = 5.26^b$ s.d. = .96	6.549**
Adoption intention	$M = 2.89^a$ s.d. = 1.78	$M = 2.28^a$ s.d. = 1.53	$M = 4.30^b$ s.d. = 2.11	6.518**
High prior knowledge	(*n* = 55)	(*n* = 29)	(*n* = 32)	
Comprehension	$M = 4.78$ s.d. = 1.08	$M = 3.78^b$ s.d. = 1.06	$M = 4.71^a$ s.d. = 1.06	9.032**
Evaluation	$M = 5.21^a$ s.d. = .90	$M = 4.52^b$ s.d. = 1.22	$M = 5.35^a$ s.d. = .78	6.619**
Adoption intention	$M = 4.05^a$ s.d. = 2.09	$M = 2.34^b$ s.d. = 1.68	$M = 4.09^a$ s.d. = 1.80	8.826**

Notes: Variables are measured on a 7-point scale. Means with a different superscript indicate a significant difference (p < .05) (means are compared two at a time).

* p < .05; ** p < .01.

Figure 2.1   The influence of bundling and prior knowledge on the comprehension, evaluation and adoption intention of radical innovations

A: Effect of prior knowledge on comprehension

B: Effect of prior knowledge on evaluation

C: Effect of prior knowledge on adoption intention

- - -■- - - low prior knowledge
——◆—— high prior knowledge
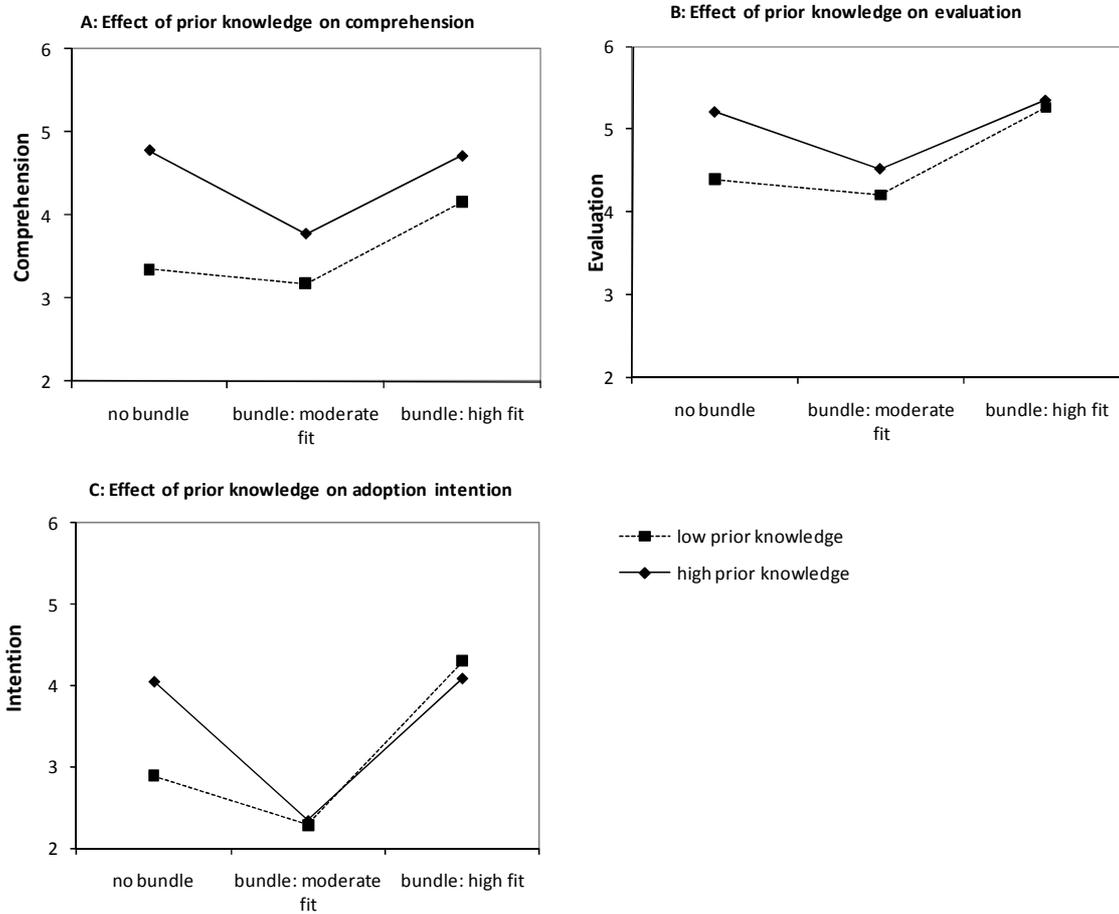
2.5   Discussion

The results of the experiment generally support the hypotheses. First, this research demonstrates that product bundling may be a powerful tool to facilitate the adoption process of radical innovations. When a radically new product is offered in a bundle together with a complementary existing product, it creates a context in which consumers recognize the relationship between the products. Although product bundling per se was not found to significantly increase comprehension of the radical innovation, it was found to enhance the new product's evaluation and adoption intention. Apparently, the decreased cognitive distance towards the radical innovation resulting from its presentation with another, more familiar product, enabled consumers to recognize the utility of the innovation. Product bundles with radical innovations also resulted in higher purchase probabilities of those innovations, showing the relevance of product bundling as marketing instrument. The consistent results for the three different radical innovations

considered in this study add to the robustness and (within the product domains considered) generalizability of these findings.

Second, negative effects of bundling are found when consumers perceive a moderate fit between the products in the bundle. The results show that comprehension, evaluation, and adoption intention of the innovation decrease when consumers perceive a lower fit between the products in a bundle. This suggests that bundling products with lower perceived fit inhibit effective information processing, which is likely to discourage consumers from progressing through the innovation adoption process. Because the fit of bundled products provides added value to the bundle (Stremersch and Tellis 2002), this finding also implies that when consumers perceive low or moderate fit between the bundled products, their perceived value of the innovation is lower in comparison with when the innovation was offered separately. Taken together, these findings contribute to the bundling literature not only by showing that product bundling may indeed be an effective instrument to introduce a radical innovation, but also by showing that product bundling may be counterproductive when ignoring the critical role of perceived product fit as core characteristic of a product bundle.

Third, the results of this study imply that the facilitating effect of product bundling on outcomes related to the innovation adoption process occurs among consumers with low prior knowledge but not among those with high prior knowledge. For people with little prior knowledge, bundling clearly has a positive effect on product comprehension and evaluation, and the effects for bundles with a moderate perceived fit are not significantly worse than those associated with offering a radical innovation separately. This beneficial role of preassembled bundles for consumers with little prior knowledge is consistent with previous studies (e.g., Spiller and Zelner 1997). Such consumers make greater use of the evaluation of others when making purchase decisions (Harris and Blair 2006b). In contrast, among people who already have knowledge in the product domain, bundling does not help enhance comprehension or evaluation of the radical innovation; bundling actually impedes comprehension and evaluation when the bundled products have a moderate fit. Wood and Lynch (2002) suggest that consumers with high prior knowledge in a product domain think that they already know how a new product works and therefore tend to more selectively process information and rely more on self-generated inferences. In the end, this might inhibit the facilitating effect of bundling on learning about the new product for these consumers.

2.5.1 Managerial Implications

The notion that product bundling helps to enhance the evaluation and purchase intention of new and relatively complex products, suggests an opportunity for new product managers to position radically new products. Bundling represents a suitable strategy to enhance benefits and reduce learning costs for radical innovations. For example, marketers can reduce perceived complexity by emphasizing the familiarity of the bundled product and at the same time enhance the perceived benefits of the new product by emphasizing the added value of the new product. Because fit is a crucial condition to ensure that bundling helps enhance evaluation of radically new products, companies should emphasize the fit between the innovation and the bundled product in advertisements, such as by explicitly stating how both products could be used together or complement each other. Images of both products packaged together might further emphasize their fit. Note, however, that to emphasize perceived fit explicitly, these strategies demand a more than moderate degree of "natural" congruity between products. In that sense, the bundles should be true product bundles.

The notion that bundling mainly has an effect on those consumers with little or no knowledge in the product domain provides additional specific implications for managers when introducing radical innovations in the market. Offering a radical innovation in a product bundle could be a fruitful strategy for companies that target customers with little or no prior knowledge in the product domain. However, managers should be wary about offering bundled radical innovations when their target customers have much prior knowledge in the product domain. For example, when customers can be divided into low and high prior knowledge customers (for example, based upon customer insights obtained from the firm's CRM system, or based upon the different communication media used by customers), we advice marketing managers to apply a multi-segment approach in introducing their new products. Product bundles might then be used to increase purchase intention for those segments that have relatively little knowledge. Furthermore, innovators or early adopters typically tend to be consumers with specific knowledge in a product domain. In contrast, the (early) majority often lacks this knowledge and only accepts new products for more pragmatic reasons (Moore 1998). Therefore, bundling might represent an especially interesting strategy for a firm aiming to cross the chasm between innovators/early adopters and the early majority.

2.5.2 Limitations

The above implications should be considered against the limitations of this study. To isolate the effects in the experiment, brand names were omitted. We recognize that

the fit of products in a bundle might not be the only means to reduce resistance to an innovation, and the brand name could be relevant in this respect as well. As such, it is interesting to explore whether a high fit between brands also positively affects the perceived product fit in the bundle. Also, this study included bundles that consist of two products. Additional research might investigate the effects of a product bundle of a radical innovation and two or more other products. The beneficial effects of product bundling for the adoption process of radical innovations found in this study suggest that bundling deserves consideration among both new product managers and innovation researchers.

Appendix 2.1   Measurement scales

Product comprehension (adapted from Raju et al. 1995) and Moreau et al. 2001)	Subjects provided self-ratings on 1. ability to use the new product, 2. ability to judge the quality of the new product, and 3. their understanding of various attributes/ features of the new product. (1 = very poor to 7 = very good) 4. After reading the description, I have a very solid understanding of how this product works. 5. It would take me a long time to figure out how this product works. (R) (1 = totally disagree, 7 = totally agree)
Product evaluation (Rijsdijk and Hultink 2003; Mano and Oliver 1993; Stayman and Batra 1991)	What is your overall judgment of this product? 1. Negative - Positive 2. Bad - Good 3. Useless - Useful 4. Worthless - Valuable 5. Low quality - High quality 6. Unattractive - Attractive 7. Boring - Interesting 8. Unexciting - Exciting 9. Mundane - Fascinating 10. Unintelligent - Intelligent (measured on a 7-point scale)
Adoption intention (Maheswaran and Meyers-Levy 1990)	1. If [product X] were to be made available in your area at a reasonable price, to what extent would you consider buying it soon? Would definitely not consider buying it – Would definitely consider buying it (measured on a 7-point scale)
Prior knowledge (domain specific) (Kleiser and Mantel 1994)	1. My knowledge of product X helps me to understand technical information about this product. 2. I use my knowledge on product X to verify if the advertising claims are true. (1 = totally disagree, 7 = totally agree)
Product fit of bundled products (Simonin and Ruth 1995)	How is the 'fit' between both products? 1. Good - bad product combination 2. Logical - not logical product combination (measured on a 7-point scale)
Comprehension level of product description (Hoeffler 2003)	I found the product description to be … 1. Easy - difficult 2. Understandable - confusing (measured on a 7-point scale)

*Deleted items in italics; R = reverse-coded item.

Chapter 3   Consequences of Forcing Consumers to Use Technology-Based Self-Service[2]

Force is all-conquering, but its victories are short-lived.

Abraham Lincoln (1809 – 1865)

Today, traditional full-service is increasingly replaced with technology-based self-service, sometimes with no other option for service delivery. This study develops a conceptual model to investigate the impact of "forcing" consumers to use technology-based self-service. The model is tested using an experimental design within railway (ticketing and travel information) contexts. The results show that forced use leads to negative attitudes toward using the technology-based self-service as well as toward the service provider, and indirectly leads to adverse behavioral responses. The findings also show that offering interaction with an employee as a "fall-back" option offsets the negative consequences of forced use, and that previous experience with technology-based self-service (in general) leads to more positive attitudes toward the offered self-service, which can offset the negative effects of forced use to some extent.

3.1 Introduction

New technologies are radically changing the way services are organized and delivered (Meuter et al. 2005). At the same time, service companies increasingly involve active participation by customers in the service process (Bendapudi and Leone 2003). The two trends together result in service providers increasingly employing new technologies to encourage consumers to perform services by themselves (Dabholkar 2000). Technology-based self-service[3], such as touch screens in department stores and information kiosks at hotels, as well as "off-site" options such as telephone or online banking and shopping (c.f., Dabholkar 1994; Dabholkar and Bagozzi 2002), essentially replaces the interaction between employees and customers (Bitner, Brown, and Meuter 2000), and allows companies to save costs, increase productivity, and create a more homogeneous service environment (Curran, Meuter, and Surprenant 2003; Dabholkar 1996). To maximize these advantages, firms can stimulate greater use of technology-based self-service by making the traditional full-service encounter relatively unattractive, for instance by charging an additional fee for the latter.

A more extreme option is to completely replace traditional service with technology-based self-service, thus "forcing" customers to use automated service. For example, a recent cover story featured by *Time* magazine suggests "the end of customer service" as one of ten ideas that are changing the world (Kiviat 2008). Indeed, several firms are starting to offer *only* technology-based self-service to their customers: (1) the opening of the Fresh & Easy grocery stores in the US by Tesco (UK) using only self-service checkout lanes, (2) the building of Alaska Airlines' "Airport of the Future" in Seattle where self-check-in kiosks have completely replaced ticket counters, (3) the move to solely self-scanning in grocery stores in many small Swedish towns, and (4) the use of on-site ticketing machines as the only means for purchasing train tickets in smaller towns in the Netherlands. In all of these cases, the customer is being forced to use on-site technology-based self-service, with no other options for service delivery. Although social psychological literature has suggested that limiting consumers' perceived freedom of choice may result in negative effects (e.g., Linder, Cooper, and Jones 1967; Zuckerman et al. 1978), little is known about the effects of forcing consumers to use technology-based

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[3] Technology-based self-service (TBSS) is a more accurate term than self-service technology (SST) for most of this literature because the majority of studies examine different types of self-service based on technology (i.e., TBSS) and not the technologies themselves (i.e., SSTs). In other words, this stream of research does not typically look at kiosk technology vs. scanner technology, for example, but at the self-service that is made possible by a variety of technologies.

self-service in terms of consumer responses to the service provider. Yet, this is becoming a critical strategic issue for service providers.

Previous literature has extensively examined the determinants of consumer use of technology-based self-service (e.g., Dabholkar 1996; Dabholkar and Bagozzi 2002; Meuter et al. 2000; Meuter et al. 2005), but it has not addressed the issue of forcing consumers to use self-service based on the new technologies. As an exception, Anselmsson (2001) studied a situation where self-scanning was the only service option in a grocery store in Sweden. However, the focus of his study was on the perceived quality of self-scanning; it did not compare the forced situation with others where choice was offered to the consumer, to determine the consequences of forced use. Furthermore, although some studies have examined links between perceived choice, perceived control, and affect or behavior in service situations (e.g., Hui and Bateson 1991; Ward and Barnes 2001), and other researchers have studied the role of perceived "voluntariness" in the use of new technologies by individuals within organizations (e.g., Agarwal and Prasad 1997; Brown et al. 2002; Moore and Benbasat 1991), a conceptual foundation and empirical test of forced use of technology-based self-service is missing in the literature.

The main purpose of our study is to fill this gap by investigating whether forced use of technology-based self-service has negative consequences for customers, in terms of attitudes as well as behavioral responses such as word-of-mouth and intentions to switch to another alternative. We draw on theory related to perceived control, psychological reactance, and attribution, as well as the forced adoption of innovations, to develop a conceptual model that explains the effects of forcing consumers to use technology-based self-service, and we empirically test this model with an experimental design.

In addition, although research on technology-based self-service acknowledges the importance of personnel-based support when introducing self-service (e.g., Anselmsson 2001; Dabholkar, Bobbitt, and Lee 2003), no study has empirically tested the effects of offering interaction with an employee as a "fall-back" option when introducing technology-based self-service. Therefore, a second purpose of this study is to investigate whether offering interaction with an employee as a fall-back option might help to offset the negative consequences of forced use of technology-based self-service.

Finally, the literature shows that consumers' previous experience with technology (or with technology-based self-service in general) positively affects attitudes and behavior toward using new technologies (or using new types of technology-based self-service) (e.g., Dabholkar 1992; Gatignon and Robertson 1991; Meuter et al. 2005). However, the effect of consumers' previous experience with technology has not been studied in a

"forced use" situation. Consumers who are more experienced may be more likely to accept the forced use of technology-based self-service as they may feel more comfortable using them. Therefore, the third purpose of our study is to extend the literature by exploring the role that consumers' previous experience plays in the forced use of technology-based self-service (referred to as TBSS from this point onwards).

3.2   Conceptual framework

3.2.1   *Effect of Forced Use on Attitude Toward Using the TBSS*

Forcing consumers to use a TBSS reduces their freedom to choose a service delivery mode for themselves, and therefore is likely to reduce their perceptions of decisional control. Decisional control is defined as "the extent of choice on means and goals that a person has in a situation" (Averill 1973; Hui and Toffoli 2002, p. 1827). Perceived decisional control is substantially reduced when consumers can no longer make decisions for themselves (e.g., Botti, McGill, and Iyengar 2003; Walton and Berkowitz 1985). Given that perceived control is an important aspect for customers in evaluating and using a TBSS (e.g., Bateson 1985; Dabholkar 1996; Lee and Allaway 2002), reduced levels of control, such as through forced use, are likely to have a negative effect on the evaluation of the TBSS.

In addition, previous research shows that consumers who can make their own choices are more intrinsically motivated than consumers engaging in activities without having a choice (Zuckerman et al. 1978). Research shows further that intrinsic motivations are an important predictor of attitudes toward the product or service (Barczak, Ellen, and Pilling 1997).

Moreover, threats to a person's freedom of choice result in a "motivational state directed at engaging in the threatened free behavior" according to psychological reactance theory (Clee and Wicklund 1980, p. 390). The option that is eliminated becomes more attractive and the option that is forced upon the consumer becomes less attractive. Therefore, removing traditional full-service offerings and forcing customers to use a TBSS is likely to result in more negative evaluations of the latter.

Finally, literature on forced adoption suggests that imposing an innovation on consumers results in resistance toward that innovation (e.g., Ram and Jung 1991). This is because consumers have to change existing behaviors, they are not consulted regarding the change, and they feel they are being manipulated to adopt the innovation. As a result, they are likely to develop negative attitudes toward the innovation.

This varied theoretical background consistently suggests that forced use of a TBSS will have a negative effect on consumer attitudes toward using that TBSS, as proposed in H1a. As a corollary, we propose that providing consumers with increasing choice between different service modes will have a positive effect on their attitudes toward using a TBSS that is offered as one of the options (see H1b). Thus:

H1a: Forced use of a technology-based self-service (vs. giving customers a choice in service delivery options) will result in less favorable attitudes toward using the technology-based self-service.

H1b: Greater choice among service delivery options will result in more favorable attitudes toward using the technology-based self-service.

3.2.2 Effect of Forced Use on Attitude Toward the Service Provider

Forcing consumers to use a TBSS is also likely to affect their evaluation of the service provider. In the context of restricted choice, consumers feel less responsible for their decisions (Kiesler 1971; Pritchard, Havitz, and Howard 1999). Such consumers are less committed to the behavior in question and are less likely to accept responsibility for negative outcomes (Bendapudi and Leone 2003; Arkin, Gleason, and Johnston 1976). Attribution theory suggests that if certain outcomes of an activity are viewed as beyond someone's control, failures tend to be attributed to external circumstances (Anderson 1991). As consumers "don't like to be trapped or forced into interacting with a company in only one way" (Bitner, Ostrom, and Meuter 2002, p. 105), such failures are likely to be attributed towards the provider of the service. Thus, consumers who feel forced to use a TBSS may be less likely to accept responsibility for potential negative consequences of using the TBSS and more inclined to make negative attributions about the service provider, resulting in negative attitudes toward the service provider.

Furthermore, according to psychological reactance theory, restricted freedom leads to frustration and hostile attitudes toward the source of the restriction on the consumer's freedom, in this case the service provider (Fitzsimons and Lehmann 2004). Accordingly, consumers are dissatisfied when the option to choose an alternative to which a consumer is personally committed is removed (Fitzsimons 2000), and dissatisfied consumers are likely to develop negative attitudes toward the service provider.

Different theoretical backgrounds suggest that forced use of TBSS will have a negative effect on consumer attitudes toward the service provider, as proposed in H2a. As a corollary, we propose that providing consumers with increasing choice between different service modes will have a positive effect on their attitudes toward the service provider (see H2b). Thus:

H2a: Forced use of a technology-based self-service (vs. giving customers a choice in service delivery options) will result in less favorable attitudes toward the service provider.

H2b: Greater choice among service delivery options will result in more favorable attitudes toward the service provider.

3.2.3   Effect of Forced Use on Behavioral Intentions

In determining behavioral intentions of interest, it is noted that past research has identified word-of-mouth and switching intentions as relevant aspects of loyalty intentions in service contexts (Bitner 1990; McKee, Simmers, and Licata 2006) including the self-service context (Meuter et al. 2003). In the proposed model, we therefore focus on word-of-mouth and switching intentions as two important, but opposite behavioral intentions. Switching intentions are indicative of a potential loss of customers (Keaveney 1995) and (positive) word-of-mouth intentions indicate a potential beneficial influence on other customers (Harrison-Walker 2001; McKee, Simmers, and Licata 2006).

Forced use of TBSS is expected to have an *indirect* negative effect on behavioral intentions through attitudes, because attitudinal research indicates that attitudes have a strong, positive effect on behavioral intentions (c.f., Fishbein and Ajzen 1975). The relationship between attitudes and intentions has been empirically supported in several studies in services settings (e.g., Bansal and Taylor 2002; Nysveen, Pedersen, and Thorbjørnsen 2005), including TBSS contexts (e.g., Dabholkar 1992; Dabholkar and Bagozzi 2002). As the first part of the indirect relationship is already proposed in H1a and H2a, we now hypothesize the second part, i.e., the direct effects of attitudes on behavioral intentions:

H3: The more positive the attitude toward using the technology-based self-service (a) the more likely that the consumer will engage in positive word-of-mouth and (b) the less likely that the consumer will switch to another mode of service.

H4: The more positive the attitude toward the service provider (a) the more likely that the consumer will engage in positive word-of-mouth and (b) the less likely that the consumer will switch to another mode of service.

3.2.4   Effect of Interaction with an Employee as a Fall-back Option on Attitudes

The negative effects of forced use of TBSS may be offset by offering interaction with an employee as a "fall-back" option when the TBSS fails or when customers need help. For instance, a fall-back option allows customers to call a helpdesk when experiencing problems with a Web-based interface, or to ask a service employee for help

in using a kiosk designed for self-service. Chang (2006) found that when customers are provided with recovery options in case of service failure, their sense of freedom of choice is partly restored due to the possibility of escaping an annoying situation. Furthermore, Dabholkar, Bobbitt, and Lee (2003) reported that consumers have a greater willingness to try a TBSS if an employee is available to show the consumer how the automated option works. Finally, Anselmsson (2001) showed that personnel-based support for the use of self-scanners has a positive effect on the perceived service quality of this option. Based on the evidence that consumers are more willing to try a TBSS given the assurance of interaction with an employee as a fall-back option, and that they perceive greater freedom of choice or higher quality in such cases, it seems reasonable to expect that the availability of interaction with an employee as a fall-back option when forced to use a TBSS will lead to more positive attitudes toward using that TBSS and toward the service provider who offers it. Hence, it is proposed that:

H5: The availability of interaction with an employee as a fall-back option in the case of forced use of a TBSS will lead to (a) more positive attitudes toward using the TBSS, and (b) more positive attitudes toward the service provider.

3.2.5 Effect of Consumers' Previous Experience on Attitudes

Literature on the adoption of TBSS shows that previous experience with TBSS in general increases the likelihood of consumers trying out new TBSS options (Dabholkar 1992; Meuter et al. 2005). Furthermore, consumers who frequently use a variety of TBSS options tend to have more positive attitudes toward using TBSS in general and toward using new TBSS options (Dabholkar 1992; Keaveney and Parthasarathy 2001). Finally, Curran, Meuter, and Surprenant (2003) suggest that consumers with greater experience in using different types of TBSS options have more positive attitudes toward service providers who offer such options. Similarly, it is expected that consumers with greater previous experience in using TBSS (in general) will have more positive attitudes toward any offered TBSS as well as toward the service provider who offers it, and this will offset the negative consequences associated with the forced use of a TBSS. Therefore, we propose that:

H6: Consumers' previous experience with using TBSS in general will lead to (a) more positive attitudes toward using a particular TBSS, and (b) more positive attitudes toward the service provider of that TBSS.

A conceptual model with these six hypotheses (excluding H1b and H2b, which are corollaries) is shown in Figure 3.1. The model relates the forced use of a TBSS to

attitudinal and behavioral consequences, and also addresses the effects of interaction with an employee as a fall-back option and consumers' previous experience with TBSS in general.

Figure 3.1   Conceptual framework
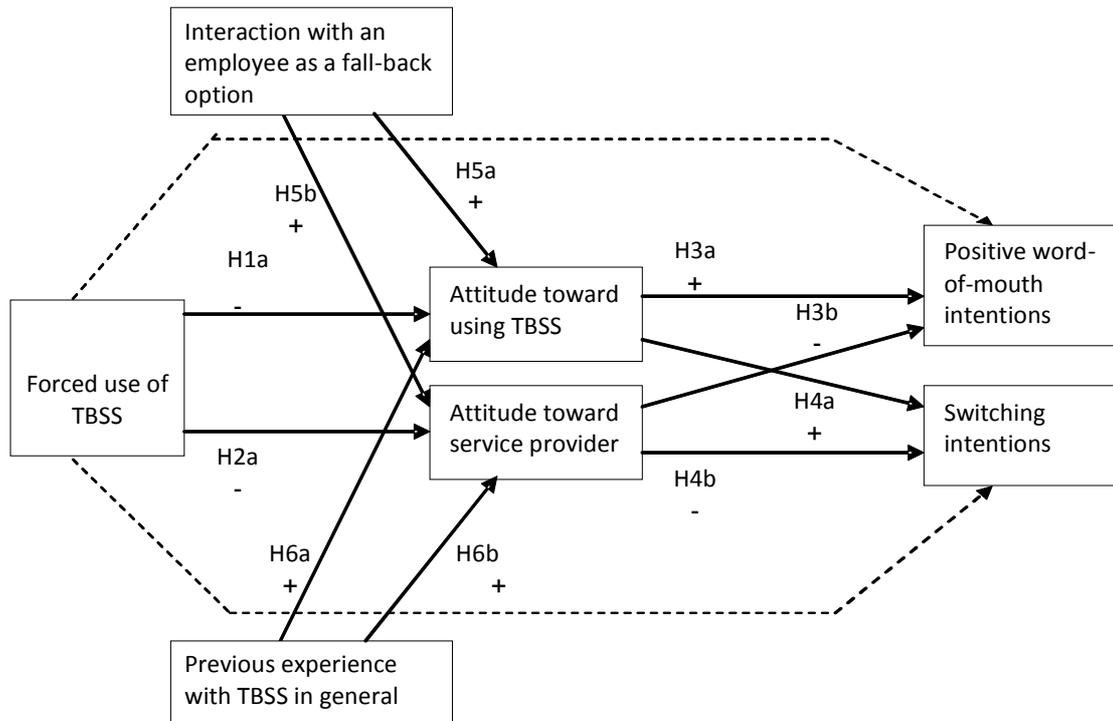
Notes: The corollaries H1b and H2b substitute "greater choice" (manipulated) or "perceived freedom of choice" (measured) instead of "forced use," changing the negative effects from this box to positive. The dotted links are not hypothesized, but are tested to gauge whether the mediating effects of attitudes are full or partial.

3.3   Method

3.3.1   Research Context

The empirical study was developed in cooperation with the Dutch Railways, which serve almost 60% of the population in the Netherlands. Technology-based self-service is very important in this research context as it is a major alternative to interaction with an employee for obtaining train tickets and travel information. Moreover, some railway stations in smaller towns offer no full-service at all, which makes this an ideal context to study the forced-use situation.

Furthermore, as other railway stations offer the traditional full-service delivery mode for buying tickets and obtaining travel information as well as two different TBSS options—on-site and off-site—the context is appropriate for testing the corollaries to the

model, i.e., whether offering consumers greater choice among service options leads to increasingly positive attitudes toward the TBSS and the service provider. Finally, as the railway company offers these varied options for two different service contexts—buying a ticket and obtaining travel information—it allows us to simultaneously test the model in two contexts, thus increasing the generalizability of the study.

3.3.2   Research Design

An experimental design was used over a field study to carefully control and test the effects of forced use of a TBSS as well as different levels of choice among service delivery options. Forced use was manipulated, along with limited choice and full choice among the options, by describing the different service modes that the railway company actually offers its customers, thus increasing the realism of the experiment. For buying a ticket, the company offers three different service modes: (1) traditional ticket office (full service), (2) ticketing machine (on-site TBSS), and (3) Internet (off-site TBSS). For obtaining travel information, the company also offers three different service modes: (1) traditional information desk (full service), (2) touch screen monitor (on-site TBSS) and (3) Internet (off-site TBSS). We created different treatments using these three different types of service modes that the railway company actually offers its customers, and did so separately for the ticketing group and the travel information group.

The treatments included forced use or no choice (customers could use only one TBSS mode), limited choice (customers could choose between two service modes: either two different TBSS modes, or a TBSS mode and a full-service mode) and full choice (customers could choose among all three service modes).[4] In addition, under the forced-use or no-choice category, different treatments were created by either offering interaction with an employee as a fall-back option, or not. The entire research design with eight different treatments for both types of service groups (i.e., ticketing and travel information) is shown in Appendix 3.1. Subjects were randomly assigned to one of these two groups and subsequently to one treatment within the group. Cell sizes for each treatment (within each group) are also shown in Appendix 3.1. Sample scenarios used to create the treatments are shown in Appendix 3.2.

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[4] We included choice between two TBSS modes as part of the limited choice option so that our research design was not merely a test of using TBSS vs. full service. If having a choice between two TBSS modes was seen as better than being forced to use a particular TBSS mode, it would widen the implications of the study for practitioners (as our results did confirm).

3.3.3 Sample

A total of 4000 customers, obtained from the railway company's register, were approached to participate in the study. It was important to draw from a population of people who had actually encountered the various service modes described in the scenarios, to further increase the realism of the experiment. Out of this group, 1396 respondents answered the questionnaire, representing a response rate of almost 35%. Of these, 246 questionnaires were unusable due to missing information, resulting in a total of 1150 usable responses.

Men (49.8%) and women (50.2%) were equally represented in the sample. The age of respondents in our sample ranged from 18 to 80 years, with approximately 40% being between 40 and 60 years. With regard to travel behavior, we found that 30% of the respondents are heavy users (they use train services more than once a week), 34% are light users (they use train services less than 11 days a year), and 36% fall in the middle category (medium users). Furthermore, we found that almost 32% of the respondents travel mainly for business reasons, whereas 51% travel mainly for leisure reasons. Finally, our sample shows that almost 14% of the respondents travel only during peak hours, whereas 44% travel only during off-peak hours, and 43% of the respondents travel in both periods.

3.3.4 Measurement

A manipulation check was used to test the effectiveness of the three main treatments—forced use or no choice, limited choice, and full choice. Subjects were asked to indicate how much choice they had in the situation described in the scenario, on a 7-point semantic differential scale ranging from "No choice at all" to "Full choice," adapted from Hui and Bateson (1991).

Perceived freedom of choice was also measured (in addition to extent of choice being manipulated in the experimental design), in order to test whether the mediating effects of attitudes were full or partial. Two items were adapted from Hui and Bateson (1991) and Hui and Toffoli (2002).

Attitude toward using TBSS was measured using the four-item, seven-point, semantic differential scale employed by Dabholkar and Bagozzi (2002). *Attitude toward service provider* was measured using the three-item, seven-point, semantic differential scale from Day and Stafford (1997). *(Positive) word-of-mouth intentions* were measured with a single, seven-point item used by Meuter et al. (2003). *Switching intentions (to another mode of transport)* were measured by adapting one item from the scale used by Bansal, Taylor, and St. James (2005). *Consumers' previous experience with TBSS in general*

was measured by adapting the three-item, seven-point Likert scale from Meuter et al. (2005), and by drawing on Dabholkar (1992) and Meuter et al. (2003) to capture usage of different types of TBSS.

Relevant psychographic variables were included in the study as controls. Technology anxiety and inertia were adapted from Meuter et al. (2005), and need for interaction was adapted from Dabholkar (1996; Dabholkar and Bagozzi 2002).

All the measures described above are shown in Appendix 3.3. Cronbach's alphas for the measures ranged from .70 to .94, and are also shown in Appendix 3.3.

Finally, demographics (gender, age, and education) and travel behavior (frequency, time of travel, and motive for travel) were measured. This was done to create a profile of the respondents (see Sample), and also to test these as additional control variables.

3.4 Results

3.4.1 Testing Hypotheses 1 and 2

A manipulation check for the three conditions—no choice, limited choice, and full choice—worked well for both groups, ticketing and travel information. Subjects' perceptions of extent of choice for forced use (no choice) were lower and significantly different from having any choice, and full choice was seen as greater than limited choice. As be seen in Table 3.1, the means for buying a ticket were ($M_{\text{no choice}}$ = 2.49, $M_{\text{limited choice}}$ = 3.96, $M_{\text{full choice}}$ = 5.76; $F_{(2,561)}$ = 165.75, p < .001) and the means for obtaining travel information were ($M_{\text{no choice}}$ = 2.83, $M_{\text{limited choice}}$ = 4.89, $M_{\text{full choice}}$ = 5.31; $F_{(2,583)}$ = 163.44, p < .001). Games-Howell post-hoc tests revealed significant differences between all three means for both contexts.

**Table 3.1**   **Effect of forced use and greater choice on attitudinal and behavioral consequences**

	Condition			*F*-value	Conclusion
	No choice	**Limited choice**	**Full choice**		
Ticketing group	(*n*=255)	(*n*=220)	(*n*=89)		
Manipulation check (for extent of choice)	$M = 2.49^a$ s.d. = 1.508	$M = 3.96^b$ s.d. = 1.660	$M = 5.76^c$ s.d. = 1.108	165.75*	Manipulation worked
Attitude toward using TBSS	$M = 2.67^a$ s.d. = .960	$M = 3.55^b$ s.d. = .846	$M = 3.78^b$ s.d. = .796	75.53*	H1a is supported
Attitude toward service provider	$M = 3.14^a$ s.d. = 1.344	$M = 4.36^b$ s.d. = 1.396	$M = 5.04^c$ s.d. = .933	90.77*	H2a is supported
WOM intentions	$M = 3.12^a$ s.d. = 1.654	$M = 4.20^b$ s.d. = 1.664	$M = 4.98^c$ s.d. = 1.382	52.70*	
Switching intentions	$M = 3.99^a$ s.d. = 1.907	$M = 2.59^b$ s.d. = 1.513	$M = 2.52^b$ s.d. = 1.374	49.90*	
Travel information group	(*n*=308)	(*n*=200)	(*n*=78)		
Manipulation check (for extent of choice)	$M = 2.83^a$ s.d. = 1.665	$M = 4.89^b$ s.d. = 1.215	$M = 5.31^c$ s.d. = 1.177	163.44*	Manipulation worked
Attitude toward using TBSS	$M = 2.80^a$ s.d. = .977	$M = 3.58^b$ s.d. = .762	$M = 3.65^b$ s.d. = .686	60.71*	H1a is supported
Attitude toward service provider	$M = 3.57^a$ s.d. = 1.366	$M = 4.79^b$ s.d. = .997	$M = 5.09^b$ s.d. = .966	87.36*	H2a is supported
WOM intentions	$M = 3.35^a$ s.d. = 1.683	$M = 4.70^b$ s.d. = 1.356	$M = 4.81^b$ s.d. = 1.378	61.11*	
Switching intentions	$M = 3.11^a$ s.d. = 1.736	$M = 2.59^b$ s.d. = 1.335	$M = 2.29^b$ s.d. = 1.406	11.79*	

Notes: *Significant at $p < .01$, s.d. = standard deviation. Means with a different superscript indicate a significant difference ($p < .05$) (means are compared two at a time). Variables are measured on a scale ranging from 1 to 7.

Next, analysis of variance was used to test the effect of forced use as well as of increasing (or greater) choice on attitudes. The results are reported in Table 3.1 as well as shown graphically in Figure 3.2. As seen from Table 3.1, Figure 3.2A and Figure 3.2B, the means for attitude toward using TBSS and attitude toward the service provider increase in the correct direction across the three conditions for both groups (ticketing and travel information). Moreover, the means are significantly different for the forced-use or no-choice condition vs. the other two conditions, for both types of attitudes and both service contexts. Thus, hypotheses H1a and H2a are supported unequivocally. However, the means for limited choice and full choice are only significantly different for attitude toward the service provider in the case of ticketing. Therefore, corollary H1b is not supported, and corollary H2b is supported only for the ticketing context. Additional analysis showed

no variation in the results if limited choice was offered through multiple TBSS options or with a combination of TBSS and interaction with an employee.

Figure 3.2   Main effects of forced use and greater choice
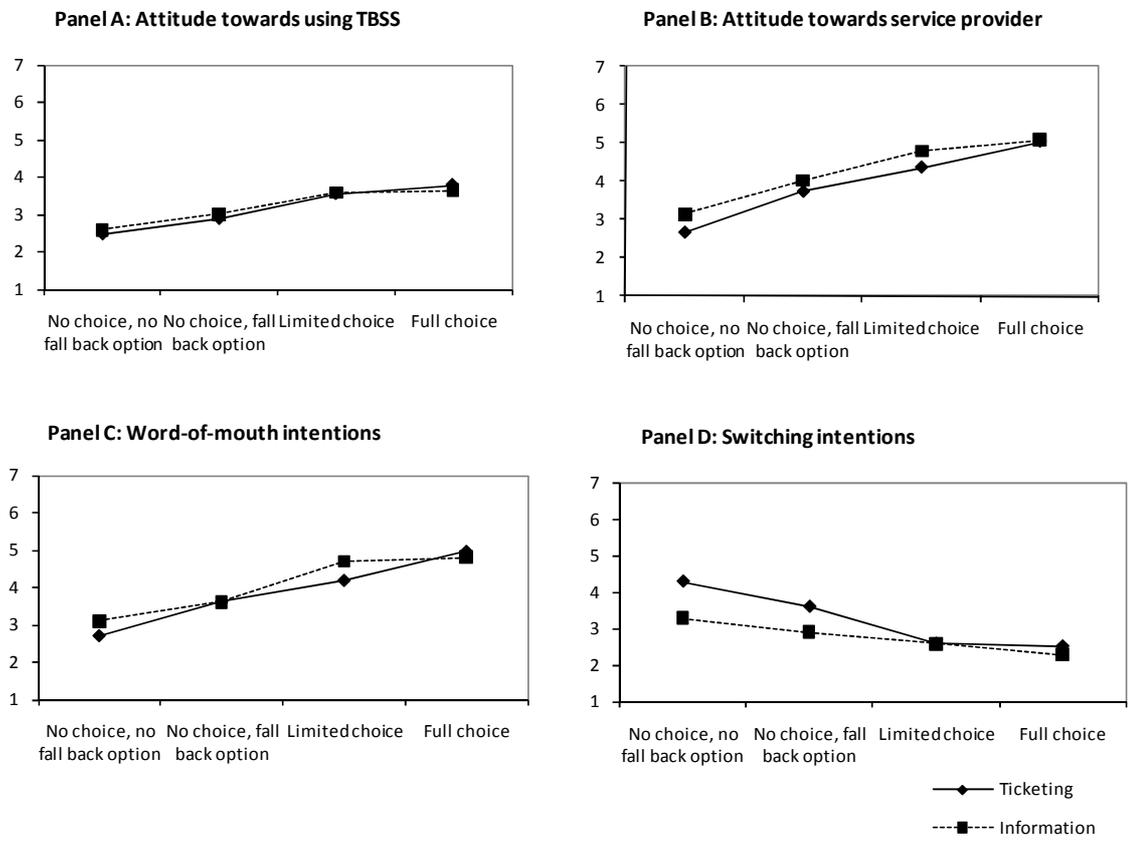
Note: Figure 3.2 combines the results of Tables 3.1 and 3.3 (except for WOM intentions and switching intentions) to depict four conditions of increasing choice for consumers.

The effects of forced use on attitudes are not only consistent over the two groups (ticketing and travel information), but are also robust over the two types of TBSS (on-site and off-site options). Thus, there is strong support suggesting that forcing consumers to use TBSS leads to unfavorable attitudes toward using the TBSS and toward the provider.

Although not explicitly hypothesized, we tested and found negative consequences of forced use (and positive consequences of greater choice) on word-of-mouth and switching intentions (see Table 3.1, Figure 3.2C and Figure 3.2D). Mediation tests were performed (discussed later) to verify if these effects were direct or indirect.

3.4.2   Testing Hypotheses 3 and 4

Multiple regression analysis was used to test the effect of attitudes on behavioral intentions. The results (see Table 3.2) show that attitudes toward using TBSS and attitudes toward the service provider have positive effects on word-of-mouth intentions

and negative effects on switching intentions, thus supporting hypotheses H3a-b and H4a-b for both service contexts (ticketing and travel information). The effect size for attitude toward the service provider was much larger than for attitude toward using TBSS, across both types of intentions, and for both contexts.

Table 3.2   Results of regression analyses and mediation tests

Dependent variables	Independent variables			R^2	Conclusion
	Perceived freedom of choice (PFOC)	Attitude toward using TBSS	Attitude toward service provider		
Ticketing group (n=564)					
Word-of-mouth intentions					
Effect of Attitudes	----	.109***	.658***	.535	H3a & H3b are supported
Effect of PFOC	.533***	----	----	.284	
Simultaneous effects	.089**	.079**	.625***	.549	
Switching intentions					
Effect of Attitudes	----	−.213***	−.400***	.311	H4a & H4b are supported
Effect of PFOC	−.400***	----	----	.160	
Simultaneous effects	−.033	−.206***	−.386***	.318	
Travel information group (n=586)					
Word-of-mouth intentions					
Effect of Attitudes	----	.138***	.642***	.550	H3a & H3b are supported
Effect of PFOC	.560***	----	----	.314	
Simultaneous effects	.085**	.131***	.591***	.560	
Switching intentions					
Effect of Attitudes	----	−.101*	−.289***	.131	H4a & H4b are supported
Effect of PFOC	−.276***	----	----	.076	
Simultaneous effects	−.038	−.104*	−.265***	.138	

Notes: Standardized *β* coefficients are reported, *$p < .10$, **$p < .05$, ***$p< .01$. Variables are measured on a scale ranging from 1 to 7.

3.4.3   Tests for mediation

To test for the mediating effect of attitudes in the model, we used the 2-item measure of perceived freedom of choice and the approach proposed by Baron and Kenny (1986). It was already seen that both types of attitudes significantly affected both types of intentions (see support for H3 and H4 above). Additionally, Table 3.2 shows that perceived freedom of choice, as the only independent variable, had a significant positive effect on word-of-mouth and a significant negative effect on switching intentions for both contexts. Thus, it matched the experimental effects of forced use (and greater choice) on intentions shown in Table 3.1 and Figure 3.2 earlier.

However, the effect of perceived freedom of choice on word-of-mouth intentions was substantially weakened when it was regressed simultaneously with attitudes and the effect on switching intentions disappeared completely (see Table 3.2). Thus, we conclude

that attitudes partially mediate the relationship between perceived freedom of choice and word-of-mouth intentions and fully mediate the relationship between perceived freedom of choice and switching intentions.

3.4.4 Testing Hypothesis 5

A manipulation check indicated that the two conditions, with and without interaction with an employee as a fall-back option, were significantly different in subjects' perceptions of extent of choice, for both the ticketing and travel information contexts. As seen in Table 3.3, subjects perceived greater choice when a fall-back option was available than when it was not ($M_{\text{no fall-back}}$ = 2.17, $M_{\text{fall-back}}$ = 2.88; t = 3.820, $p < .001$ for the ticketing group and $M_{\text{no fall-back}}$ = 2.50, $M_{\text{fall -back}}$ = 3.18; t = 3.654, $p < .001$ for the travel information group).

Table 3.3   Effect of fall-back option on attitudinal consequences

	Condition		*t*-value	Conclusion
	No choice, no fall-back option	No choice, fall-back option		
Ticketing group	(*n*=141)	(*n*=114)		
Manipulation check (for providing a fall-back option)	*M* = 2.17 s.d. = 1.434	*M* = 2.88 s.d. = 1.512	3.820**	Manipulation worked
Attitude toward using TBSS	*M* = 2.48 s.d. = .934	*M* = 2.89 s.d. = .946	3.383*	H5a is supported
Attitude toward service provider	*M* = 2.66 s.d. = 1.186	*M* = 3.73 s.d. = 1.294	6.890**	H5b is supported
Travel information group	(*n*=158)	(*n*=150)		
Manipulation check (for providing a fall-back option)	*M* = 2.50 s.d. = 1.551	*M* = 3.18 s.d. = 1.715	3.654**	Manipulation worked
Attitude toward using TBSS	*M* = 2.59 s.d. = .925	*M* = 3.01 s.d. = .987	3.830**	H5a is supported
Attitude toward service provider	*M* = 3.15 s.d. = 1.281	*M* = 4.02 s.d. = 1.312	5.896**	H5b is supported

Notes: *Significant at $p < .01$, **Significant at $p < .001$, s.d. = standard deviation. Variables are measured on a scale ranging from 1 to 7.

Next, more *t*-tests were conducted for the effect of offering interaction with an employee as a fall-back option on attitudinal outcomes (see Table 3.3). The *t*-tests revealed significantly higher means for the condition *with* a fall-back option (vs. *without* a fall-back option) for attitude toward using the TBSS as well as for attitude towards the service provider, and this was true for both contexts. Thus, hypotheses H5a and H5b were strongly supported.

3.4.5   Testing Hypothesis 6

A median split divided the sample into low vs. high experience in using TBSS in general. As before, *t*-tests were conducted to check for differences in means for the attitudinal outcomes (see Table 3.4). The *t*-tests revealed significantly higher means for subjects with greater previous experience for attitude toward using the TBSS, and this was true for both contexts, thus supporting H6a. Although the means for attitude toward the service provider were also in the correct direction, they were not significantly different for low vs. high experience, thus failing to support H6b for both contexts.

Table 3.4   Effect of previous experience with TBSS on attitudinal consequences

	Low previous experience	High previous experience	*t*-value	Conclusion
Ticketing group	(*n*=272)	(*n*=280)		
Attitude toward using TBSS	*M* = 3.08 s.d. = 1.011	*M* = 3.28 s.d. = .987	2.369*	H6a is supported
Attitude toward service provider	*M* = 3.88 s.d. = 1.474	*M* = 3.91 s.d. = 1.524	.236	H6b is not supported
Travel information group	(*n*=272)	(*n*=306)		
Attitude toward using TBSS	*M* = 3.07 s.d. = .915	*M* = 3.27 s.d. = .979	2.538*	H6a is supported
Attitude toward service provider	*M* = 4.16 s.d. = 1.324	*M* = 4.22 s.d. = 1.405	.487	H6b is not supported

Notes: *Significant at $p < .05$, s.d. = standard deviation. Variables are measured on a scale ranging from 1 to 7.

3.4.6   Testing control variables

The psychographic variables identified in the literature (i.e., need for interaction, inertia, and technology anxiety) were tested as control variables. In the ticketing group, there was a significant direct, negative effect of need for interaction on attitude toward using the TBSS ($\beta = -.103$, $p < .05$). Significant negative effects of inertia on attitude toward using the TBSS were found for the ticketing group as well as the travel information group ($\beta = -.210$, $p < .001$ and $\beta = -.114$, $p < .05$ respectively). Furthermore, in both groups a direct, negative effect of inertia was found on attitude toward the service provider ($\beta = -.295$, $p < .001$ and $\beta = -.194$, $p < .001$ respectively). No effects of technology anxiety were found for the ticketing or travel information group. Interaction effects between each psychographic variable and extent of choice were tested using 2-way ANOVAs, but no significant interaction effects were found.

We also tested demographic variables (gender, age, and education) as controls. In the ticketing group, men were slightly more positive toward the service provider than women (M_{men} = 4.06, M_{women} = 3.78; $p < .05$), but no direct effects of age or education

were found. No direct effects of any demographics were found for the travel information group. The only significant interaction effect with demographics was in the ticketing group, between extent of choice and gender on attitude toward using the TBSS. The effect of extent of choice was a bit more pronounced for women ($M_{\text{no choice, no fall-back}}$ = 2.32, $M_{\text{no choice, fall-back}}$ = 2.99, $M_{\text{limited choice}}$ = 3.56, $M_{\text{full choice}}$ = 3.99 for women and $M_{\text{no choice, no fall-back}}$ = 2.69, $M_{\text{no choice, fall-back}}$ = 2.74, $M_{\text{limited choice}}$ = 3.54, $M_{\text{full choice}}$ = 3.61 for men; F (3, 533) = 3.875, p < .05).

Finally, we checked the travel behavior of the respondents (travel frequency, travel time, and travel motive) as control variables. The only direct effect was that for both groups (ticketing and travel information), infrequent (or light) travelers had higher switching intentions than frequent (medium or heavy) travelers (M_{heavy} = 3.16, M_{medium} = 2.95, M_{light} = 3.51, F (2,561) = 4.723, p < .05 for ticketing and M_{heavy} = 2.71, M_{medium} = 2.65, M_{light} = 3.11, F (2,583) = 4.834, p < .05 for travel information). No interaction effects were found between travel behavior variables and extent of choice.

3.5   Discussion

3.5.1   Theoretical Implications

The literature has typically examined the introduction of TBSS options within a voluntary context, and focused on drivers of the acceptance of such service modes versus full service. Yet, companies are increasingly replacing traditional full-service modes with some form of TBSS, but no study to date has examined the effects of forcing consumers to use TBSS.

Our study found that forcing consumers to use TBSS has severe, adverse effects on attitudes toward using the TBSS and toward the service provider. Thus, despite all the benefits of using a TBSS that have been identified in the literature (such as ease of use, fun, convenience, reliability, and so on), the negative attitudes toward using TBSS, when forced to use it, is likely to move consumers away from using the TBSS (and to stimulate others to do so as well).

Our extended framework (i.e., the corollaries), which proposed increasingly positive attitudes with greater choice among service delivery options, was not as strongly supported as the negative consequences of forced use of self-service. It is possible that consumers do not necessarily want a whole range of choices when it comes to service delivery, so the additional options did not appear as a significant benefit. All they seem to want is *some* choice. It is only when consumers are forced vs. given a choice in using service delivery modes that the negative effects of lack of choice are seen. In fact, our

analysis showed that even when choice was between two modes of TBSS, customers preferred that to being forced to use a single mode of TBSS. Our study thus extends previous literature within social psychology (e.g., Linder et al. 1967; Zuckerman et al. 1978) and marketing (e.g., Hui and Bateson 1991) that focused on the positive consequences of choice. Our findings show that having no choice adversely affects attitudinal and behavioral consequences, but that offering an increasing number of choice options does not linearly contribute to more positive attitudes and behavioral intentions.

Specifically, our results showed that the negative attitudes resulting from forced use of TBSS are translated into reduced (positive) word-of-mouth intentions and increased switching intentions. The effect of attitude toward the service provider was much stronger than that of attitude toward using the TBSS, which was understandable given that our behavioral intentions were more closely related to the provider. Thus, forced use of TBSS can result in increased negative word-of-mouth about the service provider and a loss of customers to a competing provider. These findings add new insights to the extant literature on TBSS as well as to the literature on switching behavior.

Another theoretical contribution is that all of these effects were robust for two different service contexts (i.e., buying a ticket and obtaining travel information) and for both the on-site TBSS options (ticketing machine and touch screen monitor) and the off-site TBSS option (Internet). Thus, our model has some generalizability across different service and TBSS contexts.

Our study also found that the negative effects of forced use of TBSS are reduced by offering interaction with an employee as a fall-back option. The idea of possible "escape" in a situation of forced use might create a feeling of control. This is in line with literature that has identified the offer of recovery as having a buffering effect on the negative impact of service failure due to a sense of increased control (e.g., Chang 2006; Cranage and Sujan 2004).

In addition, consumers who had previous experience with TBSS in general were found to have less negative attitudes toward using the TBSS. This finding supports previous literature on consumers' experience with using TBSS in general and extends it to the forced-use situation. In addition, it was interesting that previous experience helps to establish a more positive attitude toward using the TBSS, but does not lead to a more positive attitude toward the service provider. An explanation might be that, regardless of previous experience, customers evaluate a service provider in terms of their total service offerings. For example, Montoya-Weiss, Voss, and Grewal (2003) found that online and traditional channels have complementary effects in determining customers' overall

satisfaction with the service provider. Similarly, even when a TBSS is evaluated positively, satisfaction with the service provider may also be determined whether customers can choose between the TBSS and a traditional service encounter.

The direct effects of psychographic control variables found in this study extend previous literature to the forced use situation. We found negative direct effects of need for interaction on attitude toward using TBSS (e.g., Dabholkar 1996), and negative direct effects of inertia on both attitude toward using TBSS and attitude toward service provider, which is related to the finding that inertia leads to hesitancy in trying new service delivery options (Meuter et al. 2005) and thus may result in more negative attitudes.

Finally, our study showed that men were more favorable toward forced TBSS than were women, and in addition, women preferred to have a greater choice of alternatives when TBSS was offered. These findings extend past literature which suggests that men tend to adopt innovations faster than women (e.g., Gatignon and Robertson 1991). Our study shows that this gender difference is supported even in the forced use of TBSS.

3.5.2 Practical Implications

The results of our study have obvious practical implications for service providers who want to replace traditional full-service modes with TBSS. With forced use, consumers apparently feel frustrated about not having any choice and develop negative attitudes toward using the TBSS and toward the service provider. Moreover, these negative attitudes lead to adverse behavioral intentions related to switching to other providers or spreading negative word-of-mouth. To avoid these negative repercussions, service providers need to carefully consider if forced use of a TBSS option is warranted.

Our study further suggests that it is not necessary to offer a whole range of choices of service delivery options as the benefits may be incremental. Even when the limited choice scenario in our study included choice between two types of TBSS (and no option to use traditional full service), customers preferred having a choice to a forced use situation. Thus, the implication for practitioners is *not* to force consumers to use only one type of TBSS with no other choice of service delivery.

In the European railway context, where forced use of on-site TBSS is underway, imposing ticketing machines or other TBSS modes on customers as the sole service delivery option might discourage them from using railways as a means of travel altogether. Railway companies should therefore offer some choice, whether between alternative TBSS modes (e.g., ticketing machine as well as online ticketing) or between a TBSS mode and a traditional full-service encounter at railway stations. Also, in switching

to unmanned railway stations with only ticketing kiosks available, they should offer an on-site fall-back option, where customers who need help can interact with service employees by telephone.

Similar implications also hold for other on-site contexts where traditional full-service encounters are being fully replaced by technology-based self-service (see examples in Introduction). In such cases, alternative off-site TBSS modes such as online grocery shopping or online check-in for travel should be encouraged, and on-site fall-back options should be available so customers can avail of employee help in person or by telephone if needed.

Online service providers might face similar problems as in the offline forced use of TBSS. Especially in relatively complex services, such as home mortgages, where previous research has shown that even online customers have a strong preference for interaction with an employee (Frambach, Roest, and Krishnan 2007), caution is required when forcing customers to use only the online mode without the possibility of some type of interaction with an employee.

In situations where forcing the use of a TBSS is the best option for a provider, our study suggests possible strategies the provider could use to mitigate the negative consequences. First, as discussed above, the provider could offer interaction with an employee as a fall-back option. Our study shows that this type of fall-back option creates a sense of greater choice and leads to more favorable attitudes. The service provider could set up a fall-back option to be used in case of emergencies such as machine failure. A feature on TBSS machines could allow customers to interact with a service employee if needed. Taking it a step further, the service employee could take over the task and complete it if the customer cannot. The downside for the company would be if too many customers automatically start using the interaction feature to get the employee to provide the service. Hence, this possibility should only be available if the machine fails. Alternatively, the customer could be free to call on the employee at any time, but in case the machine is functioning, the employee should not complete the task, but instead should "walk" the customers through the task to help them learn to use the technology.

Another approach is where the service provider could decide to target the forced use of TBSS to those customers with considerable experience in using TBSS in general, to partly offset the negative consequences of forced use. But our study suggests that even such customers will not be inclined to view the provider favorably, so this is not entirely a risk-free proposition. Moreover, if customers with limited or no experience in using TBSS in general represent a large portion of the market, the provider should offer alternative service delivery modes to minimize negative consequences.

Finally, our study shows that switching intentions were higher for infrequent users of the service. This is in accordance with the literature on switching behavior where more intensive users of the service had lower switching intentions (Keaveney and Parthasarathy 2001), due either to sunk costs related to the customer's investment in time and emotions to build a relationship with the service provider or to the fact that frequent users of the service have no attractive alternatives (Bansal, Taylor, and James 2005; Patterson and Smith 2003). This is an encouraging finding in that customers who are frequent users of the service may not switch so easily with forced use of TBSS. At the same time, it may be worthwhile for service firms to also prevent infrequent customers from switching, especially if they represent a large segment for the company. In this case, special attention should be paid to the concerns of infrequent customers when introducing the forced use of TBSS.

3.5.3 Limitations and Future Research

Our study shows very promising results with respect to the implications of forced use of TBSS, but it represents an initial attempt to investigate the phenomenon. Although we included multiple types of TBSS options as well as two different service contexts (ticketing and travel information), the study was restricted to a public transport service within a single country. Future research could test our model in a variety of contexts and even in cross-national settings, thus further increasing the generalizibility of the results presented here.

We used single item measures for word-of-mouth and switching intentions, which did not allow us to check the reliability of these measures. The decision to use single items in these cases was driven by the use of single-item measures in previous studies (e.g., Bitner 1990; Meuter et al. 2003) and a concern for reducing questionnaire length. However, future research on the topic should use multi-item measures for all constructs if possible.

Given our focus on forced use, we examined demographic and other variables as controls. Future studies could build these variables into the model itself, if there is theoretical justification. In addition, future studies could elaborate on the potential influence of personal characteristics, such as the drivers and inhibitors of technology readiness (i.e., optimism, innovativeness, discomfort, and insecurity) (Parasuraman 2000).

Our study could also be extended by investigating negative attributions toward the service company (as a result of forced use) or spill-over effects to other services that the service company offers (e.g., Bitner 1990; Hess, Ganesan, and Klein 2003). In addition, other types of consumer reactions are worth studying, such as seeking redress from the

service company (e.g., Zeithaml, Berry, and Parasuraman 1996), or even more extreme behavior, such as boycotting the service company (e.g., Klein, Smith, and John 2004).

Future studies could test the boundaries of forcing consumers to use a TBSS. In this study we considered the situation in which other options truly were not available. Future research might explore the effects of other forms of "forcing" customers to use TBSS, such as by decreasing the attractiveness of traditional service delivery modes. For example, introducing fees could make full-service options less attractive or even highly undesirable. In contrast, in line with reactance theory, the traditional full service may become more attractive when consumers feel forced to use a TBSS, causing consumers to switch to those companies that still offer full-service options. Future studies could verify if this is so. Furthermore, future research could explore whether adding interaction with an employee as a fall-back option enhances the perceived service quality of the forced TBSS and to what extent it actually helps inexperienced customers in learning to use the technology.

Finally, future research can explore the forced use of TBSS in online contexts, where no instant interaction with an employee is possible. Such research could also investigate differences across online service contexts with varying degrees of complexity and test whether instant interaction with an employee (e.g., online chat) offered as a fall-back option enhances consumer attitudes and behavior.

Appendix 3.1   Research design

Treatment	Level of Choice	Ticketing group (*n*=564)	Travel information group (*n*=586)
Treatment 1	NO choice	Only possible to use the ticketing machine, <u>no fall-back option</u>. (*n* =72)	Only possible to use touch screen monitor, <u>no fall-back option</u>. (*n*=88)
Treatment 2	NO choice	Only possible to use the Internet, <u>no fall-back option</u>. (*n*=69)	Only possible to use the Internet, <u>no fall-back option</u>. (*n*=70)
Treatment 3	NO choice	Only possible to use the ticketing machine, <u>fall-back option provided</u>. (*n*=56)	Only possible to use touch screen monitor, <u>fall-back option provided</u>. (*n*=76)
Treatment 4	NO choice	Only possible to use the Internet, <u>fall-back option provided</u>. (*n*=58)	Only possible to use the Internet, <u>fall-back option provided</u>. (*n*=74)
Treatment 5	Limited choice	Choice between ticketing machine and traditional ticket office. (*n*=78)	Choice between touch screen monitor and traditional information desk. (*n*=62)
Treatment 6	Limited choice	Choice between ticketing machine and Internet. (*n*=73)	Choice between touch screen monitor and Internet. (*n*=68)
Treatment 7	Limited choice	Choice between Internet and traditional ticket office. (*n*=69)	Choice between Internet and traditional information desk. (*n*=70)
Treatment 8	Full choice	Full choice between ticketing machine, Internet, and traditional ticket office. (*n*=89)	Full choice between touch screen monitor, Internet, and traditional information desk. (*n*=78)

Note: NO choice = forced use.

Appendix 3.2   Sample scenarios

Treatment 1 (Ticketing group):

Imagine that you have planned to travel by train and you want to buy a ticket at the railway station. When arriving at the station, you see that there are only ticketing machines available. There is no traditional ticket office where you can buy your tickets. When the ticketing machine is out of order or when you need some help in using the ticket machine, there is no possibility to call a service desk or approach someone at the railway station.

Treatment 8 (Travel information group):

Imagine that you have planned to travel by train and want to get updated information about your journey. There are several possibilities to obtain this travel information. First you can make use of several touch screen monitors that are available at the railway station. These touch screen monitors are interactive monitors that allow you to request travel information by entering your journey (departure and destination). In addition, it is possible to get the same travel information when using the railway company's website. This website can also be accessed by using the Internet through your mobile phone or PDA. Finally, it is possible to go to a traditional information desk, with service employees who are willing to answer your question.

Appendix 3.3   Measurement scales

Manipulation check (adapted from Hui and Bateson 1991)	1. How much choice do you think you have in this situation in using the self-service option? (measured on a 7-point scale ranging from No choice at all to Full choice)
Perceived freedom of choice (adapted from Hui and Bateson 1991 and Hui and Toffoli 2002)	1. In this situation, I feel forced to use the self-service option. (R) 2. In this situation, I can choose between several options to order the [service]. (measured on 7-point scales ranging from Not agree to Totally agree; α = .70)
Attitude toward using TBSS (Dabholkar and Bagozzi 2002)	Given the scenario, how would you describe your feelings with regard to using the self-service? 1. Good - Bad 2. Pleasant - Unpleasant 3. Harmful - Beneficial (R) 4. Favorable - Unfavorable (measured using a 7-point scale; α = .94)
Attitude toward service provider (Day and Stafford 1997)	Given the scenario, how would you describe your feelings with regard to the service provider? 1. Good - Bad 2. Positive - Negative 3. Favorable - Unfavorable (measured on a 7-point scale; α = .90)
Word-of-mouth intentions (Meuter et al. 2003)	Given the scenario, how likely is it that you would participate in positive word-of-mouth? 1. I definitely will not – I definitely will (measured on a 7-point scale)
Switching intentions (Bansal et al. 2005)	Given the scenario, rate the probability that you would switch to another mode of transport. 1. No chance – Certain (measured on a 7-point scale)

Notes: (R) = reversed coded items, α = Cronbach's alpha.

Consumers' previous experience with TBSS in general (Dabholkar 1992; Meuter et al. 2005; and Meuter et al. 2003)	1. I commonly use many computers 2. I do not have much experience using the Internet (R) 3. I use a lot of technologically based products and services (measured on 7-point Likert scale) In addition, respondents were asked to describe how often they use each of the self-service options provided in a list that reflects a cross section of different TBSS modes (i.e., phone based, computer based, etc.). Potential responses were "never use," "use infrequently," "use occasionally," and "use regularly." (α = .72, based on combining both sets of items)
Technology anxiety (Meuter et al. 2005)	1. I feel apprehensive about using technology 2. Technical terms sound like confusing jargon to me 3. I have avoided technology unfamiliar to me 4. I hesitate to use most forms of technology for fear of making mistakes I cannot correct. (measured on a 7-point Likert scale; α = .90)
Inertia (adapted from Meuter et al. 2005)	1. Changing [the service delivery mode of buying a train ticket] would be a bother 2. For me, the cost in time, effort, and grief to switch [the service delivery mode of buying a train ticket] is high 3. It's just not worth the hassle for me to switch [the service delivery mode of buying a train ticket]. (measured on a 7-point Likert scale; α = .86)
Need for interaction (Dabholkar 1996)	1. Human contact makes the process enjoyable for the customer. 2. I like interacting with the person who provides the service. 3. Personal attention by the service employee is not very important to me. (R) 4. It bothers me to use a machine when I could talk with a person instead. (measured on a 7-point Likert scale; α = .92)

Notes: (R) = reversed coded items, α = Cronbach's alpha.

Chapter 4   How Forced Use of Technology-Based Self-Service Affects Consumers' Post-Adoption Evaluation: The Role of Technology and Service Expertise

In the beginner's mind there are many possibilities. In the expert's mind there are few.

Shunryu Suzuki (1904 – 1971)

Although generally found to be advantageous in the adoption of technology-based self-services (TBSS), this study shows that consumer expertise could also have an aversive effect on the post-adoption evaluation of TBSS, specifically in case of forced adoption. Consumers may or may not have expertise with the technology versus the service. This study shows how both types of expertise affect TBSS evaluation based upon forced use of a TBSS in the transportation sector using a sample of 267 consumers. In support of our hypotheses, we find technology expertise to negatively affect evaluation of the TBSS after forced adoption. Moreover, post-adoption evaluation by technology experts was more negative for service experts as compared to service novices and post-adoption evaluation by technology novices was more positive for service experts as compared to service novices. These research findings have implications for understanding the role of consumer expertise in the acceptance of innovations in general and in the post-adoption evaluation of self-service technologies in particular.

4.1 Introduction

Airline check in, car rental, banking, and supermarket checkout are but a few examples of service interactions where service providers try to stimulate the use of technology-based self-service (referred to as TBSS from this point onwards). They do so by making the traditional full-service encounter relatively unattractive (e.g., by charging higher price) or by completely replacing traditional service with TBSS, thus "forcing" customers to use an automated service. However, although beneficial from a service provider's point of view, replacing traditional face-to-face service with TBSS also has potential negative consequences. For example, many consumers complain about the self-checkout aisles that have proliferated in many supermarkets[5]. In addition, according to a recent study by Genesys, 87 percent of consumers feel that more and more companies are pushing self-service onto them and, as a result, consumers become less loyal, start complaining, or stop doing business with such companies (Askari 2006). Similarly, research on forced adoption suggests that imposing an innovation on consumers results in resistance toward that innovation (e.g., Ram and Jung 1991). More importantly, as Reinders, Dabholkar, and Frambach (2008) show, these negative evaluations of forced changes extend beyond the innovation itself by simultaneously leading to negative evaluations of the service provider itself.

Consumers' skills and expertise with regard to self-service technologies are likely to play an important role in their ability to understand and to effectively use the new service (Bell and Eisingerich 2007). Based on insights from the literature, the adoption intention of new TBSS options is highest among those who perceive the least barriers in using the new service (e.g., Keaveney and Parthasarathy 2001; Meuter et al. 2005). Companies that introduce a new self-service therefore tend to target customers who have experience with similar technologies first. For example, mobile banking was first targeted to those consumers that were already familiar with online banking services (*ABA Bank Marketing* 2009). However, in a forced adoption context, consumers' evaluation of the innovation *after* use is more relevant compared to usage intention. As expectations between experts and novices with regard to the usage of new products are different (Wood and Moreau 2006), the evaluation of a new TBSS for both novices and experts is subsequently expected to differ after (forced) use of TBSS. While there are a few studies that seem to support this notion on a theoretical level (Alba and Hutchinson 2000; Wood

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[5] For examples, see "Quicker, Faster, Better: The Self-Serve Checkout Catastrophe" by Dave Cunning (davecunning.wordpress.com), "Tesco self service checkout machines" (www.weeklygripe.co.uk), and "The Price of Nice" by Megan Santosus (CIO Magazine, 2005).

and Lynch 2002), we contribute to this research by empirically testing this effect. More specifically, this study examines the premise that technology *novices* are more likely to experience *positive* disconfirmation of expectations after forced usage of a new TBSS (having an experience "better than expected"), while technology *experts* are more likely to experience *negative* disconfirmation (having an experience "worse than expected").

Moreover, we do not only consider expertise with other self-service technologies (i.e., technology expertise), but explicitly differentiate this type of expertise from service expertise. Service expertise can be defined in terms of relationship-length and the usage level with regard to a preexisting service (Prins, Verhoef, and Franses 2009). According to Bell, Auh, and Smalley (2005, p. 170) "as relationships extend, customers become more experienced with both the organization with which they are transacting and the market in which the organization competes." Service expertise leads to an increase in customers' confidence about what they can expect to receive from the firm (Gwinner, Gremler, and Bitner 1998) and about one's evaluations of the service provider (Verhoef, Franses, and Hoekstra 2002). Increased confidence may lead to increased customer sentiments that he or she knows better how the service works than the service employee. As such, we expect service expertise to play a crucial role in consumers' post-adoption evaluation of a new TBSS and to affect the impact of technology expertise on the evaluation of TBSS after initial use of a new self-service. In addition, we check whether these effects are robust for prior satisfaction with the service, as prior satisfaction is an important determinant of the evaluation of the service (e.g., Bolton and Lemon 1999; Gustafsson, Johnson, and Roos 2005).

This study makes several contributions to the literature. First, this study contributes to the innovation adoption literature by focusing on how a new TBSS is evaluated after forced usage. Previous literature emphasizes the usage intention of TBSS (e.g., Dabholkar and Bagozzi 2002) or its initial trial (Meuter et al. 2005). However, despite the fact that the innovation adoption process does not stop at first use or trial, the literature has only recently begun to address consumers' evaluations after initial usage of innovations. This is remarkable, since it is known that consumers use different product-evaluation criteria after initial use than before (see for example Gardial et al. 1994; Karahanna, Straub, and Chervany 1999). Furthermore, this study adds to the expertise literature in trying to unfold the role of expertise in the early use of innovations. More specifically, this study makes a distinction between "technology expertise" (e.g., Meuter et al. 2005) and "service expertise" (e.g., Bell et al. 2005). Although different studies addressed the role of expertise with regard to (self-service) technology in the acceptance and use of TBSS (e.g., Keaveney and Parthasarathy 2001; Meuter et al. 2005),

less is known about the role of expertise with regard to the service itself in evaluation of a new TBSS. This study aims to elucidate the role of both types of expertise in the forced use of a new TBSS. Finally, from a managerial point of view, this study helps to improve practitioners' insight into how consumers can best be targeted when introducing a new self-service, depending on their knowledge of either the technology or the service itself. A strategy that seems intuitively appealing for service providers when migrating to TBSS is to focus their marketing efforts on those consumers who have rich experience with self-service technologies. However, as we will show in this study, such a strategy may not only be ineffective, but may have very undesirable consequences for the service provider under certain circumstances.

4.2   Conceptual Framework

4.2.1   Technology Expertise

Consumer expertise is defined as the amount of domain-specific knowledge acquired through experience or training (cf. Spence and Brucks 1997; Wood and Lynch 2002). Expertise can be distinguished from mere product familiarity. Whereas "familiarity accumulates naturally from any product-related encounter, expertise is measured relative to a performance criterion and implies the ability to perform product-related tasks successfully" (Alba and Hutchinson 1987, 2000, p. 123). However, it is clear that these two constructs are closely related: increased familiarity is likely to result in increased consumer expertise. Literature shows that consumer expertise facilitates the adoption of new products because consumers with sufficient prior knowledge in a product domain are more capable of dealing with incongruity or complexity (Wood and Moreau 2006). Similarly, expertise with regard to self-service technologies plays a role in the acceptance and evaluation of TBSS (e.g., Meuter et al. 2005). This type of expertise is referred to as technology expertise in this paper. Consumers who have experience with a variety of TBSS options tend to have more positive attitudes toward using TBSS in general and toward using new TBSS options (Keaveney and Parthasarathy 2001). Reinders et al. (2008) found that even in a forced-use situation, consumers who had previous experience with TBSS have less negative attitudes toward using the TBSS.

In situations of forced use of a TBSS, consumers' evaluations after usage provide more relevant information for marketers than consumer attitudes prior to use. Evaluations of services are seen as a function of the comparison between a customer's expectations and his or her experience with the actual service (Coye 2004; Zeithaml, Berry, and Parasuraman 1993). Technology experts have different expectations than

novices with regard to self-service technology. Montoya-Weiss, Voss, and Grewal (2003) showed that greater experience with online channels creates a greater sense of comfort with a service provider's online channel and reduces the perceived uncertainty or risk associated with it. In addition, a number of studies argue that experts tend to have overconfident expectations with regard to the usage of new products and they base their expectations largely on information stored in their memory (Alba and Hutchinson 2000; Wood and Lynch 2002). Because they rely heavily on their own prior experiences, experts often pay little attention to any usage information the firm provides. As a consequence, technology experts may be more likely to use a new product or service incorrectly (Wood and Lynch 2002). In addition, experts who think they know how to use a product might be more likely to attribute poor performance to the product rather than to themselves. In consumer research, Fournier and Mick (1999) observed that technophiles were less likely than nontechnophiles to blame themselves when technological products broke down. These attributions to the product or the service provider negatively affect product evaluations (Wood and Lynch, 2002). In a similar way, Wood and Moreau (2006) suggest that inaccurate and overconfident expectations about usability lead to a negative disconfirmation of usage expectations and negative emotions that, in turn, have a negative influence on product evaluations and satisfaction. Furthermore, successful prior experiences with other self-services in the past become the standard how the new self-service should perform (Cadotte, Woodruff, and Jenkins 1987). Successful prior experiences thus raise expectations with regard to the usage of the new TBSS. As a result, the actual outcomes as compared to the expected outcomes might be relatively disappointing, and, subsequently, negative disconfirmation of expectations occurs (Bhattacherjee 2001; Oliver 1980, 1993).

In contrast, for consumers without sufficient technology-related experience the self-service may evoke perceptions of uncertainty and complexity with respect to its usage (Frambach, Roest, and Krishnan 2007). These perceptions subsequently depress expectations of an easy experience. Wood and Moreau (2006) state that though a new product experience may be challenging for novices it may not necessarily be disappointing if difficulty is expected. In addition, because technology novices cannot rely on previously acquired heuristics to maneuver through the self-service interface, they are more likely to be curious about the service innovation and thus show a greater willingness to understand its functioning (Zhu et al. 2007). Because of these depressed expectations and greater willingness to learn, novices may be positively surprised by the actual usage experience, seeing it as "not so bad after all", a situation that can create positive emotions (Wood and Moreau 2006). More specifically, in a forced situation, although

novices may be initially resistant towards the technology, the experience of using the self-service might turn out better than expected and result in a positive evaluation afterwards. These arguments lead to the following hypothesis:

> *H1: Technology novices will report (a) a more positive disconfirmation of expectations and, subsequently, (b) a more positive evaluation of a new TBSS upon forced adoption than technology experts.*

4.2.2 Service Expertise

In the context of self-services, customers may not only have experience with the technology, but also with the service itself. As a consequence, four consumer groups can be distinguished: (1) novices (technology novices and service novices); (2) service-only experts (technology novices and service experts); (3) technology-only experts (technology experts and service novices); and (4) experts (technology experts and service experts) (see Table 4.1). Hypotheses are formulated for each of the four different situations.

Table 4.1   Consumer Expertise Typology

		Technology Expertise	
		Novice	*Expert*
Service Expertise	*Novice*	Novices	Technology-only experts
	Expert	Service-only experts	Experts

In the previous section, we hypothesized that technology novices with regard to technological interfaces are likely to experience positive disconfirmation based on the fact that the actual usage positively surprised them. However, as we will argue next, we expect this positive effect to be less positive when these technology novices are inexperienced with the service. Service experts are able to assess the performance of the new self-service relative to performances of previous service encounters with this service provider (Bell et al. 2005). Consequently, they tend to have more realistic expectations about the new self-service (Prins et al. 2009; Holloway, Wang, and Turner Parish 2005). In contrast, service novices cannot rely on previous experiences with the service provider and thus have more difficulty assessing the quality and performance of the service (Bell et al. 2005). Therefore, more cognitive effort is needed to comprehend both the process as well as the outcomes of the service process. When the amount of cognitive load becomes too high, negative effects on product evaluation occur (Keller and Staelin 1987; Meyers-Levy and Tybout 1989; Mukherjee and Hoyer 2001). Furthermore, because the service experience is difficult to evaluate for those customers who have no prior experience with

the service, they lack confidence about the performance of the service after initial usage (Yi 1993). Stated differently, because the service is new to these customers, they are still in doubt whether they completed the service in the right way (Johnson, Bardhi, and Dunn 2008). For example, when someone makes his or her first flight with an airplane and uses an online check in, (s)he probably remains uncertain whether (s)he performed the service in the right way until (s)he actually boards the plane. Therefore, we suggest the following hypothesis:

> *H2: For technology novices, (a) the disconfirmation of expectations and (b) the evaluation of a new TBSS upon forced adoption will be less positive for service novices as compared to service experts.*

Also, we argued that for technology experts forced use of TBSS more negatively affects consumers' post-adoption evaluation as compared to technology novices. Moreover, we expect that for technology experts who are experienced with the service the effect will even be more negative than for technology experts who are inexperienced with the service. Although different types of self-service technologies may have similarities and technology experts know how to deal with that, service processes also contain unique elements, which may create uncertainties for technology experts who are inexperienced with the service. As service novices know that the service they have to deal with is new, they will form less overconfident expectations with regard to the service process. In contrast, service experts, overestimate the knowledge with regard to their own role in the service process and, consequently, will misjudge what they have to do when dealing with the new self-service. Service experts will pay little attention to any information from the service provider that helps them to successfully proceed through the service process (Wood and Lynch 2002). As a result, role ambiguity occurs, which has a negative impact on perception of the task (Netemeyer, Johnston, and Burton 1990). Based on this, we expect that the disconfirmation of expectations and subsequent evaluation of the new TBSS of technology experts will be more negative for service experts than for service novices. Hence,

> *H3: For technology experts, (a) the disconfirmation of expectations and (b) the evaluation of a new TBSS upon forced adoption will be more negative for service experts as compared to service novices.*

4.2.3 Prior Satisfaction with Service Provider

Future usage of a service is strongly determined by customers' prior satisfaction with the service (Bolton and Lemon 1999). Customers' prior satisfaction has a positive

influence on customer's willingness to purchase additional or new services from the provider (e.g., Zeithaml, Berry, and Parasuraman 1996; Loveman 1998). As such, prior satisfaction with the service provider may play a role in the evaluation of the new TBSS, especially for those customers who have accumulated experiences with the service provider (i.e., service experts). Therefore, we pose that the post-adoption evaluation of service experts is contingent upon their satisfaction with the previous services they received from the service provider.

First, we will look at service-only experts. Since current customer satisfaction affects future expectations (Verhoef et al. 2009), dissatisfactory experiences with the service provider in the past are likely to lead to low expectations for the new self-service. In addition, customers with dissatisfactory previous interactions with service employees may embrace the new self-service, because they believe they can reduce human error by performing the service on their own. For example, in a study that deals with self-scanning in supermarkets, Dabholkar, Bobbitt, and Lee (2003) found that one of the reasons customers use self-scans is because they think self-scans are more reliable and because they wish to avoid rude or unhelpful employees. In addition, a recent Dutch study showed that dissatisfied customers increasingly choose Internet shopping because these online stores are better able to meet their expectations (MarketResponse 2008). Dissatisfied customers are likely to experience more control over the service when using the new TBSS. Moreover, given the fact that service experts have sufficient knowledge of the service, the use of the new TBSS may not be as difficult as expected. In contrast, for customers who are satisfied with the previous (traditional) service encounter the fact that they now are forced to perform the service for themselves by means of a TBSS will probably evoke resistance. The greater the satisfaction with the previous service, the greater the resistance to change to a new service will be (e.g., Bansal and Taylor 1999; Cronin, Brady, and Hult 2000). Moreover, based on previous satisfactory experiences, expectations for the new self-service of satisfied customers are higher than for those customers who are dissatisfied. Higher expectations are more likely to be negatively disconfirmed. Taken together,

> *H4: For technology novices, (a) the disconfirmation of expectations and (b) the evaluation of a new TBSS upon forced adoption will be more positive for service experts who are relatively dissatisfied with their previous service experience as compared to service experts who are relatively satisfied with their previous service experience.*

Also for service experts who are experienced with the technology prior satisfaction with the service provider plays a role. As was explained above, customers who are dissatisfied have the feeling that by means of the self-service, they gain more control over the (previously dissatisfactory) service process. Consumers who are both technology as well as service experts, are probably eager to gain this control in case of dissatisfactory experiences as they will be highly confident; i.e., they may think that they are better able to provide the service on their own rather than relying on the quality of the service provider. However, this confidence, despite high levels of expertise in both the technology and the service is by no means a guarantee for a successful service delivery, as we argued before. As a result, these consumers subsequently have a higher chance to experience negative disconfirmation after forced usage. Resulting negative experiences are likely to be attributed to the service provider as is typical for dissatisfied customers (Hess, Ganesan, and Klein 2003).

In contrast, satisfactory past service experiences can help to shield a service organization from the negative effects of a new service experience (Hess et al. 2003; Holloway et al. 2005). In addition, Oliver (1999) argues that customers having cumulatively satisfying experiences are likely to develop positive attitudes toward the service provider. As such, satisfied customers are less likely to make negative attributions to the service company. As a result, satisfied customers of the previous service will experience less negative disconfirmation of expectations and will have more positive evaluations of the new TBSS than dissatisfied customers. In sum, we state that:

H5: For technology experts, (a) the disconfirmation of expectations and (b) the evaluation of a new TBSS upon forced adoption will be more negative for service experts who are relatively dissatisfied with their previous service experience as compared to service experts who are relatively satisfied with their previous service experience.

4.3 Method

4.3.1 Research Context

The research context for the empirical study was urban public transport (i.e., tram and metro) in the Netherlands. Technology-based self-service plays an increasingly important role in this research context as an alternative to employee interaction. Subject of study was a smart card that is a new means of payment for the public transport system. The smart card is the size of a bank card and contains an invisible chip. It can be charged with credit in Euros with which one can travel anywhere within The Netherlands.

In addition, this smart card can be charged with a travel product such as a season ticket. Travelers have to charge their card at a vending machine. In addition, travelers have to check in at the gate by scanning their card in order for the gate to the platform to open. The smart card is scheduled to replace all other public transport tickets in The Netherlands. As such, it is a good example in which a new TBSS is forced upon customers of the public transport system.

4.3.2 Research Design

We used a survey to test the hypotheses of our model. Participants had to fill out a self-administered questionnaire in which they had to indicate their expertise with regard to self-service technologies and the particular service considered in the study (i.e., urban public transport). In addition, consumers were asked to indicate their experience with the new self-service (i.e., the smart card) as it was important to draw from a population of people who had actually encountered the new service. Since this smart card is not yet introduced in all parts of the country, but only in major cities, we collected our data among respondents from the two largest cities (i.e., Amsterdam and Rotterdam). Data was collected by a professional market research company.

4.3.3 Sample

A total of 2000 customers (Amsterdam n = 1000; Rotterdam n =1000), obtained from an online consumer panel, were approached to participate in the study. Out of this group, 493 respondents answered the questionnaire, representing an effective response rate of almost 25%. We included those respondents that had actually obtained the card and used this card at least once in the past month. As a result, we obtained a total of 267 usable responses (Amsterdam n = 90; Rotterdam n = 177) of which 60.3% are women and 39.7% are men. The age of respondents in our sample ranged from 18 to 70 years (M = 45.9). Table 4.2 shows sample characteristics for the Amsterdam and Rotterdam subsamples.

Table 4.2   Sample Characteristics

	Amsterdam sample (*n* = 90)	Rotterdam sample (*n* = 177)
Mean age	49.8	43.9
Gender		
Men	42.2%	38.4%
Women	57.8%	61.6%
Time since adoption of smartcard		
Less than 1 month	26.7%	5.1%
2-3 months	17.8%	5.6%
4-6 months	33.3%	18.1%
7-12 months	8.9%	19.8%
More than 1 year	13.3%	51.4%

4.3.4   Measures

Dependent variables. Our main dependent variable, disconfirmation of expectations, was measured by using three items adapted from Oliver (1980, 1993). Respondents had to indicate whether the new self-service was worse or better than expected with regard to usage, performance and benefits (measured on a 7-point scale). In addition, we incorporated a measure of evaluation of the new TBSS. Evaluation of the new TBSS was measured using the four-item, seven-point, semantic differential scale employed by Dabholkar and Bagozzi (2002).

Independent variables. Both technology expertise and service expertise were measured by adapting the four-item scale from Mitchell and Dacin (1996). Satisfaction with prior service encounters was measured by using two items adapted from Montoya-Weiss et al. (2003).

Covariates. We include several covariates in our analyses, which appear in previous studies as possible determinants of post-adoption evaluation. First, time since adoption is considered as a covariate as it could be positively correlated with technology expertise. Time since adoption was measured by one question in which we asked the period that the respondent makes use of the smart card (measured on a 5-point scale ranging from "1 month or less" to "more than 1 year"). In addition, current self-service usage is incorporated as it may also be correlated with technology expertise. Current self-service usage was measured by drawing on Meuter et al. (2003) to capture usage of different types of TBSS. Furthermore, motivation to use TBSS is incorporated as a covariate in our model. Motivation as a predictor of usage of technology-based products

and services is theoretically well supported in the literature (Barczak, Ellen, and Pilling 1997). According to Walker et al. (2002) consumers may have the expertise to use TBSS but their motivation to use technology may still be low. Vice versa, some consumers show motivation to use TBSS, although their capacity to use these technologies effectively is low. As such, motivation could have a potential confounding effect on disconfirmation of expectations. We measured motivation by using an eight-item scale adapted from Meuter et al. (2005). Finally, demographics (gender, age, and education) were included in the study as controls.

All the measures described above are shown in the Appendix 4.1, along with Cronbach's alphas ranging from .70 to .95.

4.4   Results

4.4.1   Usage Smart Card and Effect of Time since Adoption

The smart card was already introduced in Rotterdam in 2005 and is now the only legally allowed way to make use of public transport. In contrast, in Amsterdam the card was introduced in 2007. As a consequence, time since adoption differs between the respondents from Amsterdam and the respondents from Rotterdam (see also Table 4.2). However, independent samples t-tests reveal no differences between Amsterdam and Rotterdam on the dependent variables: disconfirmation of expectations ($t = .425$, $p > .05$) and evaluation of the smart card ($t = -0.45$, $p > .05$). We therefore pooled both samples in our analyses.

4.4.2   Testing Hypothesis 1

We performed a median split to distinguish between respondents with low and high technology expertise and subsequently conducted an analysis of covariance (ANCOVA) to test the main effect of technology expertise on the continuous dependent variables, controlling for the effects of selected other continuous variables which covary with the dependent variables. Significant results were found for technology expertise on disconfirmation of expectations ($F (1, 262) = 6.47$, $p < .05$) and for technology expertise on evaluation of the smart card ($F (1, 262) = 4.98$, $p < .05$). Inspection of the estimated marginal means reveals that novices experienced the most positive disconfirmation and reported the most positive evaluation of the smart card compared to technology experts, in support of Hypotheses 1a and 1b.

We incorporated both time since adoption and motivation as covariates in our model. The results of this test indicate significant results for motivation ($F (1, 262) =$

19.79, $p < .001$) and time since adoption (F (1, 262) = 9.27, $p < .01$) on disconfirmation of expectations and significant results for motivation (F (1, 262) = 24.84, $p < .001$) and time since adoption (F (1, 262) = 13.43, $p < .001$) on evaluation of the smart card. Current usage of different types of self-services does not affect disconfirmation of expectations and evaluation of the smart card. The results of the ANCOVA are summarized in Table 4.3.

Table 4.3   Results of ANCOVA tests Technology expertise (Hypothesis 1)

Dependent variables		Estimated marginal means		Mean square	*F*-value
		Low	High		
Disconfirmation of expectations	*Main effect*				
	Technology-expertise	4.91[a]	4.33[a]	16.47	6.45*
	Covariates				
	Motivation			50.40	19.79**
	Time since adoption			23.61	9.27**
	Current usage of TBSS			2.37	.93
Evaluation	*Main effect*				
	Technology-expertise	4.75[a]	4.22[a]	13.53	4.98*
	Covariates				
	Motivation			67.49	24.84**
	Time since adoption			36.51	13.43**
	Current usage of TBSS			1.49	.55

Notes: **Significant at $p < .01$; *significant at $p < .05$.

[a] Covariates appearing in the model are evaluated at the following values: Motivation = 4.88, Time since adoption = 3.59, and Current usage of different self-service = 3.11. Variables are measured on a scale ranging from 1 to 7.

4.4.3   Testing Hypotheses 2-5

We also performed a median split on the scores of service expertise to distinguish between respondents with low and high service expertise. Table 4.4 gives the percentages of each cell in our sample for both technology and service expertise.

Table 4.4   Technology expertise and Service expertise patterns

Technology expertise	Service expertise	Percentage of total sample	Percentage of Amsterdam sample	Percentage of Rotterdam sample
Low	Low	40.1%	43.3%	38.4%
Low	High	14.2%	12.2%	15.3%
High	Low	13.9%	12.2%	14.7%
High	High	31.8%	32.2%	31.6%

In addition, we performed a median split on the scores of prior satisfaction with the service provider to distinguish between respondents with low and high prior satisfaction.

In order to test the hypothesis that service expertise moderates the effect of technology expertise on disconfirmation of expectations and evaluation of the smart card and to test the three-way interaction with prior satisfaction, 2 (low and high technology expertise) x 2 (low and high service expertise) x 2 (low and high prior satisfaction) ANCOVAs were conducted with disconfirmation of expectations and evaluation of the smart card as dependent variables and motivation to use TBSS, time since adoption and current self-service usage as covariates. The results of the ANCOVA are summarized in Table 4.5.

4.4.4   Dependent Variable: Disconfirmation of Expectations

Main effects on disconfirmation of expectations were found for technology expertise ($F_{(1, 256)} = 45.24$, $p < .05$) and prior satisfaction ($F_{(1, 256)} = 12.03$, $p < .001$). In addition, a marginal significant interaction effect between technology expertise and service expertise was observed ($F_{(1, 256)} = 3.02$, $p = .08$). Inspection of the means demonstrated that technology novices experienced a less positive disconfirmation of expectations when they have low service expertise ($M = 4.78$) than when they have high service expertise ($M = 5.12$), in support of Hypothesis 2a (see Figure 4.1). Conversely, technology experts experienced a less negative disconfirmation of expectations when they have low service expertise ($M = 4.65$) than when they have high service expertise ($M = 4.25$). These results confirm Hypothesis 3a (see Figure 4.1). No significant interaction effects were found between technology expertise, service expertise, and prior satisfaction. Therefore, no support was found for Hypotheses 4a and 5a. Finally, the results of this test indicate significant results for the covariates motivation ($F_{(1, 256)} = 13.82$, $p < .001$) and time since adoption ($F_{(1, 256)} = 7.22$, $p < .01$).

Table 4.5   Results of ANCOVA tests Technology expertise, Service expertise and Prior satisfaction (Hypotheses 2-5)

Dependent variables		Estimated marginal means		Mean square	*F*-value
		Low	**High**		
Disconfirmation of expectations	*Main effects*				
	Technology-expertise	4.98[a]	4.43[a]	12.81	5.24**
	Service-expertise	4.70[a]	4.71[a]	.004	.002
	Satisfaction	4.32[a]	5.09[a]	29.40	12.03***
	Interaction effects				
	Technology-expertise*Service-expertise			7.38	3.02*
	Technology-expertise*Satisfaction			.06	.02
	Service-expertise*Satisfaction			3.53	1.45
	Technology-expertise*Service-expertise*Satisfaction			5.64	2.31
	Covariates				
	Motivation			33.76	13.82***
	Time since adoption			17.64	7.22***
	Current usage of TBSS			3.59	1.47
Evaluation	*Main effects*				
	Technology-expertise	4.84[a]	4.36[a]	9.49	3.66*
	Service-expertise	4.61[a]	4.59[a]	.007	.003
	Satisfaction	4.21[a]	4.99[a]	30.69	11.83***
	Interaction effects				
	Technology-expertise*Service-expertise			13.53	5.21**
	Technology-expertise*Satisfaction			.03	.01
	Service-expertise*Satisfaction			3.19	1.23
	Technology-expertise*Service-expertise*Satisfaction			4.71	1.82
	Covariates				
	Motivation			47.12	18.16***
	Time since adoption			28.56	11.00***
	Current usage of TBSS			2.47	.95

Notes: ***Significant at $p < .01$; **significant at $p < .05$; *significant at $p < .10$.

[a] Covariates appearing in the model are evaluated at the following values: Motivation = 4.88, Time since adoption = 3.59, and Current usage of different self-service = 3.11. Variables are measured on a scale ranging from 1 to 7.

Figure 4.1   Interactions between Technology Expertise (TE) and Service Expertise (SE)
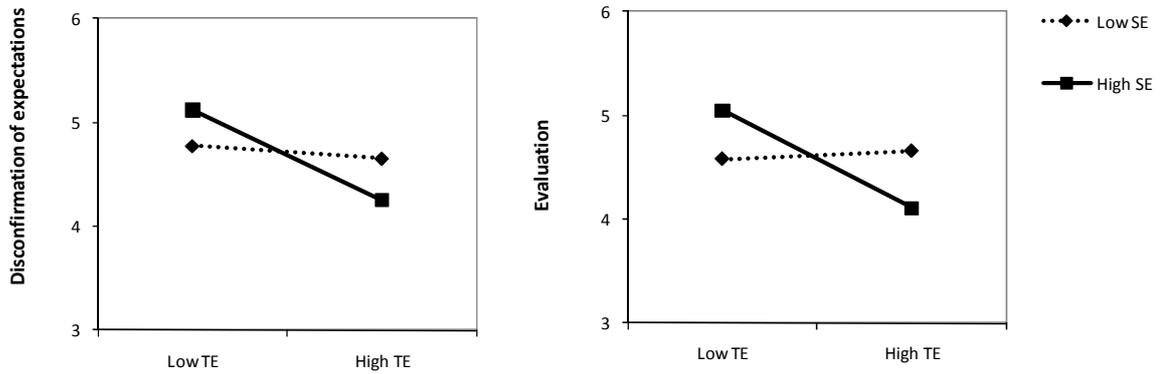
4.4.5 *Dependent Variable: Evaluation of the Smart Card*

A marginally significant effect of technology expertise (F (1, 256) = 3.66, p = .06) on evaluation of the smart card was found, as well as a significant effect of prior satisfaction (F (1, 256) = 11.83, p < .001). In addition, a significant interaction effect between technology expertise and service expertise was found (F (1, 256) = 5.21, p < .05). Technology novices reported a less positive evaluation when they have low service expertise (M = 4.58) than when they have high service expertise (M = 5.05) and technology experts reported a less negative evaluation when they have low service expertise (M = 4.66) than when they have high service expertise (M = 4.11) (see Figure 4.1). These results support Hypotheses 2b and 3b. Again, no significant interaction effects were found between technology expertise, service expertise, and prior satisfaction, failing to support Hypotheses 4b and 5b. Below, we will examine this further. Finally, significant results were found for the covariates motivation (F (1, 256) = 18.16, p < .001) and time since adoption (F (1, 256) = 11.00, p < .001).

4.4.6 *Post-hoc Analyses Prior Satisfaction*

In order to further explore Hypotheses 4 and 5, the three-way interaction between technology expertise, service expertise, and prior satisfaction was decomposed into two-way interactions by technology expertise. For technology novices we found a significant interaction between service expertise and prior satisfaction (F (1, 109) = 3.90, p = .05). Inspection of the means demonstrated that disconfirmation of expectations is almost equal for service novices who have high prior satisfaction (M = 4.56) and service novices who have low prior satisfaction (M = 4.40). In contrast, service experts

experienced a more positive disconfirmation of expectations when their prior satisfaction was high (M = 5.55) than when their prior satisfaction was low (M = 4.21). See Figure 4.2A. These results were contrary to what we expected in Hypothesis 4a. For evaluation of the smart card we did not find a significant interaction between service expertise and prior satisfaction (F (1, 109) = 2.61, p > .05), although the means of prior satisfaction for service experts and service novices were in the same direction (see Figure 4.2A). Therefore, Hypothesis 4b cannot be supported.

For technology experts we did not find a significant interaction between service expertise and prior satisfaction on disconfirmation of expectations (F (1, 144) = .05, p > .05) or on evaluation of the smart card (F (1, 144) = .05, p > .05). Figure 4.2B shows that both service novices and service experts experienced a more positive disconfirmation of expectations and evaluation of the smart card when their prior satisfaction was high than when their prior satisfaction was low. Furthermore, disconfirmation of expectations and evaluation of the smart card was slightly higher for service novices as compared to service experts (though not significant). Therefore, Hypotheses 5a and 5b cannot be supported.

Figure 4.2   Interactions between Service Expertise (SE) and Prior Satisfaction

A. Technology novices
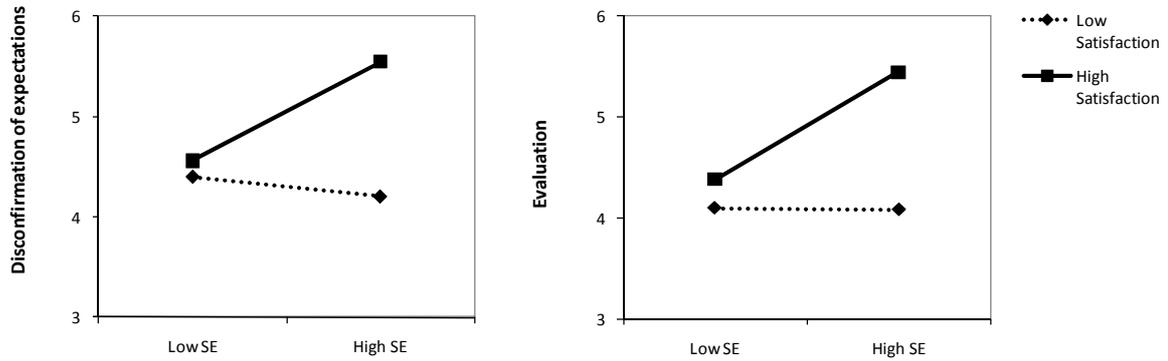
B. Technology experts
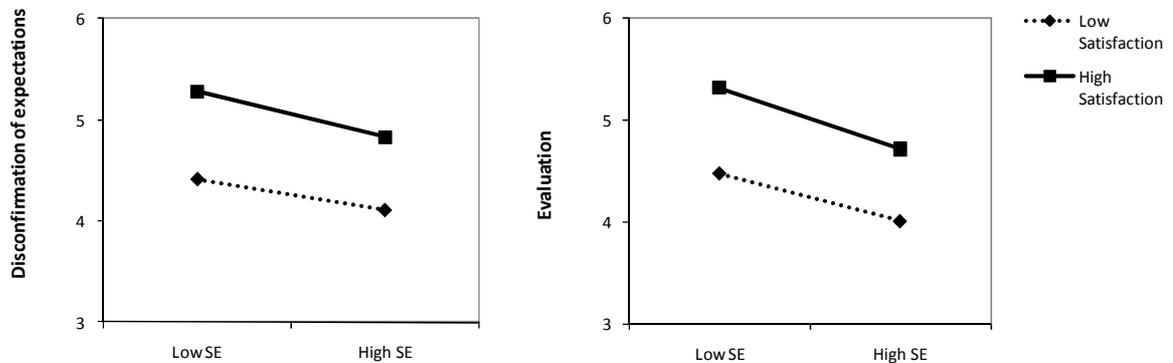
4.4.7 Demographics

Additionally, we tested the effects of demographic variables (gender, age, and education) on the dependent variables. Men reported a more positive disconfirmation of expectations than women (M_{men} = 4.98, M_{women} = 4.32; $p < .01$) as well as a more positive evaluation of the smart card (M_{men} = 4.86, M_{women} = 4.19; $p < .01$). In addition, age shows a positive correlation with both disconfirmation of expectations (β = .237, $p < .01$) and evaluation of the smart card (β = .223, $p < .05$). No direct effects of education were found. Furthermore, no significant interaction effect between (technology and service) expertise and demographics were found.

4.5   Discussion

The results of our study provide theoretical contributions to the literature and offer practical implications for service providers considering to replace traditional full-service interaction modes with TBSS.

4.5.1 Technology and Service Expertise

First, this study found that, in a forced adoption context, technology expertise has a negative effect on post-adoption evaluation of a new TBSS (disconfirmation of expectations and evaluation of the service innovation). Technology experts experienced a less positive disconfirmation of expectations and reported less positive evaluations of the new self-service than technology novices. Firms should thus carefully consider the role of technology expertise when forcing their customers to use a new TBSS option. Our study extends the work by Wood and Moreau (2006), who showed that under certain circumstances inexperienced consumers could experience more positive disconfirmation.

By disentangling technology expertise and service expertise, this study showed that disconfirmation experienced by technology novices upon forced adoption of a TBSS is more positive for service experts as compared to service novices, while disconfirmation experienced by technology experts is more negative for service experts as compared to service novices. Consequently, for companies that want to replace traditional service by TBSS most problematic appear to be customers with high levels of technology and service expertise. These customers know the technology and service best, but may experience the least positive evaluations after usage of the new self-service. For example, it may be the frequent flyers or preferred banking clients who are bothered the most by the implementation of a self-service check-in or self-service bank outlet. Such consumers will be hard to please as their sophisticated expert level is likely to make them think of processes and solutions beyond what the company is offering to the average consumer. So, if customers with high technology expertise and service expertise represent a large portion of the provider's customer base, the provider could decide to offer alternative service delivery modes to minimize negative consequences. Alternatively, for these experts, companies must avoid creating unrealistically high expectations with regard to the usage of the new self-service.

Furthermore, our study shows that service-only experts and technology-only experts have more positive post-adoption evaluations than all-round experts or novices. Their experience with either the process of this particular service or with the technology helps these customers to relatively quickly understand the new self-service. Consequently, service providers could decide to first "force" service-only or technology-only experts to migrate to TBSS. An example would be an airline targeting frequent flyers (air travel service experts) who have little experience with online check-in (technology novices) with a new mobile check-in self service. However, although these groups of customers have more positive evaluations, even these customers will not automatically

be inclined to view the new self-service favorably, so this is not entirely a risk-free proposition.

Finally, this study reveals that novice customers (with less experience regarding both self-service technologies and the service) have less positive post-adoption evaluations than technology-only and service-only experts, although they still have more positive evaluations than all-round experts. These consumers clearly need to make more efforts to learn to use the new self-service. Guiding these customers step by step through the service process could help them to overcome the main barriers that they may encounter when producing the service. Notice that for inexperienced users of the service, who may feel uncertain about the service outcome prior to consumption, the quality of the process is more important than the outcome of the service (Hui et al., 2004). As such, we recommend service providers that want to target inexperienced users to optimize the quality of their service process. For example, by focusing on the user friendliness of the automated self-service and the possibility to interact with a service employee.

4.5.2   *Prior Satisfaction with the Service Provider*

Our study found that the negative effects of forced use of TBSS are reduced by high satisfaction with prior service encounters. As a result, satisfied customers will experience less negative disconfirmation of expectations and will have more positive evaluations of the new TBSS than dissatisfied customers. Satisfaction with the service provider thus acts as a buffer to negative new service experiences (Holloway et al. 2005). Moreover, our findings are in line with the reinforcing effect of satisfaction on future service usage that was found by Lemon and Wangenheim (2009). An investment in customer satisfaction may pay off, as satisfaction positively affects customers' post-adoption evaluation of new self-services. In addition, in contrast to what we hypothesized, we found that service-only experts experienced a more positive disconfirmation of expectations when their prior satisfaction with the service provider was high, whereas we did not find such an effect for all-round experts. A possible explanation why prior satisfaction tends to have a relatively larger impact on service experts without technology expertise may be that those with technology expertise are more aware and have better knowledge of other, perhaps better, self-service technologies offered by competitors. This may lead to comparative evaluations with regard to the self-service offering that are unfavorable for the current service provider. As a result, prior satisfaction only has an interaction effect with service expertise for technology novices and not for technology experts.

4.5.3   Motivation and Time since Adoption

Finally, this study showed that the negative effect of technology expertise is conditional upon motivation to use TBSS options and time since adoption. In general, the negative effect of expertise decreases when motivation increases. Our findings are in line with Wood and Lynch (2002), who state that when high prior knowledge consumers were motivated prior to encoding of the new information, they performed better than consumers with lower prior knowledge. Or, as Wood and Lynch state it (2002, p. 424): "We do not argue that prior knowledge will always lead to poor learning but, rather, that learning will be the net results of opposing forces of ability and motivation." In addition, time since adoption seems to mitigate the negative effects of expertise. An explanation for this may be that early adopters experience more realistic anticipated utility and are not as easily dissatisfied when using the service (Prins et al. 2009). Notice that we also incorporated current usage of different other TBSS options as possible covariates in our model, but that we did not find a significant effect. So, while motivation and adoption time play a role in mitigating the effect of expertise, current usage of other types of self-service not necessarily do so.

4.5.4   Limitations and Future Research

While our study shows very promising results with respect to the role of consumer's expertise in the post-adoption evaluation of new technology-based self-service, limitations should be noted that may help to draw some interesting avenues for further research.

First, although we included two different service contexts (i.e., Amsterdam and Rotterdam), the study was restricted to a public transport service within a single country. Future research could test our model in a variety of contexts and even in cross-national settings, thus further increasing the generalizibility of the results presented here. Furthermore, in this study we used a cross-sectional design. Future research could use a longitudinal design to get more insight in the dynamic nature of individual usage patterns of the service over time, including disadoption of the new service.

Second, this study looked at consumers' self-reported knowledge of technology and service. Although our measurement of consumer expertise is a commonly accepted way of measuring expertise, the literature makes a distinction between subjective knowledge and objective knowledge (e.g., Raju, Lonial, and Mangold 1995). Future research may aim to measure consumer expertise more objectively. Furthermore, this study showed that motivation is an important covariate in the model. Future research could pay more attention to the effect of motivation in combination with consumer

expertise and its role in the adoption process by offering a complete ability-motivation framework. In addition, other consumer characteristics may be incorporated in a model of post-adoption evaluation of innovations. For example, consumer innovativeness may play a role. Some evidence shows that earlier adopters may not necessarily be more innovative in product usage than later adopters (Huh and Kim 2008). Finally, future research might investigate the role of situational awareness in the evaluation of a new TBSS. It may be expected that when expertise increases, consumers become more aware of their immediate surroundings and the behavior of other customers, instead of focusing on the task. The social environment may, in turn, affect perceptions of a satisfying service encounter (Verhoef et al. 2009).

Appendix 4.1 Measurement scales

Disconfirmation of expectations
(adapted from Oliver 1980, 1993)

1. How would you rate the usage of the new smart card?
2. How would you rate the overall performance of the new smart card?
3. How would you rate the benefits of the new smart card?

Measured on a 7-point scale ranging from "much worse than expected" to "much better than expected; α = .90.

Evaluation of the smart card
(Dabholkar and Bagozzi 2002)

How would you describe your feelings with regard to using the smart card?
1. Good – Bad
2. Pleasant – Unpleasant
3. Harmful – Beneficial (R)
4. Favorable – Unfavorable

Measured on a 7-point semantic differential scale; α = .95.

Technology expertise
(adapted from Mitchell and Dacin 1996)

1. I am very familiar with self-service technologies
2. I have a clear idea about which characteristics of self-service technologies are important in providing me maximum usage satisfaction.
3. I know a lot about self-service technologies.
4. I consider myself an expert about self-service technologies.
5. I have a lot of experience with technology-based self-service.

Measured on a 7-point scale anchored by "agree" and "disagree"; α = .93.

Service expertise
(adapted from Mitchell and Dacin 1996)

1. I am very familiar with [service X].
2. I have a clear idea about which characteristics of [service X] are important in providing me maximum usage satisfaction.
3. I know a lot about the services of [service provider X].
4. I consider myself an expert about [service X].
5. I have a lot of experience with [service X].

Measured on a 7-point scale anchored by "agree" and "disagree"; α = .87.

Prior satisfaction with service provider
(adapted from Montoya-Weiss et al. 2003)

1. Considering all or your experiences, how satisfied are you with the level of service that [company X] provides?
2. Considering your last experience, how satisfied are you with the level of service that [company X] provides?

Measured on a 7-point scale ranging from "Completely dissatisfied" to "Completely satisfied"; α = .86.

Notes: (R) = reversed coded items, α = Cronbach's alpha.

Current self-service usage (Meuter et al. 2003)	Respondents were asked to describe how often they use each of the following self-service options:
	1. Internet ticketing (e.g., airlines, theatre, railway, etcetera)
	2. Tax preparation software
	3. ATMs
	4. Internet banking
	5. Internet shopping
	6. Automated airline check-in
	7. Railway ticketing machine
	8. Online travel information
	Potential responses for each self-service option were "I have never used," "I use infrequently," "I use occasionally," and "I use regularly"; α = .70.
Motivation to use TBSS (adapted from Meuter, Bitner, Ostrom and Brown 2005)	1. Using a self-service would provide me with personal feelings of worthwhile accomplishment.
	2. Using a self-service would provide me with feelings of enjoyment from using the technology.
	3. Using a self-service would provide me with feelings of independence
	4. Using a self-service would allow me to feel innovative in how I interact with a service provider.
	5. Using a self-service would allow me to have increased confidence in my skills.
	6. Using a self-service would allow me to save time.
	7. Using a self-service would allow me to be more efficient.
	8. Using a self-service would provide me more control over the service process.
	Measured on a 7-point scale anchored by "agree" and "disagree"; α = .92.
Time since adoption	Time since adoption was measured by one question in which the period was asked that the respondent makes use of the smart card .
	Measured on a 5-point scale ranging from "1 month or less" to "more than 1 year".

Notes: (R) = reversed coded items, α = Cronbach's alpha.

Chapter 5   Conclusions

The improvement of understanding is for two ends:
first, our own increase of knowledge;
secondly, to enable us to deliver that knowledge to others.
John Locke (1632 – 1704)

This final chapter provides an overview of the most important results and research implications derived from the three previous chapters followed by a discussion of the managerial implications. Finally, different possible directions for future research are discussed.

5.1 Synopsis

Over the last decades, a large number of new products have been introduced, thereby improving or at least changing people's lives. However, many innovations meet consumer resistance when introduced in the market. This dissertation examined how consumers react to new products or services and why they accept or resist them. We focused on a number of specific research topics that were addressed in three consecutive empirical studies. In Chapter 2, we focused on consumers' reactions to radical innovations. More specifically, we study how consumers' comprehension, evaluation and adoption intention of radical innovations may be enhanced by bundling such products with existing products. Chapter 3 addressed the concept of forced adoption, which may be another cause of innovation resistance. This chapter presents and empirically tests a model to investigate the impact of "forcing" consumers to use technology-based self-service. Finally, in Chapter 4 we discussed how consumer expertise could have an aversive effect on the post-adoption evaluation of an innovation. In this chapter we differentiate technology expertise from service expertise and show how both types of expertise affect the evaluation of a new technology-based self-service. Table 5.1 further specifies the key findings of each study.

Table 5.1   Overview Empirical Studies in Dissertation

Chapter 2	
Research questions	• Does product bundling facilitate the comprehension, evaluation and adoption intention of radical innovations? • What role does perceived fit between the bundled products play? • What role does prior knowledge in the product domain play?

Key findings	• Product bundling plays an important role in the adoption process of radical innovations:
	   • Evaluation of a radical innovation is higher when this innovation is offered in a product bundle as opposed to when this innovation is offered separately.
	   • Adoption intention is higher when this innovation is offered in a product bundle as opposed to when this innovation is offered separately.
	   • However, no support was found for the effect of product bundling on the comprehension of a radical innovation.
	 • Perceived fit is a crucial condition: when consumers perceive low or moderate fit between the bundled products, their comprehension, evaluation and adoption intentions of the innovation is lower in comparison with when the innovation was offered separately.
	 • Prior knowledge in the product domain negatively moderates the positive effect of product bundling on:
	   • Comprehension (full support);
	   • Evaluation and adoption intention (indicative support).

Table 5.1   **(Continued) Overview Empirical Studies in Dissertation**

Chapter 3	
Research questions	• Does forced use of technology-based self-service (TBSS) lead to negative consequences, in terms of consumer attitudes as well as behavioral responses? • To what extent does a fall-back option help to offset the negative consequences of forced use? • What is the role of consumers' previous experience with technology in a "forced use" situation?

Key findings	• Forced use of a TBSS (vs. giving customers a choice in service delivery options) will result in less favorable attitudes toward using the TBSS and less favorable attitudes towards the service provider.
	• The more positive the attitude toward using the TBSS and attitude towards the service provider:
	   • the more likely that the consumer will engage in positive word-of-mouth;
	   • the less likely that the consumer will switch to another mode of service.
	• Attitudes partially mediate the relationship between perceived freedom of choice and word-of-mouth intentions and fully mediate the relationship between perceived freedom of choice and switching intentions.
	• The availability of interaction with an employee as a fall-back option in the case of forced use of a TBSS will lead to more positive attitudes toward using the TBSS and more positive attitudes toward the service provider.
	• Previous experience helps to establish a more positive attitude toward using the TBSS, but does not lead to a more positive attitude toward the service provider.
	• Results are robust over two contexts (buying a train ticket and obtaining travel information).

Chapter 4	
Research questions	• How does consumer expertise regarding technology affect the post-adoption evaluation of a new technology-based self-service (TBSS) in a forced use situation? • To what extent does service expertise moderate the effects of technology expertise on the evaluation of a new self-service? • What is the role of prior satisfaction with the service provider in the post-adoption evaluation of a new TBSS?

Key findings	• In a forced situation, technology expertise has a negative effect on post-adoption evaluation of a new TBSS (disconfirmation of expectations and evaluation of the service innovation).
	• Service expertise plays a role in the post-adoption evaluation of a new TBSS:
	   • Disconfirmation experienced by technology novices upon forced adoption of a TBSS is more positive for service experts, as compared to service novices.
	   • Disconfirmation experienced by technology experts upon forced adoption of a TBSS is more negative for service experts, as compared to service novices.
	• The negative effects of consumer expertise is reduced by high satisfaction with previous service encounters.
	• The negative effects of consumer expertise is conditional upon motivation to use TBSS options and time since adoption.

5.2 Discussion

In this dissertation, we have investigated three topics that relate to consumer adoption of, and resistance to, innovations. Innovation adoption is an information processing activity (Olshavsky and Spreng 1996). Literature indicates that information processing of new products depends on the characteristics of the innovation and its context (e.g., Rogers 2003; Alexander, Lynch, and Wang 2008), the stages of the innovation adoption process (e.g., Karahanna, Straub, and Chervany 1999), as well as the level of prior consumer knowledge (e.g., Moreau, Lehmann, and Markman 2001). Therefore, we have grouped the discussion of the research findings of this thesis into these three themes: innovation context, innovation adoption process, and consumer knowledge. First, we define innovation context as the type of innovation, the product domain in which an innovation is introduced or the situation under which an innovation is introduced. As such, these contexts are induced by the companies offering the innovation. Second, given the different innovation contexts, this dissertation offers implications with regard to the innovation adoption process and its relevant outcomes. Finally, consumer knowledge is central to this dissertation, as it plays an important role in the adoption of innovations. In the following, an overview is provided of the most relevant theoretical implications of this dissertation with regard to these three themes.

5.2.1 Innovation Context

This dissertation presents different innovation contexts that may lead to resistance to innovations. Although the contexts described in this thesis have become of increasing strategic importance for firms, they have yet received little attention in the innovation adoption literature. As such, this thesis provides an attempt to further investigate consumer reactions to and behavior in these innovation contexts.

Radical innovation - Chapter 2 of this thesis focuses on radical innovations. Radical innovations are defined as new products that involve substantially new technology, offer substantially greater customer benefits relative to existing products, and demand considerable changes to consumption or usage patterns (Chandy and Tellis 2000; Veryzer 1998). Although radical innovations are crucial for firms to enhance their competitive position and to safeguard their long-term success (McDermott and O'Connor 2002), from a consumer point of view, consumer resistance to radical innovations may be high. When innovations are very different from existing products (in terms of technology and benefits offered) and a new product category is created, consumers may fail to grasp its significance (Aggarwal, Cha, and Wilemon 1998). Therefore, despite their supposed benefits, potential adopters experience difficulties in comprehending and evaluating

radical innovations. Moreover, given the increasingly important role of radical innovation, it is clear that more insight is needed into how consumer resistance to radical innovations can be reduced. Our research in Chapter 2 demonstrates that product bundling may be a powerful tool to facilitate the adoption of radical innovations. We find that product bundling enhances the radical innovation's evaluation and adoption intention. When a radically new product is offered in a bundle together with a complementary existing product, it creates a context in which consumers recognize the utility of the innovation.

Technology-based self-service – Most innovation adoption studies incorporate products. Services are rarely studied, despite the fact that many of the new products introduced during the past few decades have been services, rather than durable goods (Libai, Muller, and Peres 2009). Moreover, Vargo and Lusch (2004) argued that marketing has shifted toward a new dominant logic, in which service provision, rather than goods, is fundamental to economic exchange. According to the authors: "This service-centered dominant logic implies that value is defined by and co-created with the consumer rather than embedded in output" (p. 6) and "both marketing practitioners and academics are shifting toward a continuous-process perspective, in which separation of production and consumption is not a normative goal, and toward a recognition of the advantages, if not the necessity, of viewing the consumer as a co-producer" (p. 11). Encouraging customers to be "co-producers" is regarded as the next frontier in competitive effectiveness (Bendapudi and Leone 2003), and service providers increasingly employ new technologies to encourage consumers to perform services by themselves. As such, technology-based self-service plays an important role in this dissertation. These are the objects of study in Chapters 3 and 4. By explicitly focusing on technology-based self-service, we recognize the growing importance of services in the marketing of new products.

Forced adoption - Companies increasingly replace traditional products or services with technology-infused products or services, sometimes even imposing these technologies on their customers. However, little is known about the effects of forced adoption. In this thesis, we pay attention to these forced adoption situations in Chapters 3 and 4. This dissertation offers several implications related to a forced adoption context. First, in a forced adoption context, people must leave their habits and adopt a different routine. This means that people are forced to change their behavior, which in turn leads to resistance to change. Chapter 3 finds that forcing consumers to use an innovation has severe, adverse effects on attitudes toward using this innovation and towards the company offering this innovation. Despite the benefits of this innovation, the negative attitudes generated upon forced adoption are likely to move consumers away from using this innovation. Second, Chapter 4 shows that a forced context may also offer opportunities to introduce innovations to people who otherwise would not consider using

them (e.g., people who are unfamiliar with the technology). We found that technology novices experienced a more positive disconfirmation of expectation upon forced adoption of a new technology-based self-service, compared to technology experts.

5.2.2 Innovation Adoption Process and Outcomes

The topics in this thesis focused on the different stages of the innovation adoption process. First, Chapter 2 pays attention to the pre-adoption stages (i.e., comprehension, evaluation, and adoption intention) and reflects the resistance that may occur due to the amount of cognitive processing that a consumer needs to do, in the context of the innovation (Veryzer 1998). The complexity of innovations is likely to discourage consumers from progressing through the innovation adoption process. Evaluation is an important stage in the adoption process, as product purchase probability is affected by consumer evaluations of the product (Calantone, Chan, and Cui 2006). Tools that help to diminish resistance early in the adoption process, when consumers are confronted with the innovation, and that help to improve consumer evaluations of the innovation, strongly determine whether a consumer will proceed towards adoption of the innovation. In this respect, in Chapter 2 we demonstrated that product bundling may act as such a tool to facilitate the adoption process. We found that product bundling has a positive effect on the comprehension and evaluation of the radical innovation. In turn, this may lead to an increased adoption intention of the radical innovation. In addition, the findings in Chapter 2 point to the critical role of perceived product fit between the bundled products. Bundling products with a high perceived fit enable effective information processing. Fit between the bundled products establishes a learning effect of the radical innovation in the product bundle, and can enhance the value and utility of the products when the two products get used together. In contrast, the study in Chapter 2 demonstrates that bundling even has a negative effect when consumers perceive a low or moderate fit between the products in a bundle. As such, product bundling as an instrument to facilitate the adoption process may even be counterproductive if the critical role of perceived product fit is ignored.

Chapter 3 pays attention to how a mandated adoption decision affects attitudes and subsequently behavioral intentions. Therefore, this study does not focus on how attitudes and intentions may lead to adoption, but shows how attitudes and behavioral intentions are formed after a forced adoption decision was made. As mentioned before, the empirical study found that forcing consumers to use technology-based self-service has adverse effects on consumer attitudes, but also that these negative attitudes resulting from forced use are translated into reduced (positive) word-of-mouth intentions

and increased switching intentions. Mediation analysis shows that attitudes (partially) mediate the relationship between perceived freedom of choice and word-of-mouth intentions and switching intentions. As a result, this study shows that forced use of an innovation can also induce negative behavioral consequences for the service provider, like reduced positive word-of-mouth about the service provider and a loss of customers to a competitor. However, on the other hand, Chapter 3 shows that offering an increasing number of choice options does not linearly contribute to more positive attitudes and behavioral intentions. All that consumers seem to want is some choice. This is in line with literature that suggests that having a limited and more manageable set of choices may be more intrinsically motivating than having an overly extensive set of choices; adding more choice alternatives may result in choice overload (e.g., Iyengar and Lepper 2000; Walton and Berkowitz 1985).

In addition to Chapter 3 that focuses on consumers' direct reactions to a mandated adoption decision, Chapter 4 pays attention to the post-adoption evaluation of innovations after usage. Although the adoption process itself has gained considerable attention in the literature, knowledge on innovation usage and post-adoption processes is relatively scarce (a recent exception is the use-diffusion model developed by Shih and Venkatesh 2004). Especially in a forced situation, post-adoption evaluations become more important than adoption intentions. In addition, the ultimate adoption of an innovation is dependent on an individual's experience from using it. Chapter 4 focuses on the disconfirmation of expectations and evaluation of a new technology-based self-service after forced usage. We demonstrate that the post-adoption evaluation of a technology-based self-service can turn out differently than the pre-adoption evaluation for different consumer groups. More specifically, we show that technology expertise, which often plays a facilitating role in the acceptance and evaluation of innovations (e.g., Meuter et al. 2005), might have an adverse effect on the post-adoption evaluation of a new technology-based self-service.

5.2.3 Consumer Knowledge

Consumer knowledge plays a central role in this thesis. Ratchford (2001) explains how differences in consumption patterns and consumer choices are due to differences in consumer knowledge or expertise. In line with this, this dissertation shows that there are differences in the evaluation of innovations and subsequent behavioral intentions between consumers with low versus high prior knowledge in a certain domain. Chapter 2 focuses on prior knowledge in a product domain. The facilitating effect of product bundling on outcomes related to the innovation adoption process occurs among

consumers with low prior knowledge, but not among those with high prior knowledge. This beneficial role of pre-assembled bundles for consumers with little prior knowledge is consistent with previous studies, in the sense that such consumers make greater use of the evaluation of others when making purchase decisions (Harris and Blair 2006b). In contrast, we find that consumers with expertise in a product domain value an innovation significantly lower when bundled with another product. This finding is in concordance with a recent study that shows that experts are more likely to choose customized over standardized systems because they have better insight into their own preferences (Bharadwaj, Naylor, and Ter Hofstede 2009). In addition, Wood and Lynch (2002) suggest that consumers with high prior knowledge in a certain product domain might be influenced by overconfidence and the feeling that they already know how a new product works. Therefore, they will more selectively process information and rely more on self-generated inferences. In the end, this might inhibit the facilitating effect of bundling on learning about the new product for these consumers.

In Chapter 4 we build upon this by focusing on consumer expertise as a crucial consumer variable that plays a role in an innovation's post-adoption evaluation. Although Wood and Moreau (2006) already showed that under certain circumstances inexperienced consumers can experience positive disconfirmation by finding an innovation easier to use than expected, our study extends this idea by showing that expertise can even negatively affect disconfirmation of expectations and evaluations of a new technology-based self-service. Based on the idea that experts tend to have inaccurate and overconfident expectations about usability, and that this may lead to a more negative disconfirmation of expectations, we found that expertise has a negative effect on post-adoption evaluation of a new technology-based self-service in a forced situation. In addition, this study makes a distinction between different types of expertise. With regard to self-services, customers could not only have experience with the technology, but also with the service itself. Chapter 4 looks at service expertise and tests a model in which both technology expertise and service expertise are distinguished. Results show that post-adoption evaluation by technology experts was more negative for service experts, compared to service novices, while post-adoption evaluation by technology novices was more positive for service experts, compared to service novices. In other words, service expertise appears to be an advantage for customers with low technology expertise, whereas it is a disadvantage for customers with high levels of technology expertise. In sum, this study showed that different types of expertise might affect each other by strengthening their effect on the evaluation of an innovation in a more positive or in a more negative way.

Finally, Chapter 3 incorporates the role of prior experience with technology-based self-service as an important factor in the reaction to forced use of technology-based self-service. Consumers who had previous experience with technology-based self-service in general were found to have less negative attitudes toward using the new self-service prior to adoption. This finding supports previous literature on the role of consumer expertise in the adoption of innovations and extends it to the forced-use situation.

5.3 Managerial Implications

As the strategic and financial importance of launching new products increases, a better understanding of the consumer's innovation adoption process can lead to more effective segmentation, positioning, and launch strategies (Moreau et al., 2001). The results found in Chapters 2, 3, and 4 offer several practical implications related to the reduction of consumer resistance towards innovation.

5.3.1 Overcoming Cognitive Usage Barriers

Developing a systems perspective to market the innovation can level cognitive usage barriers. After all, any new product or service interacts with other products used and other activities performed by the customer. Product bundling may be one of the possible strategies that can establish such a systems perspective. Chapter 2 shows that product bundling represents a suitable strategy for enhancing benefits and reducing learning costs for radical innovations. For example, marketers can reduce perceived complexity by emphasizing the familiarity of the bundled product and at the same time enhance the perceived benefits of the new product by emphasizing the added value of the new product. Because fit is a crucial condition to ensure that bundling helps enhance evaluation of radically new products, companies should emphasize the fit between the innovation and the bundled product, for example, in advertisements. Images of both products packaged together might further emphasize their fit. Note, however, that to emphasize perceived fit explicitly, these strategies demand a more than moderate degree of "natural" congruity between products. In that sense, the bundles should be true product bundles. Alternatively to selling pre-packaged product bundles, companies can emphasize how an innovation is related to familiar products in their marketing communications, such as by explicitly stating how the innovation can be used together with, or complementary to, existing products.

5.3.2 Facilitating Forced Adoption

With forced use, consumers apparently feel frustrated about not having any choice and develop negative attitudes toward using the innovation and toward the firm offering the innovation. This dissertation suggests possible strategies a company can use to mitigate the negative consequences of forced usage. First, companies can offer fall-back options. Chapter 3 found that offering interaction with an employee as a fall-back option reduces the negative effects of forced use of technology-based self-service. Fall-back options create a sense of greater choice and lead to more favorable attitudes towards the innovation. For example, the company offering the innovation might set up a fall-back option to be used in case of emergencies, such as machine failure or product breakdown. A feature on technological innovations might allow customers to interact with a help desk if needed. Alternatively, customers might be free to call a help desk or special service line with employees that are trained to help the customers that are learning to use the technology.

In addition, Chapter 4 shows that prior satisfaction with the service provider might act as a buffer to forced usage of new services, as satisfaction positively affects customers' post-adoption evaluations of new self-services. Especially for technology novices, we found a beneficial effect of prior satisfaction with the service provider on post-adoption evaluation of the new service. As such, marketing strategies that seek to increase customer satisfaction may help to improve customers' post-adoption evaluations of an innovation, upon forced adoption. In addition, firms can obtain insight into which customers are particularly satisfied or dissatisfied, by evaluating customer satisfaction on a periodic basis.

5.3.3 Using a Segmented Approach

Companies can use differences in the evaluation of innovations between consumers with low versus high prior knowledge to segment their market into relatively homogeneous groups that can be targeted. For example, when customers can be divided into low and high prior knowledge customers, product bundles might then be used to increase purchase intention of radical innovations for those segments that have relatively little knowledge. Product bundling may be used in this segment to help them understand the innovation and shape positive attitudes. For customers with little knowledge in the product domain, offering a radical innovation in a product bundle should not only yield direct benefits for the firm offering the innovation in terms of increased sales, but can also stimulate future cross-sell and/ or up-sell opportunities.

Moreover, consumer expertise also plays a role in a forced adoption context. As mentioned previously, technology expertise can be counterproductive in the post-adoption evaluation of innovations. In addition, we found that service expertise plays a role in the post-adoption evaluation of a new technology-based self-service. Disconfirmation experienced by technology novices was more positive for service experts, compared to service novices. In contrast, disconfirmation experienced by technology experts upon forced adoption of a new self-service was more negative for service experts, compared to service novices. Based on these findings, firms should carefully consider the role of consumer expertise when forcing their customers to use a new technology-based self-service. For example, if customers with high technology and service expertise represent a large portion of the provider's customer base, the provider might decide to offer alternative service delivery modes, to minimize negative consequences. Alternatively, service providers could decide to first "force" service-only or technology-only experts to migrate to a new self-service. In this regard, the research findings of Chapter 4 suggest specific strategies for considering when to introduce technology-based self-service, depending on the combined levels of technology expertise and service expertise.

5.4   Directions of Future Research

This section discusses different possible directions of future research. Given the extent of research already present on innovation, and new product adoption and consumer resistance in particular, we will only focus on those issues that are most relevant for future research in this field, based upon the studies presented in this thesis.

5.4.1   Drivers of Resistance

This dissertation focuses on perceived control and current consumption habits as two drivers of consumer resistance to innovations. Based on these drivers, the following suggestions for future research can be offered.

Perceived control - The loss of autonomy or control is one of the key instigators of consumer resistance to innovations (Ellen, Bearden, and Sharma 1991). In the psychological literature three different types of control can be distinguished: behavioral control (affording the possibility of "direct action on the environment"), decisional control ("having a choice among alternative courses of action"), and cognitive control (possibility of interpreting potentially threatening information in a more benign manner) (Averill 1973). In Chapter 3 of this dissertation, we focus on consumers' lack of choice in the forced use of self-service technologies. As such, forcing consumers to use new

technologies will impact their levels of decisional control. However, behavioral control and cognitive control might also play a role in the evaluation of innovations. Future research may come up with a more extensive framework of control and its role in causing or releasing consumer resistance to innovations. For example, Mick and Fournier (1998) already demonstrated that technological innovations can help consumers to feel more in control, but at the same time can contribute to consumer perceptions of losing control. In addition, future research may further elucidate consumers' underlying motivations for control and how these motivations can be addressed when introducing an innovation. For example, autonomy may be an important underlying motivation for control, whereas in other situations self-confidence or self-efficacy may be more prominently underlying motivations. Finally, perceived control with regard to innovations may differ between different types of consumers. For example, technologically proficient customers perceive a higher sense of control and greater quality when using a technological innovation, whereas those resistant to new technologies experience the opposite. Future research might try to further disentangle what types of control play a role in the adoption of innovations, dependent upon different consumer characteristics.

Consumption habits - One of the main aspects evoking consumer resistance to innovations are consumption habits (Sheth 1981). As we saw in Chapter 3, forcing consumers to leave their habits and adopt new behaviors can have aversive consequences. In addition, the adoption of innovations that do not fit within existing routines or habits tend to be very difficult (see Chapter 2). In sum, consumption habits hinder the adoption of new products or services. Moreover, research shows that about 45% of consumer behavior consists of habitual behavior that is repeated frequently and usually in the same context (Wood and Neal 2009). However, although playing an important role in consumer choice, strikingly few studies have focused on the role of habits in determining the acceptance of innovative products or services and, more importantly, how these habits can be changed so that new behaviors can be adopted. For example, studies in consumer psychology show that breaking habits becomes easier when contexts change, so that old cues no longer activate the habitual behavior (Verplanken and Wood 2006). Future studies might investigate how firms can create a context that may help to break these habits. In addition, studies have looked at conditions under which consumers attribute more or less value to their habits. For example, a recent study by Wood (2010) found that compared to consumers who are in a stable life situation, consumers who are in the midst of many changes (such as a new job or new house) are inherently more open to new options. Likewise, future research might investigate other individual differences that may affect how consumers change their habits to adopt new products or services. Finally, closely linked to research on habitual

behavior is recent research in social psychology that highlights the automatic nature of many choices in consumer behavior (e.g., Dijksterhuis et al. 2006). For example, these studies show evidence of automatic mimicry of the observable behaviors of others (Dijksterhuis et al. 2005), emotional contagion (Ramanathan and McGill 2007), and automatic behavior, due to brand exposure (Fitzsimons, Chartrand, and Fitzsimons 2008). In order to better understand why some innovations are more successfully accepted in the market than others, it may be useful to look at the role of automatic behavior in individual's adoption process of innovations, and how these automatic behavioral responses can be influenced.

5.4.2 Innovation Usage and Post-Adoption Evaluations

According to Rogers (2003), consumers discontinue the use of a new product or service either because of disenchantment or because of replacement. Whereas replacement will mostly happen among innovative adopters who move on to a newer technology, disenchantment will most likely occur among later adopters because of disconfirmation or frustration with the technology. In an online service context, Parthasarathy and Bhattacherjee (1998) demonstrated that disenchantment discontinuance is the most common type of disadoption. Many people adopt innovations without thoroughly thinking about the consequences of using the innovation, or because they have certain expectations about its benefits. After they start using the innovation, a number of these consumers become disappointed because either the product did not perform as they had expected or the product failed to fulfill desired goals. For example, this is one of the central themes of chapter 4, in which we showed how the disconfirmation of expectations differs between experts and novices. However, literature shows that many customers who are dissatisfied with a new product or service do nothing about it (Stephens and Gwinner 1998; Voorhees, Brady, and Horowitz 2006): they do not take their complaints to the company. Consequently, these customers stay unnoticed by companies. At the same time, these customers exhibit other behaviours (like disposing of products, negative word-of-mouth or undesired crossover effects) that could harm companies by negatively affecting the diffusion and product life cycle of a new product. Therefore, insight into why users become disappointed and how these negative outcomes can be converted into positive outcomes gives new product managers important information. The following suggestions for further research related to post-adoption phenomena are offered.

Emotions – Emotions are an important component of consumer response, and the importance of emotions in the sphere of consumer behavior has been established

(Bagozzi, Gopinath, and Nyer 1999; Richins 1997). Consumption emotions are driven by both actual product performance and a function of disconfirmation of expectations (Phillips and Baumgartner 2002). However, recent literature in marketing tends to primarily focus on positive emotions in relation to customer satisfaction and delight (Chitturi, Raghunathan, and Mahajan 2008). Far less insight is obtained into the effects of negative emotions on customer behavior. For example, anger, regret and disappointment are negative emotions triggered by the use of innovations. Future research might offer insight into the role of negative emotions in discontinuance behavior. In addition, research might examine what types of (negative) emotions are dominant and to what type of product evaluations these emotions can be attributed.

Coping strategies - Unexpected product or service performance can create stressful situations that should be managed (Duhachek 2005). These coping strategies that are prompted by innovations are worthy of further investigation (Moschis 2007). To the best of our knowledge, there is no research that investigates the role of coping strategies in an innovation adoption context. An exception is the study by Mick and Fournier (1998), although their focus is solely on new technologies and they did not test their framework quantitatively. Future research might aim to establish answers to questions like: What coping strategies do consumers have in response to innovations and disappointing usage experiences? To what extent can these coping strategies be related to specific emotions or adoption outcomes? What firm-related behavioral outcomes of these coping strategies can be distinguished, like complaining, product returns, or switching behavior?

Innovation recovery - Innovation recovery is here defined as the action an organization takes in response to customer dissatisfaction with regard to a certain innovation. As such, innovation recovery can be treated as a bundle of resources that an organization can employ in order to turn customer dissatisfaction into satisfaction. Future studies may investigate what possible innovation recovery strategies can be distinguished, for example, based on insights from the service recovery literature, and may help to establish the effectiveness of the various recovery strategies in different contexts.

This dissertation addresses some of the issues related to consumers' acceptance of, and resistance to, new products. It offers yet another step toward improving our understanding of the evaluation of new products and services among consumers.

Summary

Many new products and services are being introduced to the market. This dissertation examines how consumers react to these new products or services and why they accept or resist them. More specifically, in three consecutive empirical studies, we focus on a number of specific research topics that have yet received little attention in the innovation adoption literature: (1) consumers' reactions to radical innovation, (2) forced adoption of innovations, and (3) post-adoption evaluation of innovations. In addition, many of the innovations introduced during the past few decades have been services rather than products and these technology-based service innovations have become a critical component of customer-firm interactions Therefore, these types of innovations play an important role in this dissertation and are objects of study in two out of the three empirical chapters.

The central objective of this thesis is to examine consumers' reactions to radical innovations and forced adoption of (service) innovations, and to create more insight into how resistance towards these innovations can be managed. In the three empirical chapters, the following research questions are answered:

- Does product bundling facilitate the comprehension, evaluation and adoption intention of radical innovations?
- Does forced use of technology-based self-service lead to negative consumer attitudes to the technology, as well as to the service provider, and does it have negative consequences for the service provider in terms of behavioral responses of the consumer?
- Does consumer expertise have a negative effect on the post-adoption evaluation of a new technology-based self-service in a forced use situation?

Bundling Radical Innovations

Radical innovations are not easily adopted in the market. Potential adopters experience difficulties comprehending and evaluating radical innovations, due to their newness in terms of technology and benefits offered. Consequently, adoption intentions may remain low. Chapter 2 proposes bundling as an instrument to address these problems. More specifically, this chapter examines how bundling such products with existing products may enhance consumer comprehension, evaluation and adoption intention of radical innovations. The results of an experimental study provide evidence of this effect, contingent upon the level of fit perceived to exist between the radical

innovation and the product that accompanies it in the bundle. This study demonstrates that comprehension, evaluation and adoption intention of the innovation even decrease when consumers perceive a low or moderate fit between the products in a bundle. This finding suggests that bundling products with lower perceived fit inhibit effective information processing, which is likely to discourage consumers from progressing through the innovation adoption process.

In addition, the effects of bundling on consumer appraisals of radical innovations are also shown to depend on the level of prior knowledge consumers possess regarding the product category of the radical innovation. More specifically, if bundled with a familiar product, novices tend to evaluate the innovative product more positively, but for experts no such effect can be detected.

In sum, Chapter 2 shows that product bundling represents a suitable strategy for companies that target customers with little or no prior knowledge in the product domain for enhancement of benefits and reduction of learning costs for radical innovations. Because product fit is a crucial condition to ensure that bundling helps enhance evaluation of radically new products, companies should emphasize the fit between the innovation and the bundled product, for example by showing or explaining how both products can be used together or complement each other.

Forced Use of Technology-Based Self-Service

Today, traditional full-service is increasingly replaced with technology-based self-service, sometimes with no other option for service delivery. Technology-based self-services, like touch screens, ticket machines, online banking, or self-service check-in, allow customers to perform (parts of) the service, by themselves. However, little is known about the effects of "forcing" consumers to use technology-based self-service. Chapter 3 develops a conceptual model to investigate the impact of forced use of technology-based self-service. The model is tested using an experimental design within railway contexts (ticketing and travel information). The results show that forced use leads to negative attitudes toward using the technology-based self-service, as well as toward the service provider, and indirectly leads to reduced (positive) word-of-mouth intentions and increased switching intentions. On the other hand, this study shows that offering an increasing number of choice options does not linearly contribute to more positive attitudes and behavioral intentions. These results suggest that it is not necessary to offer a whole range of choices of service delivery options, as the benefits may be incremental.

The findings of this study also show that offering interaction with an employee as a "fall-back" option offsets the negative consequences of forced use. A fall-back option

(vs. no fall-back option) leads to significantly more positive attitudes toward using the self-service, as well as more positive attitudes towards the service provider. In addition, previous experience with technology-based self-service (in general) leads to more positive attitudes toward the offered self-service, but does not lead to a more positive attitude toward the service provider.

The results of this study show that to avoid the negative repercussions of forcing consumers to use technology-based self-service, service providers need to carefully consider if forced use of a technology-based self-service option is warranted. If so, service providers can mitigate the negative consequences by offering interaction with an employee as a fall-back option, or by targeting the forced use of technology-based self-service to those customers with considerable experience in using self-service technologies in general, to partly offset the negative consequences of forced use.

Consumer Expertise and Post-Adoption Evaluations

Although generally found to be advantageous in the adoption of technology-based self-services, Chapter 4 shows that consumer expertise can also have an adverse effect on the post-adoption evaluation of an innovation, specifically in cases of forced adoption. Consumers can have expertise with the technology, with the service, with both, or with none of them. This study demonstrates how both technology expertise and service expertise affect evaluation following forced use of a technology-based self-service in the transportation sector. In support of our hypotheses, we find that in a forced adoption context technology expertise has a negative effect on post-adoption evaluation of a new self-service.

Moreover, by disentangling technology expertise and service expertise, this study showed that evaluations by technology novices, upon forced adoption of a technology-based self-service, are *more positive* for service experts than for service novices, while evaluations by technology experts are *more negative* for service experts than for service novices. In other words, service expertise appears to be an advantage for customers with low technology expertise, whereas it is a disadvantage for customers with high levels of technology expertise. As a consequence, firms should thus carefully consider the roles of technology and service expertise when forcing their customers to use a new self-service option.

Finally, this chapter showed that prior satisfaction with the service provider might act as a buffer to forced usage of new services, as satisfaction positively affects customers' post-adoption evaluations of new self-services. As such, marketing strategies

that seek to increase customer satisfaction may help to improve customers' post-adoption evaluations of an innovation, upon forced adoption.

General Conclusions

As more and more companies are involved in launching new products or services into the market, a better understanding of consumer innovation adoption processes is needed. In this dissertation, we have investigated three topics that relate to consumer adoption of and resistance to innovations. The empirical studies in this dissertation present different innovation contexts that may lead to resistance to innovations (i.e., radical innovations, technology-based service innovations, and forced adoption). Although these contexts have become of increasing strategic importance for firms, they have yet received little attention in the innovation adoption literature. Furthermore, the topics covered in this thesis focused on the different stages of the innovation adoption process. Although the adoption process itself has gained considerable attention in the literature, knowledge on post-adoption processes is relatively scarce. We therefore not only looked at consumer reactions to innovations in a pre-adoption context, but also looked at post-adoption evaluations, in one of the chapters. Finally, consumer knowledge plays a central role in this thesis. This dissertation shows that there are differences in the evaluation of innovations and subsequent behavioral intentions between consumers with low versus high prior knowledge in a certain domain. More importantly, we demonstrate that experts and novices may react differently to an innovation depending on the context of that innovation and the stage of the adoption process. In addition, we showed that consumers might possess different types of expertise, which may have mutual interactions on the evaluation of an innovation.

The insights obtained in this thesis may help companies to implement more effective segmentation and positioning strategies of their innovations and offer yet another step toward improving our understanding of the evaluation of new products and services among consumers.

Nederlandse samenvatting (Summary in Dutch)

Het managen van weerstand van consumenten tegen innovaties

De afgelopen decennia zijn er veel nieuwe technologische producten en diensten geïntroduceerd op de markt. In dit proefschrift is onderzocht hoe consumenten reageren op deze nieuwe producten of diensten en waarom deze innovaties weerstand kunnen oproepen. Hierbij is in drie opeenvolgende empirische studies gekeken naar een aantal specifieke onderwerpen waar relatief weinig aandacht aan is besteed in de literatuur: (1) reacties van consumenten op radicale innovaties, (2) gedwongen gebruik van innovaties, en (3) de evaluatie van innovaties na gebruik (zogenaamde post-adoptie evaluatie). Daarnaast is het zo dat veel van de in de afgelopen decennia geïntroduceerde innovaties diensten waren in plaats van producten en deze op technologie gebaseerde vormen van dienstverlening (hierna aangeduid als technology-based self-service) zijn een kritische component geworden in de interactie van dienstverleners met hun klanten. Daarom spelen deze typen innovaties een belangrijke rol in dit proefschrift en zijn ze onderwerp van studie in twee van de drie empirische hoofdstukken.

De centrale doelstelling van het proefschrift luidt: het onderzoeken van de reactie van consumenten op radicale innovaties en gedwongen adoptie van (diensten)innovaties en het creëren van meer inzicht in hoe de weerstand tegen deze innovaties kan worden beïnvloed. In de drie empirische hoofdstukken worden de volgende onderzoeksvragen beantwoord:

1. In welke mate faciliteert productbundeling het begrip, de evaluatie en de adoptie intentie van radicale innovaties?
2. Heeft gedwongen gebruik van op technology-based self-service een negatief effect op de houding van de consument ten opzichte van de technologie en de dienstverlener en heeft dit negatieve gevolgen voor de dienstverlener in termen van de gedragsintenties van de consument?
3. In hoeverre heeft expertise van consumenten een negatief effect op de post-adoptie evaluatie van een nieuwe technology-based self-service in een situatie van gedwongen gebruik?

Het bundelen van radicale innovaties

Radicale innovaties worden niet gemakkelijk geaccepteerd in de markt. Potentiële gebruikers ervaren moeilijkheden om radicale innovaties te begrijpen en te evalueren,

juist omdat deze innovaties zo nieuw en anders zijn qua technologie en gebruikstoepassingen. Als gevolg hiervan blijft de adoptie-intentie voor dergelijke producten vaak laag. Hoofdstuk 2 kijkt naar productbundeling als een instrument om deze problemen het hoofd te bieden. De centrale onderzoeksvraag daarbij is of de kennis, de evaluatie en de adoptie-intentie van radicale innovaties verhoogd kan worden door deze innovaties te bundelen met bestaande producten. De resultaten van een experimentele studie geven inderdaad aan dat bundeling een positief effect heeft. Dit effect is wel afhankelijk van de mate waarin de radicale innovatie en het product dat ermee wordt gebundeld bij elkaar passen (dit wordt ook wel "product fit" genoemd). Sterker nog, bundelen kan zelfs averechts werken wanneer er in de ogen van de consument weinig overeenkomst bestaat tussen de gebundelde producten. Het bundelen van producten met weinig overeenkomst zou wel eens het effectief verwerken van informatie in de weg kunnen staan, waardoor consumenten ontmoedigd wordt om verder te gaan nadenken of ze het product wel of niet willen gaan aanschaffen en gebruiken. Naast de gepercipieerde 'fit' tussen de gebundelde producten hangt het effect van bundelen op de acceptatie van radicale innovaties ook af van de mate van kennis die consumenten al hebben van de productcategorie. Als de radicale innovatie gebundeld is met een bekend product, dan neigen onervaren consumenten ernaar om de innovatie meer positief te evalueren, terwijl dit effect niet voor experts geldt.

Samenvattend, voor bedrijven die zich richten op consumenten met weinig tot geen kennis in het productdomein, laat hoofdstuk 2 zien dat productbundeling een geschikte strategie kan zijn om de voordelen van radicale innovaties te versterken en consumenten de werking en het doel van het product sneller aan te leren. Omdat het cruciaal is dat de gebundelde producten goed op elkaar aansluiten, dienen bedrijven de overeenkomst tussen de radicale innovatie en het gebundelde product te benadrukken, bijvoorbeeld door te laten zien of uit te leggen hoe beide producten gezamenlijk gebruikt kunnen worden of elkaar aan kunnen vullen.

Gedwongen gebruik van self-services

Vandaag de dag wordt de traditionele vorm van dienstverlening (bijvoorbeeld aan het loket) steeds vaker vervangen door technology-based self-service. Technology-based self-service (TBSS) stelt de klant in staat om (een deel van) de dienst zelf uit te voeren. Voorbeelden van TBSS zijn geld- of ticketautomaten, Internet bankieren, maar ook het online inchecken. Soms is deze vorm van zelfbediening zelfs de enige optie om gebruik te kunnen maken van een dienst. Er is echter nog weinig onderzoek gedaan naar de effecten van gedwongen gebruik van TBSS. De studie in hoofdstuk 3 presenteert een model waarin

wordt gekeken naar de invloed van gedwongen gebruik van TBSS. Het model is getest via een experimenteel onderzoek in de context van het openbaar vervoer (de trein). Hierbij is naar twee verschillende diensten gekeken, namelijk het kopen van een vervoersbewijs en het verkrijgen van reisinformatie. De resultaten laten zien dat gedwongen gebruik van een TBSS tot een negatieve houding van de consument ten opzichte van zowel de TBSS als de dienstverlener leidt. Bovendien kan gedwongen gebruik er indirect ook toe leiden dat de klant minder snel geneigd is iets positiefs over de dienst aan anderen te vertellen en eerder geneigd is over te stappen of te stoppen met het gebruik van de dienst. Aan de andere kant laat deze studie zien dat het aanbieden van meer dan twee opties om gebruik te maken van de dienst (bijvoorbeeld een traditionele balie en twee vormen van TBSS) niet vanzelfsprekend tot nog positievere houding en gedragsintenties van de klant leidt. Deze uitkomsten suggereren dat het niet noodzakelijk is om een hele reeks van keuzemogelijkheden aan te bieden voor het afnemen van de dienst, zolang de klant maar enige keuze heeft. De resultaten laten ook zien dat wanneer de klant de mogelijkheid wordt geboden om toch nog op de een of andere manier contact met een medewerker te krijgen (een zogenaamde "fall-back" optie), de negatieve effecten van geforceerd gebruik voor een groot deel ongedaan gemaakt kunnen worden. Een "fall-back" optie leidt er namelijk toe dat de klant een significant positievere houding krijgt ten opzichte van de dienst en de dienstverlener in vergelijking met de situatie waarin zo'n "fall-back" optie niet aangeboden wordt. Ten slotte vinden we in deze studie dat ervaring met andere vormen van 'self-service' weliswaar tot meer positieve attitudes ten opzichte van de dienst zelf leidt, maar niet tot meer positieve attitudes ten opzichte van de dienstverlener.

De resultaten van deze studie laten zien dat om de negatieve gevolgen van gedwongen gebruik van TBSS te vermijden dienstverleners zorgvuldig zullen moeten afwegen of het op die manier opdringen van diensten aan hun klanten wel gerechtvaardigd is. Indien dienstverleners er toch voor kiezen alleen diensten op basis van zelfbediening aan hun klanten aan te bieden kunnen zij de negatieve gevolgen van geforceerd gebruik nog verzachten door interactie met een medewerker als "fall-back" optie aan te bieden of door zich te richten op klanten met behoorlijke ervaring met betrekking tot het gebruik van TBSS. Hoewel deze laatste strategie geen garantie op succes geeft, zoals ook uit het volgende hoofdstuk zal blijken, bestaat er een kans dat dit de negatieve effecten van geforceerd gebruik enigszins kan reduceren.

Expertise en post-adoptie evaluaties

Hoewel expertise in het algemeen als een voordeel wordt gezien als het gaat om de acceptatie van TBSS, laat de studie in hoofdstuk 4 zien dat expertise ook een nadelig effect kan hebben op de evaluatie van een innovatie na gebruik (de zogenaamde post-adoptie evaluatie), vooral in het geval van gedwongen adoptie. Consumenten kunnen ervaring hebben met de technologie (technologie-expertise), met de dienst (dienst-expertise), met beide, of met geen van beide. Deze studie laat zien hoe zowel technologie-expertise en dienst-expertise de evaluatie van een TBSS in de vervoerssector beïnvloeden. In overeenstemming met de hypothesen, vinden we dat technologie-expertise een negatief effect heeft op de evaluatie van TBSS na geforceerd gebruik. Bovendien, wanneer we het onderscheid maken tussen technologie-expertise en dienst-expertise, laat deze studie zien dat de evaluaties van mensen met weinig expertise met betrekking tot de technologie *meer positief* zijn voor degenen die veel dienst-expertise hebben dan voor degenen met weinig dienst-expertise. Voor technologie-experts daarentegen is de post-adoptie evaluatie *meer negatief* voor degenen die veel dienst-expertise hebben dan voor degenen die weinig dienst-expertise hebben. Expertise met betrekking tot de dienst lijkt dus in het voordeel te werken voor consumenten met weinig kennis van de technologie, terwijl het een nadeel is voor consumenten met veel kennis van de technologie. Als gevolg hiervan dienen bedrijven zorgvuldig de expertise van hun klanten met betrekking tot de techniek en de dienst in beschouwing te nemen wanneer zij hun klanten willen dwingen om een nieuwe self-service te gaan gebruiken.

Tot slot laat dit hoofdstuk zien dat tevredenheid van de klant met de dienstverlener een positief effect heeft op de post-adoptie evaluatie van de nieuwe technology-based self-service. Klanttevredenheid fungeert daarmee als een buffer tegen nieuwe negatieve ervaringen. Marketingstrategieën die gericht zijn op het vergroten van de klanttevredenheid kunnen helpen om de post-adoptie evaluatie bij gedwongen gebruik van een innovatie te verbeteren.

Algemene conclusies

Omdat meer en meer bedrijven nieuwe producten of diensten op de markt introduceren, is een beter begrip van het acceptatieproces van innovaties door de consument nodig. In dit proefschrift is gekeken naar drie onderwerpen die relateren aan de acceptatie van innovaties en de weerstand die innovaties bij consumenten kan oproepen. De empirische studies in dit proefschrift presenteren hiertoe verschillende voorbeelden van innovaties die weerstand bij de consument kunnen oproepen, namelijk

radicale innovaties, technologische innovaties op het gebied van dienstverlening en de context van het afdwingen van het gebruik van een innovatie. Hoewel deze verschillende innovaties en innovatiecontexten in toenemende mate van strategisch belang zijn voor bedrijven, hebben zij tot op heden nog weinig aandacht gekregen in de literatuur over de adoptie van innovaties. Dit proefschrift levert daarom een bijdrage door de reactie van consumenten op deze innovaties of in deze contexten verder te onderzoeken. Daarnaast richten de onderwerpen die in dit proefschrift aan bod komen zich op de verschillende fasen van het innovatie adoptieproces. Hoewel het adoptieproces op zichzelf redelijk wat veel besproken is in de literatuur, is de kennis van het evaluatieproces na adoptie van de innovatie relatief beperkter. Daarom hebben we in dit proefschrift niet alleen gekeken naar de reacties van consumenten ten aanzien van innovaties in een pre-adoptie context, maar hebben we ook evaluaties in een post-adoptie context in beschouwing genomen. Ten slotte speelt ook de kennis die consumenten hebben een centrale rol in dit proefschrift. In dit proefschrift wordt aangetoond dat er verschillen zijn tussen de evaluaties en de daaropvolgende gedragsintenties van consumenten met weinig en consumenten met veel kennis in een bepaald domein. We laten hierbij zien dat experts en nieuwkomers anders kunnen reageren op een innovatie afhankelijk van de context van die innovatie en de fase van het innovatie adoptieproces. Bovendien wordt aangetoond dat consumenten verschillende soorten van expertise kunnen hebben en deze een onderlinge wisselwerking hebben op de evaluatie van een innovatie.

Met de inzichten die in dit proefschrift zijn verworven kunnen bedrijven worden geholpen bij het implementeren van meer effectieve segmentatie- en positioneringstrategieën ten aanzien van hun innovaties. Bovendien leveren de resultaten van dit proefschrift een belangrijke stap in het vergroten van de kennis over hoe nieuwe producten en diensten door consumenten beoordeeld worden.

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