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MASTER

NPD speed and first-to-market
the innovator's response to radical innovations containing benefits and deficiencies

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NPD Speed and First-to-market: the Innovator’s Response to Radical Innovations Containing Benefits and Deficiencies

by

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In partial fulfillment of the requirements for the degree of

Master of Science

in Innovation Management

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Subject headings: NPD speed, first-to-market, product deficiencies, product benefits, consumer forgiveness, ambivalence, radical innovation, innovators.
“You can’t just ask customers what they want and then try to give that to them. By the time you get it built, they’ll want something new.”

-Steve Jobs, CEO Apple Inc.
The thesis you are about to read is the end result of my graduation project of the master Innovation Management at the Eindhoven University of Technology which I performed from the department of Innovation, Technology Entrepreneurship & Marketing (ITEM). With this preface I briefly want to take you through my exciting and turbulent journey which resulted in this report lying in front of you. After this journey, I want to show my gratitude towards the persons who supported me directly and indirectly in writing this report.

My journey started when I obtained my bachelor degree in Engineering at the Haagsehogeschool in The Hague. At that time I was 21 years old and believed that life was more than just having a bachelor degree. I wanted to expand my knowledge and decided to follow a master. This master was Innovation Management which was one of the best choices I have made because every firm needs to innovate to survive. During my time on the Tu/e I had spent a lot of time with classmates and friends performing challenging projects, discussing about divergent subjects, debating and having regular coffee breaks. But most importantly, my time on the TU/e has contributed to my personal development in critical thinking, analyzing and team work which will be valuable assets in my future career.

First of all, I want to thank my first supervisor Joost Wouters for his help, guidance and direction during the whole process. With his conceptual thinking he helped me develop my research subject. I also want to thank my second supervisor Jeroen Schepers for his critical and sharp comments regarding my thesis. Also without his expertise on programming I wouldn’t be able to randomly direct my respondents to different scenarios. Of course I also want to thank all the students who participated in my study. Without them I wouldn’t have any data at all. A special thanks to my former fellow students Jeroen Schilderman, Tim Bongard and Martijn Goossens for the time spent on the Tu/e. Together with them I performed many projects which resulted in a good evaluation but more importantly, we had fun doing all these projects together.

Rests me nothing else than to wish the reader a pleasant time reading this thesis.

Chase Alkemade

Brunssum, July 2011
Abstract

Manufacturing firms compete by speeding up their NPD process in order to be first-to-market and obtain pioneering benefits. However, NPD speed might negatively affect new product quality which can result in product deficiencies. This study revealed that for pioneers and followers, entering the market with a radical innovation containing a mix of benefits and deficiencies results in positive satisfaction levels. In addition, results suggest that innovators are more forgiving towards pioneers than followers considering an innovation with the same mix of benefits and deficiencies. Also, innovators have relative more conflicting feelings towards a radical innovation with a high level of benefits and deficiencies compared with an innovation with a low level of benefits and deficiencies. The former is accompanied with higher satisfaction levels.
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For those firms that are active in highly competitive markets such as high-tech markets, new product development (NPD) is an essential activity because it contributes to the long-term survival and growth of firms by developing innovations that positively influence a firm’s performance (Frishammer and Hörte, 2007). In today’s technology business settings, developing new products are thus the main focus of competition between manufacturing firms (Koufteros et al., 2010; Bradfield, 2007). NPD is becoming more time based; firms want to bring innovations faster to market in order to achieve first-mover advantages such as profitability, technology leadership, brand image and other competitive advantages due to fast changing technologies, shortened product lifecycles and customers’ changing demands (Bayus, 1997; Chen, Reilly and Lynn, 2005; Langerak and Hultink, 2005; Chen & Reily 2009).

Being first to market may be beneficial because of the first-mover advantages; however certain negative effects may occur due to accelerating the NPD process in order to achieve this position. One of these negative effects is the occurrence of product deficiencies. Researchers have shown that NPD speed may negatively affect new product quality and this may lead to product deficiencies. Despite the deficiencies, it may be beneficial to be a first mover when we look how innovators evaluate the innovation concerning the benefits and deficiencies it contains. No research has paid attention to how innovators deal with the duality of the simultaneous presence of product deficiencies and benefits within an innovation. It is important to gain insight in the underlying psychological evaluation process in order to investigate the impact on customer satisfaction since practice shows an increase in product deficiencies (Siouden, 2009; Bates, Holweg, Lewis & Oliver, 2005).

This study represents an important contribution to the literature in the following ways. The first contribution of this research is to provide insight of the effect of a firm’s time-to-market strategy on market performance in the context of product deficiencies. In other words, do first movers perform better than followers considering product deficiencies? And if so, why? Many scholars have studied first-movers in the context of survival rates, the benefits obtained by entering the market first, how research methods affect the results of first-mover advantages studies and how first to
market affect stock-prices (Kerin, Varadarajan & Peterson, 1992; Robinson & Min, 2002; van der Werf & Mahon, 1997 and Zantout & Chaganti, 1996). However, no research has paid attention to first-movers in context of product deficiencies, as practice shows an increase in product failure. Therefore it is important to gain insight in a firm’s time-to-market strategy and product deficiencies and how these variables might affect market performance.

Second, this study considers another approach to satisfaction where we look at the interaction of product benefits and deficiencies and how innovators respond on such innovations. No research has paid attention to how innovators deal with the duality of the simultaneous presence of product benefits and deficiencies within an innovation. Also, no research has paid attention to the construct ambivalence as it relates to perceived quality and satisfaction which is an understudied concept in the consumer behavior literature (Olsen, Wilcox & Olsson, 2005). In order to fill this gap in literature, this thesis will investigate the psychological mechanism ambivalence which addresses the duality of the innovation. It investigates how innovators deal with product quality which is considered as a mix of product benefits and deficiencies.

The academic relevance of this thesis is reflected in the fact that it combines two major research streams (the literature on market order entry and marketing). Literature suggest a need for more focus on marketing variables in NPD studies because marketing variables are more powerful and understudied antecedents of NPD success (Page and Schirr, 2008). This thesis tries to give answer on the following two research questions:

*What is the relative impact of firm’s time-to-market strategy in the overall satisfaction (evaluation) by consumers with radical product innovations containing a certain mix of benefits and deficiencies?*

*What is the relative impact of product benefits and deficiencies in the overall satisfaction (evaluation) by consumers with radical product innovations?*
CHAPTER 2

Literature Review

This chapter will provide a theoretical background for the research questions under investigation and is organized as follows: the first part of this section (section 2.1- section 2.3) is from a strategic perspective and will discuss the importance of speeding NPD in order to be first to market. Section 2.1 will further discuss certain techniques discussed in literature in order to operationalize NPD speed. Subsequently, the key competitive advantages of being a pioneer will be highlighted in section 2.2. Section 2.3 will further discuss the negative effect of NPD speed on new product quality and its effect on satisfaction. The second part of this chapter (section 2.4) is from a consumer’s perspective and will discuss possible mechanisms underlying the innovator’s satisfaction assessment of innovations containing benefits and deficiencies.

2.1 Being First-to-Market: Speeding up your NPD Process

NPD speed has become more and more important for management of innovation in organizations due to intensified global competition in the high tech market and the shortening of product life cycles. Various perspectives have emphasized the importance of NPD speed and innovation such as first-mover advantage, fast-follower strategy and fast product development cycle time. The fast-pace of current business environment has lead to a shift in management focus from a cost orientation to time orientation. To begin with, NPD speed is important in the following ways: first it enables firms to serve ‘impatient’ customers (the innovators) who are willing to pay a premium price. Secondly, fast NPD increases the chance to establish industry standards and lock up distribution channels. Thirdly, fast NPD gives a firm the capability to quickly respond to market demands, improving the timeliness of the firm’s market entry and customer satisfaction (Chen, Damanpour & Reily, 2009). But the most important aspect of NPD speed in this context is that it enables a manufacturing firm to enter the market first.

Several techniques are available in order to operationalize NPD speed. According to Langerak et al. (2008), NPD speed can be achieved with one of the following techniques: (1) supplier involvement, (2) lead user involvement, (3) speeding up activities and tasks, (4) reduction of parts and components in new product, (5) training and rewarding employees, (6) implementing support
systems and techniques, (7) stimulating inter-functional cooperation, (8) emphasizing value for customers and (9) simplifying the organizational structure. They revealed that 5 out of 9 techniques were significant where speeding up activities and tasks has a positive effect on NPD speed ($\beta=.22$, $p<.01$). Speeding up activities and tasks is the most direct way to increase NPD speed and therefore it is likely that firms favor this technique due to its simplicity and ease of implementation. Following from this, speeding NPD is a key component of time based strategy and the key to competitive advantages since it allows a firm to be first-to-market and obtain first-to-market benefits (Chen et al. 2005, Chen et al. 2009). The next section will discuss these benefits of being first-to-market.

2.2 Being First-to-market: Key Competitive Advantages

The previous section has provided the foundation for the importance of NPD speed in today’s turbulent business environment. Section 2.2 will further elaborate on this premise by discussing the advantages of being first-to-market. First of all, this thesis follows the definition of a pioneering firm provided by Robinson, Kalyanaram and Urban (1994): “the market pioneer is typically defined as the market’s first entrant. Implementing this definition requires that entrants be distinguished from firms that attempt to enter a market, but fail and market boundaries are established. To be classified as an entrant, a business should reach a competitive scale of commercialization. This competitive scale gives the pioneer an opportunity to capture first-mover advantages”. So a pioneer is a firm that is first to enter the market with a particular action in the areas of business strategy and operationalized in the form of new products and/or new technology (Sofka & Schmidt, 2004).

Many scientific studies have shown that being first-to-market has some key competitive advantages. Pioneering firms benefit from first-mover advantages from the opportunities they gain to determine the rules of subsequent competitive advantage. These are achieved through preemption of competition, access to scarce resources, the image of innovation leadership that is not available to followers and customer loyalty when switching costs are high (DiBenedetto & Song, 2008; Day & Wensley, 1988). Repurchase should also be higher for pioneering firms since customers can learn more about the firm because they are longer present on the market. These first-mover advantages raise the opportunity to shape consumer’s tastes and preferences in favor of the pioneering brand (Robinson, Kalyanaram and Urban, 1994). In addition pioneers benefit from technology leadership and signaling effects on shareholders. The former takes place in the form of learning curve effects and lower costs and through patents that provides a firm a temporary monopoly position. The latter is operationalized through the announcement of product innovations that leads to an increase in shareholder value for the pioneer and consequently negatively affects
competitor’s valuation. Despite these key advantages some disadvantages of being first-to-market also exists. Disadvantages from pioneering are free ride on the investment and profit from the resolution of market and technology uncertainty (Sofka & Schmidt, 2004; Fernandez & Usero, 2009). Further, later entrants have less risk in NPD and can more easily implement new technologies which results in lower production costs (Shao, 2011).

Pioneering firms may benefit greatly due to these long-term positive effects and thus may guarantee survival which is important for firms embedded in high-tech markets. Although speeding products to market is very important to obtain a pioneering position, NPD speed may have a negative effect on new product quality. The next section will discuss this negative effect on new product quality.

2.3 Being First-to-market: Product Quality

Researchers in the NPD speed literature argue that trade-offs exists when speeding a firm’s NPD process concerning new product quality. In this context, the term quality refers to the success a firm has in fulfilling the customer requirements. Lukas et al. (2002) state that NPD speed may shift management’s focus on strict deadlines which might make NPD teams slip key processes, trim performance specifications and reduce technological content. These aspects undermine new product quality. Other researchers have suggested that that NPD speed can compromise quality due to time pressure and development shortcuts (Crawford, 1992; Meyer, 1993; Sethi, 2000). Lukas and Menon (2004) even propose an inverted U-shaped relation which suggests that superior new product quality is less likely to be achieved when NPD is conducted quickly; slowing down NPD is a double-edged sword as a reduction of NPD speed below moderate levels becomes detrimental to new product quality, as well.

This negative effect is important to consider since product quality is one of the major concerns for manufacturing firms as product failures can lead to loss of market share on the long term and thus affects a firm’s financial performance. To the author’s knowledge, no empirical research has been conducted in how product deficiencies affect customer satisfaction. However, there are studies that show that product performance is positively related to satisfaction (e.g. Szymanski & Henard, 2001). Therefore it can be assumed that bad product performance, or product deficiencies, may have a negative effect on satisfaction. In this thesis the focus is on product attributes and does not include other quality aspects like price and delivery time (Berden, 2000). Despite the negative effect of NPD speed on product quality, it is important for technological based firms to be first-to-market due to the competitive advantages that can be obtained.
So when a firm decides to accelerate their NPD process in order to be first-to-market and obtain the above mentioned first-mover advantages, one has to acknowledge the possibility of launching an innovation that might contain deficiencies due to NPD speed. This further might negatively affect customer satisfaction. However, when we look how innovators (the first adopters of innovations) might respond on such an innovation, it might be favorable to launch the innovation and claim a pioneering position. The next section will discuss how innovators might respond on innovations with a mix of benefits and deficiencies.

2.4 Innovator’s Underlying Cognitive and Emotional aspects: Forgiveness and Ambivalence

This second part of chapter 2 will discuss the subject time-to-market strategy from a consumer perspective which is embedded in the consumer behavior paradigm. Section 2.4 will first discuss this paradigm. Afterwards, several psychological mechanisms will be mentioned where forgiveness and ambivalence will be discussed in further detail. These mechanisms might explain how innovators respond on innovations containing a mix of benefits and deficiencies.

Consumer behavior covers a lot of aspects. Mainly “it is the study about processes that are involved when individuals purchase, use or dispose products, services, ideas or experiences to satisfy their needs and desires” (Solomon, Bamosey, Askegaard & Hogg (2006). When zooming in this paradigm from a consumer’s perspective, consumer behavior involves the processes of pre-purchase issues, purchase issues and post purchase issues. This thesis relates to the processes of post purchase issues. To be specific, this thesis investigates the part of this paradigm how consumer’s satisfaction is affected by an innovation that provides a mixture of product benefits and deficiencies. A firm’s main objective should always be customer satisfaction since it is an antecedent of increased market share, profitability, Word of Mouth, customer retention and customer loyalty (Anderson, 1994; Szymanski & Henard, 2001). Satisfaction is a construct that is mainly based on cognitive and emotional components (Szymanski & Henard, 2001). Therefore, we have to focus on the cognitive and emotional mechanisms that affect customer satisfaction when confronted with an innovation containing benefits and deficiencies.

There are different theories that might explain customer’s response from a cognitive and emotional perspective. A few examples are: the attribution theory, complaining, justice theory, innovator’s personality traits, consumer forgiveness and ambivalence. We will dive into the mechanisms forgiveness and ambivalence since the attribution theory doesn’t consider the mix of benefits and deficiencies the innovation contains but only focuses on the deficiency aspect of the product. In addition, complaining and justice theory are also not applicable since these are focused
as an outcome of satisfaction whereas this thesis is focused on underlying mechanisms of the satisfaction assessment. In addition, complaining assumes a dissatisfied customer which may not be certain in case of this thesis. Forgiveness is more likely to occur due to the innovator’s personality trait empathy (Rogers, 2003). The innovator might project himself into the role of the firm and sympathizes with the pioneering firm. This sympathizing aspect might further result in forgiving the firm for launching an innovation with deficiencies. According to Fehr, Gelfand & Nag (2010), forgiveness is related to empathy ($r=.42$). Therefore, a more plausible aspect to consider is forgiveness which can be derived from the innovator’s personality. Regarding the combination of benefits and deficiencies and how innovators might respond, ambivalence is a likely mechanism since it focuses on the conflict that arises between the benefits and deficiencies. The next section will discuss these two mechanisms forgiveness and ambivalence in further detail.

2.4.1 Consumer forgiveness

Forgiveness has its origin in the field of theology and philosophy but is nowadays also used in the field of the social sciences. More recently the field of Marketing has shown interests in the concept forgiveness in order to explain relationships between customers and business organizations (Xie & Peng, 2009). According to Zechmeister et al. (2004, p.533), “forgiveness is often operationally defined in terms of behavioral, affective, and cognitive responses following an interpersonal offence. Individuals are described as forgiving if they inhibit retaliatory or destructive responses and instead respond with conciliatory or constructive behaviors, affect, and cognitions”. The concept of forgiveness in this study will be focused on the friction that arises between the manufacturing firm and the customer after product performance failure. The end result of forgiveness in this context should relief the innovation adopter from negative emotions (e.g. anger, fear, resentment, dissatisfaction) which might be the result from the deficiencies. This relief should positively enhance satisfaction.

Several aspects of forgiveness in the business context can be deducted from the limited body of literature. First, forgiveness follows a deep, personal and long lasting injury. Second, forgiveness is linked to a sense of justice. Third, forgiveness takes time (so it can be long and difficult). Fourth, the firm needs not to apologize and the firm need not have intended any wrongdoing. Fifth, the severity of the offence (deficiencies) influences the prospects of forgiveness. The process of forgiveness follows the following steps: (1) the recognition of being offended or experiencing an injustice; (2) accepting the choice/ decision to let go of negative emotions; (3) achieving relief from internal tension and (4) feeling compassion for an offender (Tsarenko & Gabott, 2006). See figure 1 for the visualization of the forgiveness process just described.
recognition of being offended or experiencing an injustice
accepting the decision to let go of negative emotions
achieving relief from internal tension
feeling compassion for an offender

Figure 1. The process of forgiveness (Tsarenko & Gabott, 2006).

Another aspect affecting forgiveness is the innovator’s characteristic. According to Rogers (2003), “innovators are also willing to accept an occasional setback when new ideas prove unsuccessful as inevitably happens”. Due to this innovator characteristic, the benefits provided by the innovation should outweigh the deficiencies due to consumer forgiveness in the sense that the innovator focuses his attention from the deficiencies to the benefits. When following the forgiveness process as previously discussed, innovators first recognize and experience the injustice which is characterized in this context with product deficiencies. Secondly, since they are willing to accept a setback they decide to let go of negative emotions which is the result of the deficiencies and are relieved from internal tension where finally they feel compassion for the pioneering firm.

To sum up from a situational perspective, innovators might be more forgiving towards product deficiencies regarding the pioneer’s innovation due to the fact the firm has entered the market first. In addition, the innovators expect deficiencies to occur since radical innovations carry risks and uncertainties with them. In turn this may result in a positive satisfaction level.

**H1:** Customer satisfaction (market performance) is higher for pioneers than for followers with the same combination of benefits and deficiencies, because

**H2:** Customers are more forgiving towards pioneers than for followers

### 2.4.2 Attitudinal ambivalence

Another aspect that might affect the customer satisfaction assessment is the concept of ambivalence. Ambivalence is the state of having simultaneous, conflicting feelings towards an object (Olsen et al. 2005). The attitudinal evaluation is based on separate positive evaluations and negative evaluations. In this context ambivalence is reflected in the simultaneous existence of both product benefits and product deficiencies. Nordgren et al. (2005) found evidence that people who experience ambivalence generate one-sided thoughts through biased information processing. This process
enables people to resolve the strong psychological conflict of the simultaneous presence of positive
and negative aspects through selective elaboration of favorable information. However, the same
authors also found that only people that have the cognitive capabilities to resolve this conflict do so
\(F(2, 98) = 3.00, p < .05\). This suggests that people are searching for psychological relief where they are
motivated to seek for consistency. Turning back to biased processing, the researchers found evidence
that people are biased towards information that is consistent with their prior attitude. Therefore, it
may be assumed that innovators are more biased to product benefits the innovation provides since
they always seek for novelty and are willing to accept a setback. So innovators may experience
ambivalence where they selectively focus on the positive aspect of the product. This will in turn
provide them relieve of the psychological tension that has risen and ultimately positively affect
satisfaction.

**H3:** Customer satisfaction (market performance) is higher with radical innovations containing a high
level of benefits and a high level of deficiencies than radical innovations with low level of benefits and
low level of deficiencies, because

**H4:** Customers experience more ambivalence towards innovations containing a high level of benefits
and deficiencies than innovations containing a low level of benefits and deficiencies.
CHAPTER 3

Research Design

The previous chapter has laid the theoretical foundation for the research questions and hypotheses. This chapter will provide the design of the research and follows the research process suggested by Babbie (2005). To begin with, section 3.1 will provide grounds for the use of an experimental design in order to test the hypotheses. Subsequently, section 3.2 will discuss the measurement and operationalization of the constructs used in the experiment. Section 3.3 will discuss the design of the scenario where a hypothetical situation is depicted which includes a fictitious firm introducing a radical innovation. The data collection will be discussed in section 3.4.

3.1 Experimental Design

This section will discuss the guiding decisions behind the use of an experimental design. The three guiding decisions behind the use of an experimental design were: (1) the context of this study, (2) data collection and (3) the targeted population. An experiment was chosen as research design due to the low probability context this study is embedded in. It’s a rare phenomenon for firms to introduce radical innovations and in addition gathering data about product deficiencies is a sensitive issue for firms. A possible approach is the use of the critical incident technique. This technique consist of a set of procedures for collecting direct observations of human behavior in order to facilitate their potential usefulness in solving practical problems (Flanagan, 1954). However this is not the appropriate design due to the low probability context and the respondent’s response biases due to memory-lapses. In addition, critical incidences require open questions which increase the probability of mortality.

The above mentioned aspects make it favorable to use scenarios. The use of scenarios allows difficult manipulations to be more easily operationalized and provides a high degree of control. In addition, scenarios are favorable since it can simulate low probability events such as the innovator’s response to radical innovations. The key drawback of using scenarios is the risk of demand effects and the potential inability of respondents to accurately project how they actually would react to the scenario. One way to solve this is using manipulation checks. Further, internal validity is important to achieve since this enables us to make valid conclusions. Smith & Bolton (1998) state that scenarios
demonstrate ecological validity which refers to the extent the results can be applied to real-life settings.

In order to investigate whether innovators are more forgiving towards a pioneer, a reference point should be included which in this case is a follower. This provides grounds for a categorical variable with two levels: pioneer and a follower. Further, in order to investigate the construct ambivalence, the innovator should experience a conflict towards a certain object. In this case, the conflict is the simultaneous presence of benefits and deficiencies. So investigating both aspects in one study requires 3 categorical variables: time-to-market with 2 levels (pioneer and follower), product benefits with 2 levels (high and low) and product deficiencies with 2 levels (high and low). Each possible combination with the three categorical variables represents a scenario. Table 1 shows 6 different scenarios which include the three independent manipulation variables time-to-market, benefits and deficiencies. Two treatments are not included in this study since these treatments are quite evident and are not necessary to investigate the proposed hypotheses. Participants were randomly assigned to these 6 treatments and therefore it is assumed that these groups are probabilistically equivalent which enhances the internal validity of this study (Judd et al. 1991).

<table>
<thead>
<tr>
<th>6 scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low deficiencies</td>
</tr>
<tr>
<td>Y= Customer-satisfaction</td>
</tr>
<tr>
<td>Pioneer</td>
</tr>
<tr>
<td>Fast follower</td>
</tr>
</tbody>
</table>

Table 1. 6 different scenarios with 3 independent categorical variables time-to-market, benefits and deficiencies.

Scenario 1 presents the situation where a pioneer launches a radical innovation containing a relative low level of benefits and deficiencies. Scenario 2 represents a situation where a pioneer launches a radical innovation with a high level of benefits and a low level of deficiencies. Scenario 3 presents a situation where a fast follower launches a radical innovation with a low level of benefits and deficiencies where scenario 4 presents a situation of fast follower launching a radical innovation with a high level of benefits and a low level of deficiencies. Finally, scenario 6 represents a situation of a pioneer launching a radical innovation with a high level of benefits and deficiencies where
scenario 8 presents a fast follower launching such an innovation. The following section will discuss the measurements and operationalization of the variables.

In order to test the 4 proposed hypotheses, multiple independent t-tests were carried out. An independent t-test is used in situations in which there are two scenarios with different participants in each scenario. These 2 scenarios are than compared with each other in order to find a possible significant difference between the mean values of the dependent variable of the 2 scenarios. To investigate whether innovators are more satisfied with an innovation from a pioneer than for followers (where the innovation contains the same mix of benefits and deficiencies), different scenarios were compared with each other. For hypothesis 1 an independent t-test was conducted where scenario 1 was compared with 3, scenario 2 with 4 and scenario 6 with 8 with satisfaction as dependent variable. To investigate if innovators are more forgiving towards pioneers than followers (where the innovation contains the same mix of benefits and deficiencies), different scenarios were compared with each other. For hypothesis 2 an independent t-test was conducted where scenario 1 was compared with 3, scenario 2 with 4 and scenario 6 with 8 with consumer forgiveness as dependent variable. To investigate whether innovators are more satisfied with an innovation containing a high level of benefits and deficiencies compared with an innovation containing a low level of benefits and deficiencies, 2 scenarios were compared with each other. For hypothesis 3 an independent t-test was conducted where scenario 6 was compared with scenario 1 with satisfaction as dependent variable. Finally, in order to investigate whether innovators experience more ambivalence towards an innovation containing a high level of benefits and deficiencies compared with an innovation containing a low level of benefits and deficiencies, 2 scenarios were compared with each other. For hypothesis 4 an independent t-test was conducted where scenario 6 was compared with scenario 1 with ambivalence as dependent variable.
3.2 Measurement & Operationalization of Variables

This section discusses the measurements and operationalization of the variables. The first section will discuss the manipulation variables time-to-market, product benefits, product deficiencies and radical innovation. Subsequently, the control variables innovativeness and affinity with consumer electronics (CE) will be highlighted. Finally, the core variables customer satisfaction, forgiveness and ambivalence will be discussed. The literature used for the measurement of the constructs is shown in table 2.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Literature Source</th>
</tr>
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<tbody>
<tr>
<td><strong>Manipulation variable</strong></td>
<td></td>
</tr>
<tr>
<td>Radical innovation</td>
<td>Chandy &amp; Tellis (1998, 2000), Hauser et al. (2006)</td>
</tr>
<tr>
<td><strong>Control variable</strong></td>
<td></td>
</tr>
<tr>
<td>Affinity with CE</td>
<td></td>
</tr>
<tr>
<td><strong>Core variable</strong></td>
<td></td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>Konus (2010), Olsen et al. (2005)</td>
</tr>
<tr>
<td>Consumer forgiveness</td>
<td>Xie &amp; Peng (2009), McCulough (2000, 2003), Rye et al. (2001), Berry et al. (2001)</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>Olsen et al. (2005), Liver et al. (2006), Jonas et al. (1997), Kaplan (1972), Priester (2001)</td>
</tr>
</tbody>
</table>

Table 2. An overview of the literature used for the manipulation variables, control variables and core variables.
3.2.1 Manipulation variables
This section will discuss the manipulation variables time-to-market, product benefits, product deficiencies and radical innovation.

The variable, time-to-market is a categorical variable and contains two levels: pioneer and follower. The following statement is used to test whether respondents perceived this variable as was intended: the firm described in the scenario can be considered as a pioneer. Respondents could rate this statement on a 5-point Likert scale where 1=strongly disagree, 2= somewhat disagree, 3=neutral, 4= agree and 5= strongly agree.

Regarding the variable product benefits, this thesis focuses on the consumer electronic market. In this market, providing consumers with greater functionality by increasing the number of features is the key strategy to enhance and differentiate a product (Thompson et al. 2005). Therefore, product benefits are seen as product features. The variable benefits is a categorical variable with two levels: low and high level of benefits. In order to assure that the manipulation succeeded the following question was used: How would you rate the positive aspects of the product while ignoring the negative ones? (Kaplan, 1972, Jonas et al. 1997, Olsen et al. 2005, Priester, 2001). A 5-point Likert scale was used where 1=not all positive, 2=somewhat positive, 3= positive, 4=very positive and 5=extremely positive.

With product deficiencies we will follow the following situation/definition: the customer has purchased an innovation based on the value it provides where afterwards, while using the new product, the customer discovers an aspect where the product doesn’t perform as was promised (negative disconfirmation). This variable is a categorical variable with two levels: low and high level of deficiencies. The following question was used to test whether the manipulation succeeded: How would you rate the negative aspects of this product while ignoring the positive aspects? (Kaplan, 1972, Jonas et al. 1997, Olsen et al. 2005, Priester, 2001). Respondents could rate this statement on a 5-point Likert scale where 1=not all negative, 2=somewhat negative, 3=negative, 4=very negative and 5=extremely negative.

This thesis considers a radical innovation as a product new to the market which uses technology in a new way. According to Chandy & Tellis (1998, p476), radical innovations “involves substantially new technology and provides substantially greater benefits per dollar, relative to existing products”. From a business perspective, radical innovations are necessary since it will assure a firm’s continuity and therefore it is critical for long-term success. Chandy & Tellis (2000) also describe a radical product innovation as a new product that has integrated an entirely new technology and provides significantly higher benefits relative to previous products. Radical innovations are crucial since it will give a firm a strong competitive advantage where it can destroy and create new markets (Hauser et al. 2006). The items The product described is a product that is
completely new to the market and The product described is a product that uses technology in a new way were used to test whether the respondents perceived the new product as a radical innovation.

3.2.2 Control Variables

This section will discuss the control variables consumer innovativeness and the degree to which respondents feel familiar and committed to consumer electronics. The former should ensure us that the respondents are innovators and represent the target population. The latter should ensure experimental involvement. Who the participant happens to be is a very important determinant of how the respondent performs on the experimental tasks compared with the treatment to which the respondent is assigned to. Therefore, in order to assure that the respondents are consumers of innovations, their innovativeness was measured. The respondents of the experiment can be compared with innovators due to overlapping characteristics. In order to assure this the control variable consumer innovativeness is included. Consumer innovativeness describes the mental, behavioral and demographic characteristics that are associated with consumer’s willingness to adopt innovations (Hauser et al. 2006). Literature suggests 2 scales for measurement: the life innovativeness scale and the adoptive innovativeness scale. The former goes beyond the sole adoption of new products and is focused on innovativeness as a trait, searching for new problems and original solutions for firms and the willingness to change (Roehrich, 2004). Roehrich (2004) further state that life innovativeness measurements are more focused on novelty seeking than specific innovativeness due to their poor predictive validity with new product purchase. The latter measurement is specifically designed to measure innovativeness as the tendency to purchase new products.

Another view on consumer innovativeness is the construct Technology Readiness. This construct refers to “people’s propensity to embrace and use new technologies for accomplishing goals in home and at work” (Parasuraman, 2000 p. 308). This construct is based on the dichotomous nature of consumer’s reactions to new technology (e.g. control/chaos, efficiency/inefficiency, new/obsolete). So technology readiness reflects the general facets of potential drivers and inhibitors of technology readiness. The drivers or the contributors consist of 2 aspects: optimism and innovativeness. The former represents the degree to which one believes in the inherent benefits of cutting edge technology, such as offering convenience, time flexibility, mobility and stimulation. The latter represent the tendency to experiment with new technology, including gathering information and influencing others. The inhibitors also consist of 2 aspects: discomfort and insecurity. The former includes a perceived lack of control over technology, including a desire for assistance and a preference for simplicity. The latter is about the concern regarding safety, security and privacy of technology, as well as a need for assurance that it is working properly.
The TRI is a well developed measure since it is based on both qualitative and empirical studies where the 4 dimensions showed good reliability according to Parasuraman’s (2000) study (optimisms ($\alpha= .78$), innovativeness ($\alpha= .82$), discomfort ($\alpha= .79$) and insecurity ($\alpha= .72$) respectively). In addition, the TRI measures people’s attitude which is the focus of this experiment. Due to these arguments the TRI measure is the main measure to control for consumer innovativeness. Regarding the 4 separate constructs, the items with the highest loadings were used to operationalize the constructs which ranged from .62–.70. In the case with the item ‘optimism’ the following items were used: Technology gives people more control over their daily lives and Technology gives you more freedom of mobility. These items showed the highest factor loading and in addition fit best in the context. Regarding the item ‘innovativeness’ the items Other people come to you for advice on new technologies and You can usually figure out high-tech products and services without help from others were chosen. From the item ‘discomfort’ the questions Technical support lines are not helpful because they don’t explain things in terms you understand and When you get technical support from a provider of a high–tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you were used. The last questions regarding the item ‘insecurity’, the items You do not feel confident doing business with a place that can only be reached online and Any business transaction you do electronically should be confirmed later with something in writing were used.

The second control variable, affinity with CE, was included in order to assure that the respondents feel familiar with the new product which should lead to experiment involvement. The items I find modern consumer electronics one of the most enjoyable things in my life (think about gaming, TV, smart phones, computers, gadgets etc.) and I spent an excessive amount of my time on consumer electronics such as gaming, watching TV, smart phones, computers, tablets, gadgets etc. were used to test for this. The next section will discuss the core variables forgiveness, ambivalence and satisfaction.

### 3.2.3 Core variables

This section will discuss the operationalization of the variables forgiveness, ambivalence and satisfaction. Consumer forgiveness is a possible mechanism why consumers are more directed to the benefits instead of the deficiencies. 3 items were used to measure forgiveness. These items are: I would feel sympathy towards this company, I would think favorable of this firm and I would disprove this company (Xie & Peng, 2009; Rye et al. 2001). This scale is designed to measure forgiveness toward a particular offender and contains both positive and negative responses to the wrong doing of the firm. In addition, a single item measure of forgiveness is included which is commonly used in forgiveness studies (McCulough, 2003).
The second variable is ambivalence. The two most used measurements for attitudinal ambivalence are formula-based indices of ambivalence (objective ambivalence) and self reports (subjective ambivalence). The two measurements are both acceptable as different approaches to measure ambivalence (Olsen et al. 2005). The latter measure is aimed at asking the degree to which the respondents feel conflicted about a certain issue. For the self report measure the item *I would experience the presence of both positive and negative aspects of this product as conflicting* was used which was introduced by *Can you please state how your attitude would be towards the product regarding the positive and negative aspects it has?* Regarding the formula-based measure, participants are required to evaluate only the positive aspects of the product, while ignoring the negative aspects (deficiencies) and vice versa (Liver et al. 2006). For the positive aspects the question *How would you rate the positive aspects of the product while ignoring the negative ones* was used whereas for the negative aspect the question *How would you rate the negative aspects of this product while ignoring the positive aspects* was used. These positive and negative reactions are than combined according to a mathematical model that provides an index of ambivalence (Kaplan, 1972, Jonas et al. 1997, Olsen et al. 2005, Priester, 2001). The formula \((\frac{P+N}{2}) - |(P-N)|\) was used where P denotes the positive attitude component and N denotes the negative attitude component. The scale for the positive aspect ranged from 1=not all positive, 2=somewhat positive, 3= positive, 4=very positive, 5=extremely positive. The range for the negative scale ranged from 1=not all negative, 2=somewhat negative, 3=negative, 4=very negative, 5=extremely negative. However, the scores must be transformed in order to arrive at the appropriate format for the formula. This implicates for the positive and the negative scales that 1=0, 2=1, 3=2, 4=3 and 5=4.

The third variable is customer satisfaction which can be measured with different approaches. This thesis measures satisfaction that is line with the view of studying attitudes towards an object along a bipolar scale (Olsen et al. 2005). To be specific, we adopt the measures used by Konus (2010) which used the construct customer satisfaction within an experiment. These items are unfavorable-favorable (1= very unfavorable, 2= (unfavorable), 3= neutral, 4= (favorable), 5= very favorable), unpleasant-pleasant (1= very unpleasant, 2= (unpleasant), 3= neutral, 4= (pleasant), 5= very pleasant), negative-positive (1= very negative, 2= (negative), 3= neutral, 4= (positive), 5= very positive) and unsatisfied-satisfied (1= very unsatisfied, 2= (unsatisfied), 3= neutral, 4= (satisfied), 5= very satisfied) which was introduced by the question *Can you please state how your attitude would be towards the product, regarding the positive and negative aspects it has?* The following sections will discuss the scenario design and data collection.
### 3.3 Scenario design

When designing a scenario one should be careful: the more levels of inferences between the questions asked and the questions to be answered, the more the potential arises of validity problems (Wason et al. 2002). On the other hand, also according to the same authors, appropriately designed scenarios are very useful to help managers with certain interventions or should trigger action towards certain management problems. Using scenarios provides the following advantages: it provides greater realism, standardized stimuli which enhance internal validity and measurement reliability. Finally using scenarios also enhances respondent’s involvement.

The experiment considers a manufacturing firm that primarily develops consumer electronic products. A fictitious firm is used to avoid confounding effects due to consumers’ existing relationships with real brands (Xie & Peng, 2009). The electronic product industry was chosen since it is assumed that the respondents are familiar and have relatively high interests in such products. Therefore, a higher involvement level of the scenario can be expected which should enhance internal validity. Further, the consumer electronic market is a competitive, dynamic and turbulent market with relatively high level of product introductions and therefore it is more likely that in this sector product deficiencies occur. A radical innovation was chosen since these types of innovations are more prone to deficiencies which makes it more likely that such an event may happen in real-life and makes the scenario more believable.

The new product presented in the experiment can be considered as the next step for 3D TV which allows the customer to experience watching TV in an entire new way. This new product stimulates the brain with the help of a headset. This headset stimulates the cognitive and emotional processes of the brain which allows the customer to fully enjoy video content. However, it might be expected that the respondents are careful concerning the delicate human brain which may affect the results of this study. Therefore the scenario includes a section which shows that several highly rated journals revealed that this technology will have no significant negative effect on the brain. Subsequently, the technology used in the product is briefly discussed (electroencephalography (EEG) and its reverse application in the military industry in brainwave binoculars). Most new and radical technologies come from the military. Think about GPS which is an old military technology and now used in consumer electronic products.

The manipulation variable product deficiencies is operationalized with the help of negative disconfirmation where the respondent’s expectation exceeds the actual outcome (Szymanski & Henard, 2001). The experiment depicted what the respondent can expect from the product and reveals that this expectation was not met.
3.4 Data Collection

Pioneering firms initiate a niche market by embedding technological inventions into a new product (Lee, 2009). And in this niche market, innovators are present (Rogers, 2003; Moore, 2002). This study uses students from Eindhoven University of Technology as sample since these students can represent the target population of innovators. Besides that, these students can be resembled with innovators due to their overlapping characteristics. These overlapping characteristics are formal education, literate, higher social status, upward social mobility, rational, intelligent and a high involvement with technology. Regarding communication characteristics students and innovators have more social participation, engage in more active information seeking and have greater knowledge in innovations (Rogers, 2003). Student samples are often used because of their accessibility, convenience and low cost. Students are also more receptive of complex designs, yielding data that is difficult to collect from ‘real’ innovators from practice, but are suspect regarding their generalizability (Bello et al. 2009).

Manipulation checks are needed for the variables time-to-market, product benefits and product deficiencies in order to ensure experimental validity. A pilot test between 12 students was conducted where several aspects were suggested and changed accordingly. Approximately 15 respondents are necessary per condition meaning a total of (6 x 15) 90 respondents based on other experiment studies using categorical variables in a 2 x 2 x 2 design (e.g. Jonas, 1997; Xie & Peng, 2009; Heim et al. 2009; Tooren & de Jonge, 2010). Online surveys were distributed among students from the faculty of Industrial Engineering & Innovation Sciences at Eindhoven University of Technology. Links were sent to their email accounts which randomly direct them to one of the six scenarios. In addition, the professional social media site LinkedIn was used (the group Tu/e ITEM) to increase the sample size. Data were collected over 5 weeks and resulted in a total sample of 108 students.
CHAPTER 4

Data Analysis

Chapter 4 is divided in two parts. The first part will discuss the data exploration. Section 4.1 will first briefly discuss whether the parametric assumptions were met and if the used items are appropriate for measuring the constructs. Afterwards in section 4.2, the descriptive statistics of the constructs such as the means, standard deviations and correlations will be provided. The second part of chapter 4, section 4.3, will discuss the results of the experiment.

4.1 Confirmatory Factor Analysis and Cronbach Alpha

First the normality of the data was tested. According to the Kolmogorov- Smirnov and Shapiro- Wilk tests, results reveal non-significant (> .05) findings for each scenario. This means that the distribution of the sample is not significant different from a normal distribution (Field, 2005). This applies for all three independent variables. In addition, normal Q-Q plots also visually reveal normal distribution. Subsequently, a confirmatory factor analysis (CFA) was conducted in order to test whether the measures of the constructs are consistent with literature. For the innovativeness construct a CFA with an oblimin rotation, to allow for some correlation between items, was performed. CFA revealed 3 factors: optimism, innovativeness and insecurity with loadings ranging from .76 - .86. A Cronbach alpha of .60 is obtained after deleting item 2. For the construct forgiveness a CFA with an oblimin rotation was conducted. CFA revealed one component with loadings .81, .87 and .77 for the items 24, 25 and 26 respectively. The Cronbach alpha for forgiveness is .79. For the satisfaction construct a CFA with an oblimin rotation was conducted. CFA showed that all items had a loading ranging from .77 - .87 for the items 19, 20, 21 and 22 respectively. The Cronbach alpha for satisfaction is .82. For the construct radical innovation a CFA with an oblimin rotation was conducted. Results revealed loadings of .85, .82 and .72 for the items 11, 12 and 13 respectively. The Cronbach alpha for the radical innovation (context) is .70. For the last construct affinity with consumer electronics, a CFA with an oblimin rotation was conducted. CFA revealed one component with loadings .89 and .89 for the items 32 and 33 respectively. The Cronbach alpha for this construct is .73. See appendix A for a detailed overview of all the CFA loadings with their corresponding items.

Field (2005) and Hair et al. (2009) proposes that cronbach alpha values ranging between 0.7 and 0.8 are acceptable. Table 3 shows that all core construct have a good reliability except for the construct
innovativeness which has a cronbach alpha of, 60. The next section will discuss the manipulation checks of the experiment.

<table>
<thead>
<tr>
<th>Construct</th>
<th>CFA loadings</th>
<th>Cronbach alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovativeness</td>
<td>&gt;.73</td>
<td>.60</td>
</tr>
<tr>
<td>Forgiveness</td>
<td>&gt;</td>
<td>.77</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>&gt;.72</td>
<td>.82</td>
</tr>
<tr>
<td>Radical innovation</td>
<td>&gt;.72</td>
<td>.70</td>
</tr>
<tr>
<td>Consumer electronics</td>
<td>&gt;.89</td>
<td>.73</td>
</tr>
</tbody>
</table>

Table 3. Overview of the CFA loadings and cronbach alpha’s.

4.2 Manipulation checks

In order to make sure the manipulation variables time-to-market, product benefits and product deficiencies in the experiments worked, manipulation checks were carried out. Results reveal that respondents had difficulties interpreting the manipulation variables time-to-market, product benefits and product deficiencies. For all the six the scenarios, their effectiveness ranges from 0% (for scenario 4) to 35% (for scenario 6). This means that nobody in scenario 4 interpreted the manipulation variables correctly and for scenario 6, 35% of the respondents perceived the manipulations correctly. See table 4 for an overview of the scenario’s effectiveness. In total, only 21 out of 108 respondents (19.4%) perceived the scenario correctly in which they were randomly directed to. This reflects a low effectiveness of the manipulation variables. In addition, this makes data analysis difficult since results will be based on wrong interpretation of the variables. A possible way to resolve this is to re-allocate the respondents to the correct scenarios. For example, when a respondent in scenario 1 (pioneer, low benefits, low deficiencies) perceived the scenario as scenario 6 (pioneer, high benefits, high deficiencies), than this respondent will be re-allocated to scenario 6. The next sections will discuss the descriptive statistics and results of the data considering this re-allocation process of respondents. Descriptive statistics and results of the data without re-allocation can be found in appendix B and appendix C for comparison.
### 4.3 Descriptive statistics

This section will first discuss the descriptive statistics of the dependent variables customer satisfaction, customer forgiveness and ambivalence for each scenario. Subsequently, the correlation matrix will be depicted which also includes the means and standard deviation values. Afterwards the variables innovativeness, affinity with CE and radical innovation will be discussed.

Table 5 gives an overview of the descriptive statistics. In total, 71 of the 108 respondents (65.7%) correctly interpreted one of the six scenarios. Their age ranged from 19 to 43 with an average age of 24. 55 of the 71 respondents were male and 16 out of 71 respondents were female.

The descriptive statistics reveal that they were satisfied about the new product that was presented in the 6 scenarios (mean values ranging from 2.75 – 3.67 and standard deviations ranging from .35 - .70). Regarding consumer forgiveness, respondents were also on average forgiving towards the fictitious firm (mean values ranging from 2.67 – 3.82 and standard deviations ranging from .48 - .77). No statement can be made about ambivalence for each scenario since it reflects an index where statements can only be made with a reference to another ambivalence value. Ambivalence values ranges from 0.00- 8.00. Table 6 shows the correlation matrix including the mean and standard deviation values of the variables.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Condition</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer satisfaction</td>
<td>Scenario 1</td>
<td>20</td>
<td>3.14</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>Scenario 2</td>
<td>15</td>
<td>3.67</td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>Scenario 3</td>
<td>11</td>
<td>3.12</td>
<td>.62</td>
</tr>
<tr>
<td></td>
<td>Scenario 4</td>
<td>1</td>
<td>3.50</td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Mean</td>
<td>St. dev</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------</td>
<td>---------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>1. Time-to-market</td>
<td>3,97</td>
<td>.99</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2. Product benefits</td>
<td>3,54</td>
<td>.83</td>
<td>1,42</td>
<td></td>
</tr>
<tr>
<td>3. Product deficiencies</td>
<td>3,23</td>
<td>1,00</td>
<td>-.51</td>
<td>.46**</td>
</tr>
<tr>
<td>4. Radical innovation</td>
<td>3,97</td>
<td>.84</td>
<td>.80**</td>
<td>.16</td>
</tr>
<tr>
<td>5. Consumer satisfaction</td>
<td>3,22</td>
<td>.66</td>
<td>.21</td>
<td>.21</td>
</tr>
<tr>
<td>6. Consumer forgiveness</td>
<td>3,27</td>
<td>.75</td>
<td>.29*</td>
<td>.29*</td>
</tr>
<tr>
<td>7. Attitudinal ambivalence</td>
<td>4,00</td>
<td>1,79</td>
<td>-.05</td>
<td>.68**</td>
</tr>
<tr>
<td>8. Innovativeness</td>
<td>3,63</td>
<td>.97</td>
<td>.01</td>
<td>.09</td>
</tr>
<tr>
<td>9. Affinity with CE</td>
<td>3,37</td>
<td>1,12</td>
<td>.13</td>
<td>.17</td>
</tr>
</tbody>
</table>

Table 6. Correlation matrix including mean and standard deviation values (N=71). NOTE: * indicates a correlation that is significant at the level of .05 (2-tailed). ** indicates a correlation that is significant at the level of .01 (2-tailed).
Table 6 suggests that on average, respondents are innovative (mean value = 3.63 with st.dev = 0.97) which reflect the targeted population of innovators. Zooming in on the control variable consumer innovativeness, Table 7 further reveals that the minimum value is 1.00 and the maximum value 5.00. Only 5 out of 71 respondents scored below 2.50 which suggest they are no innovators. Despite this fact, all respondents were further taken into the analysis since results revealed no significant differences when deleting these 5 respondents.

<table>
<thead>
<tr>
<th>Consumer innovativeness</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>1.00</td>
<td>2</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>1.50</td>
<td>2</td>
<td>2.8</td>
<td>2.8</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>1</td>
<td>1.4</td>
<td>1.4</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>2.50</td>
<td>9</td>
<td>12.7</td>
<td>12.7</td>
<td>19.7</td>
</tr>
<tr>
<td></td>
<td>3.00</td>
<td>7</td>
<td>9.9</td>
<td>9.9</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td>3.50</td>
<td>14</td>
<td>19.7</td>
<td>19.7</td>
<td>49.3</td>
</tr>
<tr>
<td></td>
<td>4.00</td>
<td>16</td>
<td>22.5</td>
<td>22.5</td>
<td>71.8</td>
</tr>
<tr>
<td></td>
<td>4.50</td>
<td>12</td>
<td>16.9</td>
<td>16.9</td>
<td>88.7</td>
</tr>
<tr>
<td></td>
<td>5.00</td>
<td>8</td>
<td>11.3</td>
<td>11.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>100,0</td>
<td>100,0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Detailed descriptive statistics of the control variable consumer innovativeness.

Table 6 shows that on average, respondents have affinity with CE (mean value = 3.37 with st.dev = 1.12). This suggests that the respondents enjoy and spend an excessive amount of time on CE. This reflects their commitment and involvement in the experiment which should also enhance internal validity. Regarding the second control variable affinity with CE, Table 8 shows that only 12 out of 71 respondents scored below 2.50 which suggest they have relatively low affinity with CE. Despite this fact, all respondents were further taken into the analysis since results revealed no significant differences when deleting these 12 respondents.

<table>
<thead>
<tr>
<th>Affinity with consumer electronics</th>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>1.00</td>
<td>5</td>
<td>7.0</td>
<td>7.0</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>1.50</td>
<td>2</td>
<td>2.8</td>
<td>2.8</td>
<td>9.9</td>
</tr>
</tbody>
</table>
Table 8. Detailed descriptive statistics of the control variable affinity with CE.

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,00</td>
<td>5</td>
<td>7,0</td>
<td>7,0</td>
<td>16,9</td>
</tr>
<tr>
<td>2,50</td>
<td>7</td>
<td>9,9</td>
<td>9,9</td>
<td>26,8</td>
</tr>
<tr>
<td>3,00</td>
<td>10</td>
<td>14,1</td>
<td>14,1</td>
<td>40,8</td>
</tr>
<tr>
<td>3,50</td>
<td>11</td>
<td>15,5</td>
<td>15,5</td>
<td>56,3</td>
</tr>
<tr>
<td>4,00</td>
<td>15</td>
<td>21,1</td>
<td>21,1</td>
<td>77,5</td>
</tr>
<tr>
<td>4,50</td>
<td>9</td>
<td>12,7</td>
<td>12,7</td>
<td>90,1</td>
</tr>
<tr>
<td>5,00</td>
<td>7</td>
<td>9,9</td>
<td>9,9</td>
<td>100,0</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>100,0</td>
<td>100,0</td>
<td></td>
</tr>
</tbody>
</table>

Table 9. Detailed descriptive statistics of the control variable radical innovation.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,00</td>
<td>1</td>
<td>1,4</td>
<td>1,4</td>
</tr>
<tr>
<td>1,50</td>
<td>1</td>
<td>1,4</td>
<td>2,8</td>
</tr>
<tr>
<td>2,00</td>
<td>1</td>
<td>1,4</td>
<td>4,2</td>
</tr>
<tr>
<td>2,50</td>
<td>4</td>
<td>5,6</td>
<td>9,9</td>
</tr>
<tr>
<td>3,00</td>
<td>8</td>
<td>11,3</td>
<td>21,1</td>
</tr>
<tr>
<td>3,50</td>
<td>9</td>
<td>12,7</td>
<td>33,8</td>
</tr>
<tr>
<td>4,00</td>
<td>14</td>
<td>19,7</td>
<td>53,5</td>
</tr>
<tr>
<td>4,50</td>
<td>18</td>
<td>25,4</td>
<td>78,9</td>
</tr>
<tr>
<td>5,00</td>
<td>15</td>
<td>21,1</td>
<td>100,0</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>100,0</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Zooming in on the variable radical innovation, table 6 suggests that the new product in the experiment was on average experienced as a radical innovation (mean value= 3,97 with st.dev= .84). Table 9 reveals that the minimum value was 1 and the maximum 5. Only 3 out of 71 respondents scored below 2,50 which suggest they experienced the new product not as a radical innovation. Despite this fact, all respondents were further taken into the analysis since results revealed no significant differences when deleting these 3 respondents. The following section will discuss the results of the experiments.
Regarding the categorical variables time-to-market (pioneer and follower), product benefits (low and high) and product deficiencies (low and high), these were divided as follows: for time-to-market, respondents that scored 4 or higher belong to the pioneer level. Respondents that scored 3 or lower belong to the follower level of time-to-market. For the variable product benefits, respondents that scored 4 or higher belong to the high benefit level. Respondents that scored 3 or lower belong to the low benefit level. For the variable product deficiencies, respondents that scored 4 or higher belong to the high deficiencies level. Respondents that scored 3 or lower belong to the low deficiencies level. These divisions are based upon the results of the analysis which showed no significant differences when changes were made to these divisions.

4.4 Results

This section will discuss the results of the experiments. To investigate whether innovators are more satisfied with an innovation from a pioneer than for followers (where the innovation contains the same mix of benefits and deficiencies), the following scenarios were compared with each other: scenario 1 with scenario 3, scenario 2 with 4 and scenario 6 with scenario 8 since these scenarios compares the pioneer with the follower considering the same mix of benefits and deficiencies. Satisfaction is used as dependent variable. In order to find a difference between these scenarios, t-tests were performed where the results are depicted in table 10. For all the t-tests, Levine’s tests showed non-significant values (>0.05). This means that all the variances of the scenarios are equal and therefore they meet the assumption of homogeneity. Results suggest that on average, although not significant (t(29)= .18; p>.05), participants were slightly more satisfied in scenario 1 (M=3.14; SE=.16), compared with scenario 3 (M=3.09; SE=.19). Executing a t-test between scenario 2 and 4 couldn’t be performed since scenario 4 only contained 1 respondent which is not sufficient to perform a t-test with. Further, table 10 shows that on average although not significant (t(22)= 1.28; p>.05), participants were more satisfied in scenario 6 (M=3.17; SE=.17), compared with scenario 8 (M=2.75; SE=.24).

To investigate if innovators are more forgiving towards pioneers than followers (where the innovation contains the same mix of benefits and deficiencies), the following scenarios were compared with each other: scenario 1 with scenario 3, scenario 2 with 4 and scenario 6 with scenario 8 with forgiveness as dependent variable. Results from the t-test suggest that on average, although not significant (t(29)= .77; p>.05), participants were more forgiving in scenario 1 (M=3.17; SE=.17), compared with scenario 3 (M=2.97; SE=.15). Executing a t-test between scenario 2 and 4 couldn’t be performed since scenario 4 only contained 1 respondent which is not sufficient to perform a t-test with. Further, table 10 shows that on average, although not significant (t(22)= .98; p>.05),
participants were more forgiving in scenario 6 (M=3.26; SE=.17), compared with scenario 8 (M=2.89; SE=.41).

To investigate whether innovators are more satisfied with an innovation containing a high level of benefits and deficiencies compared with an innovation containing a low level of benefits and deficiencies, the following scenarios were compared with each other: scenario 1 with 6 and scenario 3 with 8. These are compared since they level out the variable time-to-market (pioneer and follower) and include the mix of low benefits and low deficiencies and high benefits and high deficiencies. Regarding scenario 1 and 6, the result of the t-tests suggest that on average although not significant (t(36)= -.13; p>.05)), participants were slightly more satisfied in scenario 6 (M=3.17; SE=.17), compared with scenario 1 (M=3.14; SE=.16). Regarding scenario 3 and 8, results shows that on average, although not significant t(15)= 1.082; p>.05)), participants were more satisfied in scenario 3 (M=3.12, SE=.62) compared with scenario 8 (M=2.75, SE=.59). This is in the opposite direction as was hypothesized.

Finally, in order to investigate whether innovators experience more ambivalence towards an innovation containing a high level of benefits and deficiencies compared with an innovation containing a low level of benefits and deficiencies, the following scenarios were compared: scenario 1 with 6 and scenario 3 with 8 with ambivalence as dependent variable. These are compared since they level out the variable time-to-market (pioneer and follower) and include the mix of low benefits and low deficiencies and high benefits and high deficiencies. Results of the t-test suggest that on average, participants experienced more conflicting feelings (ambivalence) in scenario 6 (M=6.11; SE=.11), compared with scenario 1 (M=2.60; SE=.29). Table 10 shows that this difference was significant t(36)= -10.72; p<.01). Regarding scenario 3 and 8, results suggest that respondents in scenario 8 experienced more conflicting feelings towards the new product (M=6.00, SE=0) compared with scenario 3 (M=3.09, SE=1.04). Table 12 shows that this difference was significant t(15)= -9.24; p<.01).

See appendix D for a more detailed overview of the t-test output.

<table>
<thead>
<tr>
<th>Scenario comparison</th>
<th>Mean 1</th>
<th>Mean 2</th>
<th>T-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1 - 3</td>
<td>3.14</td>
<td>3.12</td>
<td>.182</td>
<td>.857</td>
</tr>
<tr>
<td>Scenario 2 - 4</td>
<td>3.67</td>
<td>3.50</td>
<td>.462</td>
<td>.651</td>
</tr>
<tr>
<td>Scenario 6 - 8</td>
<td>3.17</td>
<td>2.75</td>
<td>1.279</td>
<td>.214</td>
</tr>
<tr>
<td>Scenario 1 - 6</td>
<td>3.14</td>
<td>3.17</td>
<td>-.126</td>
<td>.900</td>
</tr>
<tr>
<td>Scenario 3 - 8</td>
<td>3.12</td>
<td>2.75</td>
<td>1.082</td>
<td>.296</td>
</tr>
<tr>
<td>Forgiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 10. Results t-tests including mean, t-value and p-value of each scenario for every independent variable. Mean 1 denotes the mean value of the first scenario; mean 2 denotes the mean value of the second scenario (E.g. Scenario 1 – 3: Mean 1 refers to scenario 1 and Mean 2 refers to scenario 3).

<table>
<thead>
<tr>
<th>Scenario 1 - 3</th>
<th>Mean 1</th>
<th>Mean 2</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 2 - 4</td>
<td>3.82</td>
<td>2.67</td>
<td>1.944</td>
<td>.072</td>
</tr>
<tr>
<td>Scenario 6 - 8</td>
<td>3.26</td>
<td>2.89</td>
<td>.975</td>
<td>.340</td>
</tr>
<tr>
<td>Ambivalence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1 - 6</td>
<td>2.60</td>
<td>6.11</td>
<td>-10.721</td>
<td>.000</td>
</tr>
<tr>
<td>Scenario 3 - 8</td>
<td>3.09</td>
<td>6.00</td>
<td>-9.24</td>
<td>.000</td>
</tr>
</tbody>
</table>

To sum up, results suggest although not significant, on average pioneers perform better than followers measured against customer satisfaction considering an innovation with the same mix of benefits and deficiencies. Due to this non significant finding, hypothesis 1 is not supported. Regarding the mechanism forgiveness, results from the scenarios show that although not significant, on average respondents experienced more forgiveness towards the pioneer compared with the follower when considering the same mix of benefits and deficiencies. However, when scenarios were divided in only two groups, the pioneer group (scenario 1+2+6) and the follower group (scenario 3+4+8), results reveal a significant difference (t(69)= 2.302; p<.05) where the pioneer group was more satisfied (M=3.38, SE=.10) compared with the follower group (M=2.93, SE=.16). A possible reason for this significant finding might be due to the increase in sample size which was obtained. See appendix D for the detailed output of these results. Therefore hypothesis 2 is supported. Result also suggests that respondents who evaluated the new product with high benefits and high deficiencies were more satisfied compared with the respondents who evaluated the new product with low benefits and low deficiencies when not considering the variable time-to-market. However, this difference was not significant meaning that hypothesis 3 is not supported. Finally, results suggest that respondents experienced more ambivalence with the new product with high benefits and high deficiencies compared with respondents who evaluated the new product with low benefits and low deficiencies. This difference was found significant. Therefore hypothesis 4 is supported. Tables 11, 12 and 13 illustrate the mean values of the dependent variables satisfaction, forgiveness and ambivalence across the six scenarios. The next chapter will discuss the findings.
### 6 scenarios

<table>
<thead>
<tr>
<th>Y= Customer satisfaction</th>
<th>Low benefits</th>
<th>High benefits</th>
<th>Low benefits</th>
<th>High benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer</td>
<td>(1) 3,14</td>
<td>(2) 3,67</td>
<td>5</td>
<td>(6) 3,17</td>
</tr>
<tr>
<td>Fast follower</td>
<td>(3) 3,09</td>
<td>(4) 3,50</td>
<td>7</td>
<td>(8) 2,75</td>
</tr>
</tbody>
</table>

Table 11. Result of the Independent samples tests with satisfaction as dependent variable expressed in mean values.

<table>
<thead>
<tr>
<th>Y= Consumer forgiveness</th>
<th>Low benefits</th>
<th>High benefits</th>
<th>Low benefits</th>
<th>High benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer</td>
<td>(1) 3,17</td>
<td>(2) 3,82</td>
<td>5</td>
<td>(6) 3,26</td>
</tr>
<tr>
<td>Fast follower</td>
<td>(3) 2,97</td>
<td>(4) 2,67</td>
<td>7</td>
<td>(8) 2,89</td>
</tr>
</tbody>
</table>

Table 12. Result of the Independent samples tests with forgiveness as dependent variable expressed in mean values.

<table>
<thead>
<tr>
<th>Y= Ambivalence</th>
<th>Low benefits</th>
<th>High benefits</th>
<th>Low benefits</th>
<th>High benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer</td>
<td>(1) 2,60</td>
<td>(2) -</td>
<td>5</td>
<td>(6) 6,11</td>
</tr>
<tr>
<td>Fast follower</td>
<td>(3) 3,09</td>
<td>(4) -</td>
<td>7</td>
<td>(8) 6,00</td>
</tr>
</tbody>
</table>

Table 13. Result of the Independent samples tests with ambivalence as dependent variable expressed in mean values.
Conclusion and Discussion

Chapter 5 will first provide the conclusion of this thesis by briefly summarizing the results. Subsequently, this chapter will further discuss why hypothesis 1 and 3 were not significant. Further, hypothesis 2 and 4 will also be discussed.

First of all, what is the relative impact of a firm’s time-to-market strategy on the overall satisfaction (evaluation) with radical innovations containing a certain mix of benefits and deficiencies? Results suggest an overall positive impact of a firm’s time-to-market strategy on satisfaction. To be specific, results suggest that on average but not significant, pioneers perform better than followers considering an innovation with the same mix of benefits and deficiencies measured against the innovator’s satisfaction. In addition results also suggest that on average, innovators are more forgiving towards the pioneer than the follower. This difference was found significant when considering the result of the two groups pioneer (scenario 1+2+6) and follower (scenario 3+4+8). The construct forgiveness might explain why pioneers perform better than followers with innovations containing the same mix of benefits and deficiencies measured against satisfaction.

Secondly, what is the relative impact of product benefits and deficiencies in the overall satisfaction (evaluation) by consumers with radical product innovations? Results suggest that innovators, who evaluated the new product with high benefits and high deficiencies, were on average more satisfied than innovators who evaluated the new product with low benefits and low deficiencies when leveling out the variable time-to-market. Despite the finding, this difference was found not statistically significant. Regarding the construct ambivalence (conflicting feelings due to the benefits and deficiencies), innovators who evaluated the new product with high benefits and high deficiencies experienced on average, more ambivalence than innovators who evaluated the new product with low benefits and low deficiencies. Results suggest that this difference was significant. This means that the combination of high benefits and high deficiencies triggered more conflicting feelings. This higher level of ambivalence was accompanied with a higher level of satisfaction.

Why were hypotheses 1 and 3 not significant? To begin with hypothesis 1, differences between a pioneer and a follower may be small to detect and therefore a larger sample size may be needed to detect this small effect. However, combing scenarios and therefore increasing the sample size revealed no significant finding. Another reason why hypothesis 1 was not significant may be due
the fact that respondents may have difficulties to differentiate between a follower and a pioneer since the follower enters the market 6 months after the pioneer (according to the experiment). Therefore they might perceive the follower as a pioneer. To support this, results suggest that the construct radical innovation (excluding the item time-to-market) is highly correlated with a firm’s time-to-market strategy \((r=.57; p<.01)\). See appendix E for the correlation matrix. This means that the more the respondents perceive the product as new (new to the market and new technology), the more they will perceive the firm as a pioneer. Since the aim of this study is to investigate a radical innovation, the respondents might perceive the firm as a pioneer which suggests they might not differentiate between a pioneer and follower. Another plausible reason of the non-significance of hypothesis 1 might come from a literature perspective. Radical innovations propose a barrier in adopting the product. Generally, radical innovations are not easily adopted in the market. Potential adopters may experience difficulties to comprehend and evaluate radical innovations due to their newness in terms of technology and benefits offered (Reinders et al. 2010). In case of an experiment, it may enhance this difficulty in evaluating the product innovation since no tacit product is available to evaluate.

Regarding hypothesis 2, no significant findings of the mechanism consumer forgiveness were found. A possible reason is the low sample size that was used to compare the scenarios with each other. Therefore, combining several scenarios and thus increasing the sample size revealed a significant difference suggesting that innovators are more forgiving towards pioneering firms compared with followers when considering an innovation containing the same mix of benefits and deficiencies.

Regarding hypothesis 3, no significant findings were found. Also in this case this might be due to the relative small sample sizes of the scenarios. However despite the non significance, results still suggest that innovators who evaluated a radical innovation containing a high level of benefits and deficiencies are more satisfied compared with innovators who evaluated a radical innovation containing a low level of benefits and deficiencies. In addition regarding hypothesis 4, innovators experienced more ambivalence with radical innovation containing a high level of benefits and deficiencies compared to radical innovation with a high low level of benefits and deficiencies which was statistically significant. Therefore we can carefully state that a higher level of ambivalence is accompanied with higher satisfaction levels. No causal relation can be made since the correlation matrix in table 6 showed no significant relation between satisfaction and ambivalence.

When we look at table 11, results seem to suggest it is better to be a follower launching a radical innovation with a high level of benefits and a low level of deficiencies (scenario 4) since this scenario results in the highest level of satisfaction compared with the other scenarios. It may be interesting to compare this scenario with the scenario of the pioneer launching a radical innovation
with a high level of benefits and a high level of deficiencies (scenario 6). However, the sample size of scenario 4 is not sufficient to perform a t-test with. A possible reason why scenario 4 has a higher level of satisfaction might come from a literature perspective. Firstly, when we only look at the radical innovation and leveling out the time-to-market variable, the new product in scenario 4 contains a high level of benefits and a low level of deficiencies. Due to the higher level of benefits and lower level of deficiencies, it might be that this is related with higher satisfaction levels. When including the time-to-market variable, it might be that a follower has learned from the pioneer and can incorporate relative newer technology (benefits) relatively compared with the pioneer due to the time gap that exists between the pioneer and the follower.
CHAPTER 6

Implications and Future Research

What do these finding entail for management? Further, what does this mean for the academic world? The first part of this section will give answers to these two questions by elaborating the impact of the findings on practice and literature. We will first begin by discussing 4 managerial implications relating to time-to-market, forgiveness, customer’s zone of tolerance and a firm’s recovery strategy. Subsequently, I will discuss 2 academic implications concerning a firm’s time-to-market strategy in the context of deficiencies and the construct ambivalence. The second part of this chapter will try to address two specific limitations of this thesis and how these may affect the interpretability of the results. Future directions for research are pointed out that should first overcome the limitations and second help to broaden the literature in order to provide better scientific insights.

The first managerial implication is that it’s better to launch an innovation first instead of following the pioneer when considering the same mix of benefits and deficiencies. Results show that, although not significant, this result in a relative higher level of customer satisfaction when assuming that achieving the highest level of satisfaction is a firm’s main objective. In addition to this suggestion, other studies have shown that it is important to launch an innovation first due to the first-mover advantages that can be obtained. Following from this study, this higher level of satisfaction might be due to the psychological mechanisms forgiveness.

The second managerial implication is that it is still important for firms to enhance consumer forgiveness. Result show that consumer forgiveness is highly related to satisfaction (r=.58, p<.01). Therefore, enhancing forgiveness can be seen as a crucial step in repairing customer’s trust which may be affected by the deficiencies (Xie & Peng, 2009). How can firms enhance forgiveness? An attributional perspective might shed some light in this matter. Once a firm acknowledges that the product failure was firm-related, it should provide the customer a refund or an apology. Folkes (1984) showed that customers felt a strong need for a refund or apology once the product failure was firm-related. Firms should not underestimate the impact of an apology or refund since it shows a strong relation with customer satisfaction (Karatape et al. 2004). Results of this thesis also show that innovators are on average satisfied about the product despite the deficiencies. This eventually may lead to customer loyalty (Yang and Peterson, 2004; Homburg & Giering, 2001).
The third managerial implication is to widen a customer’s zone of tolerance of thereby lowering the probability of dissatisfying customers. Although results of this study suggest that the innovators are satisfied, firms should be prepared of dissatisfied customers. Due to a wider zone of indifference, customers might accept product failure. In this way we create tolerance for failure. In order to achieve this, firms should focus on customer involvement and this can only be achieved over time (Henard, 2010).

The fourth managerial implication is that firms should be prepared for product deficiencies when speeding up their NPD process since one doesn’t have full control over the severity of the deficiency that may occur. Therefore, firms should develop and have recovery strategies in place in order to overcome the negative effect of such an event. In this case we speak of a product harm crisis. Such an event may have a negative effect on a firm’s image by the means of negative publicity (Dean, 2004). Firms should not underestimate the effect of publicity since today we are continuously spreading information (positive or negative) via social media which reaches a large population in a short amount of time. Turning back to product recalls, these strategies are needed to avoid the customer being hurt by the product. Souiden (2009) suggest that voluntary recalls or improvement campaigns have a significant positive impact on the manufacturers’ image, consumer’s loyalty and purchase intention.

The following section will discuss two academic contributions. The first academic contribution is that this study has paid attention to a firm’s time-to-market strategy in the context of deficiencies which has, according to the author, not been studied in academic literature. Many scholars have studied first-movers in other contexts such as survival rates, the benefits obtained by entering the market first, how research methods affect the results of first-mover advantages studies and how first to market affect stock-prices. To be specific, no research has paid attention to first-movers in context of product deficiencies, as practice shows an increase in product failure. With the experiment in this study, I hope to contribute to a better understanding of pioneers and followers launching innovations containing a mix of benefits and deficiencies. Further, I hope to contribute to a better understanding of possible responses of innovators to such innovations from a psychological perspective.

The second academic implication is that this study has considered another approach to satisfaction by looking at the duality between benefits and deficiencies. By investigating how innovators respond on innovations with both benefits and deficiencies, I hope to contribute to a further understanding of ambivalence and how this mechanism affects satisfaction. No research has paid attention to how innovators deal with the duality of the simultaneous presence of product deficiencies and benefits within an innovation. Also, no research has paid attention to the construct ambivalence as it relates to perceived quality and satisfaction (Olsen, Wilcox & Olsson, 2006).
Therefore I tried to fill this gap by investigating ambivalence in relation to product quality and satisfaction in the context of product deficiencies.

Every study carries limitations. The first and most important limitation of this study is the effectiveness of the experiment. As results showed, respondents had difficulties interpreting the scenarios as was intended. Therefore, a re-allocation process was executed in order to place the respondents in the right scenario. After this re-allocation process, still only 71 of the 108 respondents perceived one of the six scenarios correctly which suggest a 65.7% overall effectiveness. Future research should first be directed at more respondents. In order to arrive at a sufficient sample size, one should try to gather approximately 60 additional respondents. When assuming the same effectiveness of 65.7%, than the sample will consist of 71 + (60 x 0.657) = 111 respondents. Future research should also be aimed at improving the scenarios and thereby increasing its effectiveness. Special attention should be paid to the manipulation variable time-to-market, especially the follower level. The improved scenario should emphasize more on the follower level without priming the respondents.

Setting up an experimental design automatically generates some limitations. The second limitation is that this study is limited in its generalizability. Due to the artificial situation created, this study has a relatively high level of internal validity and therefore limiting the generalization of the results into other contexts. So the external validity is reduced in order to achieve internal validity. Concerning the generalizability, the focus of this thesis was on radical product innovations and specifically the consumer electronics. In order to increase external validity, future research should focus on other products outside the consumer electronics. Subsequently, the context of this thesis was embedded in the business-to-consumer market. However, innovators are also present in the business-to-business market. Future research should be directed at collecting data from these innovators which might help to increase external validity. In addition, recent development in the tablet market might be a source of empirical data. The tablet can be considered as a radical innovation in line with the definition used in this thesis. In this case, are the customers of Apple’s I-pad more satisfied than the customers of Samsung’s tablet? Samsung was second in market launching a tablet. Of course controlling for loyal Apple customer is needed. Another limitation is that students, or innovators in this context, might respond differently in a real life setting on innovations containing benefits and deficiencies since they have paid for the new product and therefore other behavioral outcomes might be expected. So price might be variable to consider for future research.

An approach for future research is using a different research methodology: causal modeling. With causal modeling we can say more about the relation between the variables which is difficult for this current study. With the help of SMART PLS a causal model can be made where one investigates
how the position of a pioneer affects customer satisfaction. This direct relationship is moderated by an innovation containing benefits and deficiencies. The benefits and deficiencies can be divided in a low and a high level. Due to these levels, an interaction might be found. Further, each variable contains a number of indicators (I1, I2 etc.) which reflects the questions used in the survey. The items in this thesis can be used for the new survey. However, one should also try to incorporate other items. See figure 2 for this causal model.

A second interesting avenue for future research might be lying in a service context. Do pioneers perform better than followers considering service failure? Trying to gain insight in this matter is important since services are more prone to failure (Wilson, 2008). It may be expected that consumers of new services are dissatisfied and that other psychological mechanisms might lie behind this process. Another avenue for future research is developing new satisfaction scales. Most of the time, products are a mixture of good and bad evaluations. For example, a customer has purchased a new TV and the TV has the attribute of delivering High Definition quality but on the other hand, the TV may have too little connections in order to connect other devices to the TV. This clash or duality of positive and negative attitude may foster ambivalence. Therefore, it is hard to express satisfaction without integrating attitudinal ambivalence.

Figure 2. Causal model for future research where pioneer might affect satisfaction and is moderated by the innovation which contains a mix of benefits and deficiencies.
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# Appendix A

## Confirmatory Factor Analysis

### Rotated Component Matrix

#### Innovativeness (TRI)

<table>
<thead>
<tr>
<th>Items</th>
<th>Component</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control over daily life</td>
<td></td>
<td>,801</td>
</tr>
<tr>
<td>2. Technology gives you more freedom of mobility*</td>
<td></td>
<td>,734</td>
</tr>
<tr>
<td>3. Other people come to you for advice on new technologies</td>
<td></td>
<td>,858</td>
</tr>
<tr>
<td>4. You can usually figure out high-tech products and services</td>
<td></td>
<td>,816</td>
</tr>
<tr>
<td>5. Technical support lines are not helpful</td>
<td></td>
<td>,510</td>
</tr>
<tr>
<td>6. You sometimes feel as if you are being taken advantage of by someone who knows more than you</td>
<td></td>
<td>,501</td>
</tr>
<tr>
<td>7. You do not feel confident doing business with a place that can only be reached online</td>
<td></td>
<td>,752</td>
</tr>
<tr>
<td>8. Any business transaction you do electronically should be confirmed later with something in writing</td>
<td></td>
<td>,760</td>
</tr>
</tbody>
</table>

Table A1. Measurement items innovativeness (TRI). Note: * denotes items that were deleted from the final analysis because of low alpha.

### Rotated Component Matrix

#### Forgiveness

<table>
<thead>
<tr>
<th>Items</th>
<th>Component</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. I would feel sympathy towards the firm</td>
<td></td>
<td>,811</td>
</tr>
<tr>
<td>25. I would think favorable of this firm</td>
<td></td>
<td>,867</td>
</tr>
<tr>
<td>26. I would disprove this company</td>
<td></td>
<td>,773</td>
</tr>
</tbody>
</table>

Table A2. Measurement items forgiveness
### Rotated Component Matrix

#### Consumer satisfaction

<table>
<thead>
<tr>
<th>Items</th>
<th>Component</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. unfavorable-favorable</td>
<td>.865</td>
<td>.82</td>
</tr>
<tr>
<td>20. unpleasant-pleasant</td>
<td>.767</td>
<td></td>
</tr>
<tr>
<td>21. negative-positive</td>
<td>.862</td>
<td></td>
</tr>
<tr>
<td>22. unsatisfied-satisfied</td>
<td>.724</td>
<td></td>
</tr>
</tbody>
</table>

Table A3. Measurement items satisfaction.

### Rotated Component Matrix

#### Radical innovation (context)

<table>
<thead>
<tr>
<th>Items</th>
<th>Component</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Firm is a pioneer</td>
<td>.848</td>
<td>.70</td>
</tr>
<tr>
<td>12. Product new to the market</td>
<td>.819</td>
<td></td>
</tr>
<tr>
<td>13. Product uses technology in a new way</td>
<td>.716</td>
<td></td>
</tr>
</tbody>
</table>

Table A4. Measurement items radical innovation.

### Rotated Component Matrix

#### Consumer electronics

<table>
<thead>
<tr>
<th>Items</th>
<th>Component</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>32. Consumer electronics one of the most enjoyable things in life</td>
<td>.887</td>
<td>.73</td>
</tr>
<tr>
<td>33. Excessive amount of time on consumer electronics</td>
<td>.887</td>
<td></td>
</tr>
</tbody>
</table>

Table A5. Measurement items consumer electronics.
Appendix B

Descriptive statistics before re-allocation of respondents

In total, 108 respondents participated in the study (men = 85 and women = 23). Their age ranged from 19 to 31 with an average age of 24 years. Table B1 provides the descriptive statistics of the constructs. The table shows that the participants are satisfied about the new product that was presented in the experiment, which ranged from mean values between 2.51 - 3.39 (standard deviations ranging from .48 - .89). Regarding consumer forgiveness, respondents were also on average forgiving towards the fictitious firm (mean values ranging from 2.84 – 3.38 and standard deviations ranging from .71 - .94). No statement can be made about ambivalence for a scenario since it reflects an index where statements can only be made with a reference to another ambivalence value.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Condition</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer satisfaction</td>
<td>Scenario 1</td>
<td>24</td>
<td>3.25</td>
<td>.58</td>
</tr>
<tr>
<td></td>
<td>Scenario 2</td>
<td>16</td>
<td>3.08</td>
<td>.89</td>
</tr>
<tr>
<td></td>
<td>Scenario 3</td>
<td>16</td>
<td>3.39</td>
<td>.67</td>
</tr>
<tr>
<td></td>
<td>Scenario 4</td>
<td>17</td>
<td>3.25</td>
<td>.64</td>
</tr>
<tr>
<td></td>
<td>Scenario 6</td>
<td>17</td>
<td>2.69</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>Scenario 8</td>
<td>18</td>
<td>2.51</td>
<td>.48</td>
</tr>
<tr>
<td>Consumer forgiveness</td>
<td>Scenario 1</td>
<td>24</td>
<td>3.38</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>Scenario 2</td>
<td>16</td>
<td>3.27</td>
<td>.78</td>
</tr>
<tr>
<td></td>
<td>Scenario 3</td>
<td>16</td>
<td>3.13</td>
<td>.94</td>
</tr>
<tr>
<td></td>
<td>Scenario 4</td>
<td>17</td>
<td>3.14</td>
<td>.92</td>
</tr>
<tr>
<td></td>
<td>Scenario 6</td>
<td>17</td>
<td>2.84</td>
<td>.64</td>
</tr>
<tr>
<td></td>
<td>Scenario 8</td>
<td>18</td>
<td>2.98</td>
<td>.71</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>Scenario 1</td>
<td>24</td>
<td>3.25</td>
<td>1.54</td>
</tr>
<tr>
<td></td>
<td>Scenario 3</td>
<td>16</td>
<td>3.38</td>
<td>1.96</td>
</tr>
<tr>
<td></td>
<td>Scenario 6</td>
<td>17</td>
<td>3.76</td>
<td>1.99</td>
</tr>
<tr>
<td></td>
<td>Scenario 8</td>
<td>18</td>
<td>4.00</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Table B1. Descriptive statistics of the scenarios including the mean and standard deviations of the core variables.
Table B2. Correlation matrix including descriptive statistics (means and standard deviation) with N=108. NOTE: * indicates a correlation that is significant at the level of .05 (2-tailed). ** indicates a correlation that is significant at the level of .01 (2-tailed).

Table B2 shows the mean and standard deviations values of all the variables (N=108). As can be seen, the respondents are innovative (mean value of 3.65 and standard deviation of .59) which reflects the targeted population of innovators. Regarding the radical innovation, respondents perceived the new product in the experiment as a radical innovation (mean value of 3.93 and standard deviation of .84). Also on average, the respondents enjoy and spend an excessive amount of time on consumer electronic products which reflects their commitment to the product and the experiment which should enhance internal validity.
## APPENDIX C

### Detailed samples t-tests matrices before re-allocation respondents

<table>
<thead>
<tr>
<th></th>
<th>Independent Samples Test</th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
<td>df</td>
</tr>
<tr>
<td><strong>Consumer satisfaction</strong></td>
<td>Scenario 1 - 3</td>
<td>0.78</td>
<td>0.782</td>
<td>-0.705</td>
</tr>
<tr>
<td></td>
<td>Scenario 2 - 4</td>
<td>2.503</td>
<td>0.124</td>
<td>-0.639</td>
</tr>
<tr>
<td></td>
<td>Scenario 6 - 8</td>
<td>3.736</td>
<td>0.062</td>
<td>0.898</td>
</tr>
<tr>
<td></td>
<td>Scenario 1 - 6</td>
<td>0.857</td>
<td>0.360</td>
<td>2.836</td>
</tr>
</tbody>
</table>

Table C1. T-test of scenario 1 – 3, 2 – 4, 6 – 8 and 1 – 6 with satisfaction as dependent variable before re-allocation.

<table>
<thead>
<tr>
<th></th>
<th>Independent Samples Test</th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
<td>df</td>
</tr>
<tr>
<td><strong>Consumer forgiveness</strong></td>
<td>Scenario 1 - 3</td>
<td>1.511</td>
<td>0.290</td>
<td>0.902</td>
</tr>
<tr>
<td></td>
<td>Scenario 1 - 3</td>
<td>1.201</td>
<td>0.281</td>
<td>0.448</td>
</tr>
<tr>
<td></td>
<td>Scenario 6 - 8</td>
<td>0.105</td>
<td>0.748</td>
<td>-0.606</td>
</tr>
</tbody>
</table>

Table C2. T-test of scenario 1 – 3, 2 – 4, 6 – 8 and 1 – 6 with consumer forgiveness as dependent variable before re-allocation.
<table>
<thead>
<tr>
<th></th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>Ambivalence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1 - 6</td>
<td>1,979</td>
<td>.167</td>
</tr>
<tr>
<td>Scenario 3 - 8</td>
<td>2,348</td>
<td>.135</td>
</tr>
</tbody>
</table>

Table C3. T-test of scenario 1 – 6 and 3 – 8 with ambivalence as dependent variable before re-allocation.
## APPENDIX D

### Detailed samples t-tests matrices after re-allocation respondents

<table>
<thead>
<tr>
<th>Consumer satisfaction</th>
<th>Independent Samples Test After Re-allocation</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Levene’s Test for Equality of Variances</td>
<td>t-test for Equality of Means</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>Scenario 1 - 3</td>
<td>.716</td>
<td>.404</td>
<td>.182</td>
</tr>
<tr>
<td>Scenario 2 - 4</td>
<td>.</td>
<td>.</td>
<td>.462</td>
</tr>
<tr>
<td>Scenario 6 - 8</td>
<td>.239</td>
<td>.630</td>
<td>1.279</td>
</tr>
<tr>
<td>Scenario 1 - 6</td>
<td>.064</td>
<td>.802</td>
<td>-.126</td>
</tr>
</tbody>
</table>

*Table D1. T-test of scenario 1 – 3, 2 – 4, 6 – 8 and 1 – 6 with satisfaction as dependent variable after re-allocation.*
<table>
<thead>
<tr>
<th></th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td><strong>Consumer forgiveness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1 - 3</td>
<td>3,344</td>
<td>.078</td>
<td>768</td>
</tr>
<tr>
<td>Scenario 2 - 4</td>
<td></td>
<td></td>
<td>1,944</td>
</tr>
<tr>
<td>Scenario 6 - 8</td>
<td>2,717</td>
<td>.114</td>
<td>975</td>
</tr>
</tbody>
</table>

Table D2. T-test of scenario 1 – 3, 2 – 4, 6 – 8 with consumer forgiveness as dependent variable after re-allocation.

<table>
<thead>
<tr>
<th></th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td><strong>Ambivalence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1 - 6</td>
<td>26,410</td>
<td>.000</td>
<td>-10,721</td>
</tr>
<tr>
<td>Scenario 3 - 8</td>
<td>635, 294</td>
<td>.000</td>
<td>-6,271</td>
</tr>
</tbody>
</table>

Table D3. T-test of scenario 1 – 6 and scenario 3 – 8 with ambivalence as dependent variable after re-allocation.
### Independent Samples Test After Re-allocation

<table>
<thead>
<tr>
<th></th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>Consumer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>forgiveness</td>
<td>0,283</td>
<td>0,595</td>
<td>2,302</td>
</tr>
</tbody>
</table>

Table D4. T-test between pioneer and follower where scenario 1, 2 and 6 are taken together and scenario 3, 4 and 8.

### Independent Samples Test After Re-allocation

<table>
<thead>
<tr>
<th></th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>Consumer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>satisfaction</td>
<td>0,317</td>
<td>0,575</td>
<td>1,673</td>
</tr>
</tbody>
</table>

Table D5. T-test between pioneer and follower where scenario 1, 2 and 6 are taken together and scenario 3, 4 and 8 after re-allocation.
Appendix E

Correlation between construct radical innovation and time-to-market

<table>
<thead>
<tr>
<th></th>
<th>Radical innovation</th>
<th>Time-to-market</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radical</strong></td>
<td>Pearson Correlation</td>
<td>1,565**</td>
</tr>
<tr>
<td>innovation</td>
<td>Sig. (2-tailed)</td>
<td>,000</td>
</tr>
<tr>
<td>N</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td><strong>Time-to-</strong></td>
<td>Pearson Correlation</td>
<td>1,565**</td>
</tr>
<tr>
<td><strong>market</strong></td>
<td>Sig. (2-tailed)</td>
<td>,000</td>
</tr>
<tr>
<td>N</td>
<td>71</td>
<td>71</td>
</tr>
</tbody>
</table>

Table E1. Correlation matrix radical innovation (excluding time-to-market) and time-to-market
Scenario 1

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This survey is part of my master thesis project which I conduct from the sub-department of Innovation, Technology Entrepreneurship and Marketing at Eindhoven University of Technology. It is an experiment regarding a new product. In this experiment we will give you a scenario you have to read carefully. After reading the scenario, we will ask several questions. It will take approximately 10 minutes to read the scenario and complete the survey. We would also like to point out that your answers are not assessed as good or bad. Open and truthful answering is appreciated.

Thank you for your cooperation.

The first 8 questions are general questions and do not directly relate to the scenario.

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

1. Technology gives people more control over their daily lives
2. Technology gives you more freedom of mobility
3. Other people come to you for advice on new technologies
4. You can usually figure out high-tech products and services without help from others
5. Technical support lines are not helpful because they don’t explain things in terms you understand
6. When you get technical support from a provider of a high –tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you
7. You do not feel confident doing business with a place that can only be reached online
8. Any business transaction you do electronically should be confirmed later with something in writing
“Watching TV beyond 3D: the new experience”

A global and respected manufacturing firm, which is characterized according to critics as a product leader, innovative and risk-taking, has successfully launched a new product and has launched the product first, 9 months before any competition. The product is the result of extensive collaboration and R&D, which involved leading scientists in the field of neurosciences, psychology, computer science and engineering. This product is the next step after the 3D TV’s. It enables you to enjoy and experience video content from your TV on an entirely new way: this product is the next step after the 3D TV’s. It enables you to enjoy and experience video content from your TV on an entirely new way: this product stimulates your brain and enables you to experience scent. Think about explosions you can smell, morning dawn, cooking programs and so on. This firm is already developing the next generation of this product where there is no need for any (TV) screens or projectors to watch TV.

This new product uses a technology that is derived from Electroencephalography (EEG). The EEG technology is used in other industries such as the military and the gaming industry. In the gaming industry the technology is used to read electrical signals from the brain which detect thoughts, expressions as well as non-conscious emotions. This means that you can control video games with your thoughts (Ortutay, 2008). In the military industry similar technology is used in brainwave binoculars developed by the Defense Research Projects Agency (DARPA). These technology applications are focused on detecting brainwaves. In case of the new product, this technology is reversed.

How does it work? A special developed headset stimulates a specific area of the brain: the part of the brain where the cognitive and emotional processes are happening. This enables you to experience the video which you have never experienced before. Another device, that can be placed anywhere in your home acts as a processing system and is connected with your TV. This connection enables the synchronization between what you see on the TV and the experience of scent. Several studies have been conducted in the area of consumer safety since the human brain is a delicate part. The results
show positive significant results that the human brain is in no danger whatsoever. These studies were published in the journals Nature Reviews Science, the Behavioral and Brain Sciences and the Journal of the American Medical Association.

The following questions are about the text you just have read

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

9. The firm described can be considered as a pioneer

10. The product described is a product that is completely new to the market

11. The product described is a product that uses technology in a new way

Continuance of text

The manual of this product says that once you have installed the processing device and put up your headset the product will start immediately. The manual also says that you can use the product 3 hours non-stop. However, when using the product you discover you have to recharge the headset after every 1,5 hours of use instead of the 3 hours. So after 1,5 hours you have to put off the headset and recharge it. This takes approximately 20 minutes.
For all following questions, please try to answer the questions as if you had experienced the scenario in real life.

12. How would you rate the negative aspects of this product while ignoring the positive aspects?
(1=not all negative, 2=somewhat negative, 3=negative, 4=very negative, 5=extremely negative)

13. How would you rate the positive aspects of the product while ignoring the negative ones?
(1=not all positive, 2=somewhat positive, 3=positive, 4=very positive, 5=extremely positive)

Can you please state how your attitude would be towards the product regarding the positive and negative aspects it has?
(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

15. I would experience the presence of both positive and negative aspects of this product as conflicting

16. I would not have any mixed feelings about the presence of both positive and negative aspects of this product

Can you please state how your attitude would be towards the PRODUCT, regarding the positive and negative aspects it has?
17. (1= very unfavorable, 2= (unfavorable), 3= neutral, 4= (favorable), 5= very favorable)
18. (1= very unpleasant, 2= (unpleasant), 3= neutral, 4= (pleasant), 5= very pleasant)
19. (1= very negative, 2= (negative), 3= neutral, 4= (positive), 5= very positive)
20. (1= very unsatisfied, 2= (unsatisfied), 3= neutral, 4= (satisfied), 5= very satisfied)

25. Regarding the negative aspect of this product, how likely would you forgive this firm?
(1=very unlikely, 2= unlikely, 3= not unlikely not likely, 4= likely, 5= very likely)

The following statements are about your attitude would be towards the firm. Can you please state how much you agree with the following statements?
(1=strongly disagree, 2 = somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

21. I would feel sympathy towards this company
22. I would think favorable of this firm
23. I would disprove this company
24. I wouldn’t stop thinking about how I was wronged by this firm
325. I would wish for good things to happen for this firm who wronged me
26. This firm’s doing would kept me from enjoying life
27. Considering the new product described, how likely would you purchase the next improved generation of this product?

(1=very unlikely, 2= unlikely, 3= not unlikely not likely, 4= likely, 5= very likely)

28. How likely would you purchase other products from the same firm?

(1=very unlikely, 2= unlikely, 3= not unlikely not likely, 4= likely, 5= very likely)

The next final questions are some remaining general questions. Can you please state how much you agree with the following two statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

29. I find modern consumer electronics one of the most enjoyable things in my life (think about gaming, TV, smart phones, computers, gadgets etc.)

30. I spent an excessive amount of my time on consumer electronics such as gaming, watching TV, smart phones, computers, tablets, gadgets etc.

31. What is your age?

32. What is your gender?
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Thank you for your cooperation.

The first 8 questions are general questions and do not directly relate to the scenario.

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

1. Technology gives people more control over their daily lives
2. Technology gives you more freedom of mobility
3. Other people come to you for advice on new technologies
4. You can usually figure out high-tech products and services without help from others
5. Technical support lines are not helpful because they don’t explain things in terms you understand
6. When you get technical support from a provider of a high–tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you
7. You do not feel confident doing business with a place that can only be reached online
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This new product uses a technology that is derived from Electroencephalography (EEG). The EEG technology is used in other industries such as the military and the gaming industry. In the gaming industry the technology is used to read electrical signals from the brain which detect thoughts, expressions as well as non-conscious emotions. This means that you can control video games with your thoughts (Ortutay, 2008). In the military industry the technology is used in brainwave binoculars developed by the Defense Research Projects Agency (DARPA). These technology applications are focused on detecting brainwaves. In case of the new product, this technology is reversed. How does it work? A special developed headset stimulates two specific areas of the brain: the part of the brain where the cognitive and emotional processes are happening and the part of the brain which involves the processing of visual stimuli. These 2 combined enables you to watch and experience the video which you have never experienced before. Another device, that can be placed anywhere in your home and acts as a processing system, sends signals that contain video content to the headset. Several studies have been conducted in the area of consumer safety since the human brain is a delicate part. The results show positive significant results that the human brain is in no danger whatsoever. These studies were published in the journals Nature Reviews Science, the Behavioral and Brain Sciences and the Journal of the American Medical Association.
The following questions are about the text you just have read

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5= strongly agree)

9. The firm described can be considered as a pioneer

11. The product described is a product that is completely new to the market

12. The product described is a product that uses technology in a new way

The manual of this product says that once you have installed the processing device and put up your headset the product will start immediately. The manual also says that you can use the product 3 hours non-stop. However, when using the product you discover you have to recharge the headset after every 1,5 hours of use instead of the 3 hours. So after 1,5 hours you have to put off the headset and recharge it. This takes approximately 20 minutes
QUESTIONNAIRE MASTER THESIS RESEARCH C. ALKEMADE 2010

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Thank you for your cooperation.

The first 8 questions are general questions and do not directly relate to the scenario.

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

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2. Technology gives you more freedom of mobility
3. Other people come to you for advice on new technologies
4. You can usually figure out high-tech products and services without help from others
5. Technical support lines are not helpful because they don’t explain things in terms you understand
6. When you get technical support from a provider of a high –tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you
7. You do not feel confident doing business with a place that can only be reached online
8. Any business transaction you do electronically should be confirmed later with something in writing
“Watching TV beyond 3D: the new experience”

A manufacturing firm has launched an electronic consumer product and has launched the product second, 9 months after the first firm. This means that this firm has entered the market second. The product is the result of collaboration and R&D, which involved scientists in the field of neurosciences, psychology, computer science and engineering. This product is the next step after the 3D TV’s. It enables you to enjoy and experience video content from your TV on an entirely new way: this product is the next step after the 3D TV’s. It enables you to enjoy and experience video content from your TV on an entirely new way: this product stimulates your brain and enables you to experience scent. Think about explosions you can smell, morning dawn, cooking programs and so on. This firm is already developing the next generation of this product where there is no need for any (TV) screens or projectors to watch TV.

This new product uses a technology that is derived from Electroencephalography (EEG). The EEG technology is used in other industries such as the military and the gaming industry. In the gaming industry the technology is used to read electrical signals from the brain which detect thoughts, expressions as well as non-conscious emotions. This means that you can control video games with your thoughts (Ortutay, 2008). In the military industry similar technology is used in brainwave binoculars developed by the Defense Research Projects Agency (DARPA). These technology applications are focused on detecting brainwaves. In case of the new product, this technology is reversed. How does it work? A special developed headset stimulates a specific area of the brain: the part of the brain where the cognitive and emotional processes are happening. This enables you to experience the video which you have never experienced before. Another device, that can be placed anywhere in your home acts as a processing system and is connected with your TV. This connection enables the synchronization between what you see on the TV and the experience of scent. Several studies have been conducted in the area of consumer safety since the human brain is a delicate part. The results show positive significant results that the human brain is in no danger whatsoever. These studies were published in the journals Nature Reviews Science, the Behavioral and Brain Sciences and the Journal of the American Medical Association.

The following questions are about the text you just have read

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)
9. The firm described can be considered as a pioneer

11. The product described is a product that is completely new to the market

12. The product described is a product that uses technology in a new way

*The manual of this product says that once you have installed the processing device and put up your headset the product will start immediately. The manual also says that you can use the product 3 hours non-stop. However, when using the product you discover you have to recharge the headset after every 1,5 hours of use instead of the 3 hours. So after 1,5 hours you have to put off the headset and recharge it. This takes approximately 20 minutes.*
QUESTIONNAIRE MASTER THESIS RESEARCH C. ALKEMADE 2010

This survey is part of my master thesis project which I conduct from the sub-department of Innovation, Technology Entrepreneurship and Marketing at Eindhoven University of Technology. It is an experiment regarding a new product. In this experiment we will give you a scenario you have to read carefully. After reading the scenario, we will ask several questions. It will take approximately 10 minutes to read the scenario and complete the survey. We would also like to point out that your answers are not assessed as good or bad. Open and truthful answering is appreciated.

Thank you for your cooperation.

The first 8 questions are general questions and do not directly relate to the scenario.

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5=strongly agree)

1. Technology gives people more control over their daily lives

2. Technology gives you more freedom of mobility

3. Other people come to you for advice on new technologies

4. You can usually figure out high-tech products and services without help from others

5. Technical support lines are not helpful because they don’t explain things in terms you understand

6. When you get technical support from a provider of a high –tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you

7. You do not feel confident doing business with a place that can only be reached online

8. Any business transaction you do electronically should be confirmed later with something in writing
“Watching TV beyond 3D: the new experience”

A manufacturing firm has launched an electronic consumer product and has launched the product second, 9 months after the first firm. This means that this firm has entered the market second. The product is the result of extensive collaboration and R&D, which involved leading scientists in the field of neurosciences, psychology, computer science and engineering. This product is the next step after the 3D TV’s. It enables you to enjoy and experience video content on an entirely new way: this product is the next step after the 3D TV’s. It enables you to enjoy and experience video content on an entirely new way: this product produces the images directly in your brain so you can close your eyes and enjoy any video content without the use of (TV) screens or projectors. For gaming this means that you can experience it on an entirely new way: role-playing games are realistic role-playing games in a 3D world. Another application of this product is virtual conferencing which let you experience as if you are in a real meeting with colleagues around the world.

This new product uses a technology that is derived from Electroencephalography (EEG). The EEG technology is used in other industries such as the military and the gaming industry. In the gaming industry the technology is used to read electrical signals from the brain which detect thoughts, expressions as well as non-conscious emotions. This means that you can control video games with your thoughts (Ortutay, 2008). In the military industry the technology is used in brainwave binoculars developed by the Defense Research Projects Agency (DARPA). These technology applications are focused on detecting brainwaves. In case of the new product, this technology is reversed. How does it work? A special developed headset stimulates two specific areas of the brain: the part of the brain where the cognitive and emotional processes are happening and the part of the brain which involves the processing of visual stimuli. These 2 combined enables you to watch and experience the video which you have never experienced before. Another device, that can be placed anywhere in your home and acts as a processing system, sends signals that contain video content to the headset. Several studies have been conducted in the area of consumer safety since the human brain is a delicate part. The results show positive significant results that the human brain is in no danger whatsoever. These studies were published in the journals Nature Reviews Science, the Behavioral and Brain Sciences and the Journal of the American Medical Association.
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9. The firm described can be considered as a pioneer

11. The product described is a product that is completely new to the market

12. The product described is a product that uses technology in a new way

The manual of this product says that once you have installed the processing device and put up your headset the product will start immediately. The manual also says that you can use the product 3 hours non-stop. However, when using the product you discover you have to recharge the headset after every 1,5 hours of use instead of the 3 hours. So after 1,5 hours you have to put off the headset and recharge it. This takes approximately 20 minutes.
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The first 8 questions are general questions and do not directly relate to the scenario.

Can you please state how much you agree with the following statements?

(1=strongly disagree, 2= somewhat disagree, 3= neutral, 4= somewhat agree, 5= strongly agree)

1. Technology gives people more control over their daily lives
2. Technology gives you more freedom of mobility
3. Other people come to you for advice on new technologies
4. You can usually figure out high-tech products and services without help from others
5. Technical support lines are not helpful because they don’t explain things in terms you understand
6. When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you
7. You do not feel confident doing business with a place that can only be reached online
8. Any business transaction you do electronically should be confirmed later with something in writing
“Watching TV beyond 3D: the new experience”

A global and respected manufacturing firm, which is characterized according to critics as a product leader, innovative and risk-taking, has successfully launched a new product and has launched the product first, 9 months before any competition. The product is the result of extensive collaboration and R&D, which involved leading scientists in the field of neurosciences, psychology, computer science and engineering. This product is the next step after the 3D TV’s. It enables you to enjoy and experience video content from your TV on an entirely new way: this product is the next step after the 3D TV’s. It enables you to enjoy and experience video content from your TV on an entirely new way: this product stimulates your brain and enables you to experience scent. Think about explosions you can smell, morning dawn, cooking programs and so on. This firm is already developing the next generation of this product where there is no need for any (TV) screens or projectors to watch TV.

This new product uses a technology that is derived from Electroencephalography (EEG). The EEG technology is used in other industries such as the military and the gaming industry. In the gaming industry the technology is used to read electrical signals from the brain which detect thoughts, expressions as well as non-conscious emotions. This means that you can control video games with your thoughts (Ortutay, 2008). In the military industry similar technology is used in brainwave binoculars developed by the Defense Research Projects Agency (DARPA). These technology applications are focused on detecting brainwaves. In case of the new product, this technology is reversed. How does it work? A special developed headset stimulates a specific area of the brain: the part of the brain where the cognitive and emotional processes are happening. This enables you to experience the video which you have never experienced before. Another device, that can be placed anywhere in your home acts as a processing system and is connected with your TV. This connection enables the synchronization between what you see on the TV and the experience of scent. Several studies have been conducted in the area of consumer safety since the human brain is a delicate part. The results show positive significant results that the human brain is in no danger whatsoever. These studies were published in the journals Nature Reviews Science, the Behavioral and Brain Sciences and the Journal of the American Medical Association.
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Continuance of text

“The manual of this product says that once you have installed the processing device and put up your headset the product will start immediately and so you can enjoy watching the video content. However, after purchasing the product you have noticed when you use the product it now and then just turns off. So when you put up the headset and enjoy the video content the headset stops working and doesn’t send any signals to your brain. On average this happens every 30 minutes of continuous use of the product. This can be solved by making a soft reset. So every time this happens you have to reset the product. Resetting takes approximately 10 minutes”
Scenario 8

QUESTIONNAIRE MASTER THESIS RESEARCH C. ALKEMADE 2010

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Continuance of text

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