The impact of critical incidents on marketing intangibles

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1 INTRODUCTION

1.1 Research purposes and main research questions

The spying scandal at Lidl (2008/09); the BP oil spill (2010); the Libor scandal in the banking industry concerning, among others, Barclays, RBS and UBS (2012); the Ergo prostitute scandal (2012), and the Sanofi-Aventis pharmacy scandal (2012) are unexpected, extraordinary incidents which are able to affect stakeholder attitudes and perceptions. Bitner, Booms and Tetreault (1990) label such events as critical incidents due to their either positive or negative significant contribution to an activity or phenomenon.

Whereas any positive incident is considered to be good luck, the prevention of negative incidents, or rather their effect minimization, may be vital for a company. This applies in particular to incidents with the potential to turn into a corporate crisis such as, for example, the BP oil spill in 2010. According to Seeger, Sellnow and Ulmer (1998), a corporate crisis creates, as distinct from negative incidents, higher levels of uncertainty and threatens - or is perceived to threaten - the primary objectives of an organization.

However, a total prevention of negative incidents is unlikely. Moreover, companies are usually unable to avoid the publication of such events due to high media coverage and the fact that information is easily spread via the Internet. Consequently, there is a strong demand for research to clarify potential consequences and to understand the impact of negative incidents (hereafter referred to as critical incident - CI).

To meet this demand, a large number of qualitative studies analyze either the nature of critical incidents (e.g. Keaveaney, 1995; Shleifer, 2004) or possible consequences from a consumer perspective (e.g. Bitner et al. 1990; Gardial, Fisher, Flint & Woodruff, 1996; Roos, Edvardsson, & Gustafsson, 2004). As a result of the consumer focus, Roos (2002) defines

critical incidents (CI) as extraordinary events which are perceived or recalled negatively by customers before purchase, during purchase or consumption. Moreover, due to their qualitative focus, van Doorn and Verhoef (2008) call for more analyzes that quantify hypotheses.

While direct material or financial damage caused by critical incidents is largely easy to quantify, the evaluation of intangible damage is considerably more difficult whilst being simultaneously more crucial to the long-term success of a company. The importance of an intangible asset loss does not stem from its higher value, but rather from the fact that the company loses a potential source of a sustainable competitive advantage (Barney, 1991).

Srivastava, Shervani and Fahey (1998) distinguish between relational and intellectual market-based assets (intangibles) which are able, among other things, to enhance and accelerate cash flows as well as to reduce volatility and vulnerability of cash flows. Moreover, competitors cannot easily neutralize intangibles because they are hard to copy and not tradable via factor markets. Therefore, these assets can improve a company's efficiency and effectiveness in the long run (Barney, 1991). Accordingly, companies should aim to increase the value of their intangible assets and try to keep any damage away from them.

In order to avert damage, a broader knowledge is necessary. For this reason, this thesis gains knowledge about the effect of occurring critical incidents on diverse relational intangibles and their interrelations. For this purpose, according to van Doorn and Verhoef (2008), the thesis quantifies, inter alia, the impact of different critical incidents.

More precisely, among others, individual effects are analyzed from a consumer perspective using the concepts of brand equity and brand personality. For this purpose, the thesis adapts Keller's (1993) multidimensional concept of customer-based brand equity (CBBE) and Aaker´s (1997) concept of brand personality (BP). Thereby, Keller (1993) defines CBBE as a *differential effect that brand knowledge has on consumer response to the*

marketing of that brand and Aaker (1997) defines brand personality as *a set of human characteristics associated with a brand*. Because of a shared customer perspective of these two concepts and a joint experimental approach, the following research questions are addressed while taking the respective concepts into account:

- Does a critical incident affect the customer-brand relationship - even if not personally affected?
- If a critical incident has an effect on the customer-brand relation, is the effect linear across dimensions?
- Are the effects limited to certain dimensions?
- Which dimensions are affected and should be addressed afterwards?
- How strong are the effects in the respective dimensions?
- Does the effect strength differ depending on the nature of the critical incident?
- Do mediators such as credibility or criticality exist? And if so, what are the differences in credibility or criticality judgments between different CI?
- Is there a difference between the reactions of potential and loyal customers?
- Does a buffering effect of brand equity exist?

However, both analyses, addressing the questions above, reveal that a considerable effort is necessary to quantify the effect of critical incidents. Taking into account that neither attitudes and perceptions (of stakeholders who are not invested) nor their changes are public information, the following question therefore arises: how do companies or investors gain their information about the effect strength?

Following Fornell, Mithas, Morgeson and Krishnan (2006) as well as Ittner and Larcker (2003), high expenses, as a result of individually conducted surveys and the usage of sophisticated measurement technology, imply that explicit and central publications of

quantified information are the most efficient way to gain knowledge about relational asset changes or rather their actual values. As a consequence of publication, a market reaction would be expected due to exceeding or falling below the expectations of market participants.

However, Hannon and Milkovich (1996), Ittner and Larcker (1998), Fornell, Mithas, Morgeson and Krishnan (2006) as well as Abraham, Friedman, Khan and Skolnik (2008) are unable to confirm an impact of corporate reputation changes on share prices.

For this reason, this thesis measures market reactions to published corporate reputation shifts which are triggered by either negative or positive incidents. Thereby, corporate reputation is conceptualized, following Walker (2010), as a relatively stable, aggregated and indirectly suggestible perception within multiple stakeholder groups based on a company's past actions and future prospects in comparison to some reference. The specific questions addressed are as follows

- Is the information of intangibles fully reflected by share prices? Or, is there a need for the publication of such information?
- Is there a linkage between a corporate reputation shift and share price changes?
- How drives the value of intangibles the shareholder value? Do investors adjust their expectations if a CI occurs?
- How do investors know about the strength of CI effects?

In summary, the thesis aims to investigate individual effects of CI from a consumer perspective as well as the effect(s) of the publication of such information from a shareholder perspective.

1.2 Structure and Outline

The thesis comprises four autonomous chapters (2-5) addressing the questions above. Each chapter represents a self-contained essay. However, the first two essays investigate effects of critical incidents from a consumer perspective; whereas the remaining two essays concentrate on the shareholder perspective.

Essay 1[1] (Chapter 2) considers the impact of critical incidents on brand personality. For this purpose, perceptional data are gathered using an online experiment with a pretest-posttest-control design. Treatment group members are exposed to newspaper articles which describe either corruption or a product failure relating to the smartphone brands Nokia and Apple. Furthermore, the study applies the recently proposed brand personality scale of Geuens, Weijters and De Wulf (2009).

Based on the individual responses, LISREL calculates the model fit indices and estimates factor scores. These factor scores are used to compute brand and dimension specific latent means. Differences between pretest and posttest latent mean indicate perceptional changes. The findings imply that the impact of a critical incident on brand personality depends on brand strength and business relation before the incident occurs as well as on the nature of crisis. In addition, the results indicate that reactions are mediated by criticality and credibility, whereby the effect of criticality is dominant.

Having investigated effects on brand personality (considered being a subdimension of brand equity), the second essay examines whether or not effects on brand equity support the findings outlined above.

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[1] *Tischer (2012)*, published as SFB 649 Discussion Paper 2012-064, October 2012, Humboldt-Universität zu Berlin.

Essay 2[2] (Chapter 3) is a joint work with Lutz Hildebrandt. This essay investigates the effect of critical incidents on customer-based brand equity. For this reason, the impact is quantified on each brand-equity dimension (perceived quality, perceived value, brand personality, organizational associations, and loyalty) in the case of corruption or product failure. The measurement scales are adopted from well-established measures (e.g. Aaker, 1996; Yoo & Donthu, 2001). Because of similar research questions, attitudinal data are also gathered online using the same experimental pretest-posttest-control design.

The CI-induced effects are evaluated on the basis of latent mean changes. However, these mean shifts are estimated simultaneously using LISREL with mean structures (Sörbom, 1974) to take item means and invariance across samples into account. Moreover, LISREL is used to evaluate the proposed structure equation model.

The findings indicate, in conformity with the first essay, that effect sizes as well as the dimensions which are affected depend on brand strength, business relation, and the nature of the crisis. However, the results do not support a mediation of criticality.

Essay 3[3] (Chapter 4) is joint work with Anne Eckert and Lutz Hildebrandt. This essay investigates whether the publication of corporate reputation ranking, representing an aggregation of information about numerous positive and negative events, drives generally share prices. For this purpose, an event study is conducted taking into account the reputation ranking published by the German business periodical *Manager Magazin* in 2008.

The findings on excess returns are a first indication that investors use the information about value changes of reputation to adjust their expectations and hence share prices. Based

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[2] *Tischer and Hildebrandt (2012)*, published as SFB 649 Discussion Paper 2012-062, October 2012, Humboldt-Universität zu Berlin.

[3] *Eckert, Tischer and Hildebrandt (2010)*, published in: The 6 Senses - The Essentials of Marketing, Proceedings of the 39th EMAC Conference, Copenhagen Business School, Copenhagen/ Denmark, 1-4 June.

on these results, the following essay investigates the announcement effects more detailed. Consequently, essay 3 can be considered as pre study of the fourth essay.

Essay 4[4] (Chapter 5) is a joint work with Lutz Hildebrand. This essay considers negative and positive reputation changes separately in contrast to the third one. Moreover, the respective portfolios are created under consideration of relative improvements or deteriorations of competitive position in comparison to the previous ranking. Therefore, reputation rankings of the years 1998 to 2008, published by *Manager Magazin*, are used to look for announcement effects. Additionally, this essay provides the theoretical framework of the linkage between reputation and share prices which addresses, among others, the need for investors to take intangibles into account.

Table 1.1 Overview of contained essays

	Research purpose	Concept under investigation	Research focus	Method
Essay 1 Tischer (2012)	Quantifying the impact of critical incidents	Brand personality	Empirical Research (Online experiment)	• Confirmatory factor analysis • Structure equation modeling (incl. invariance tests) • Missing value analysis (EM) • ANOVA, Kruskal-Wallis-Test • t-tests (paired and independent samples) • χ^2-tests, • Mann-Whitney U- &Wilcoxon signed rank test
Essay 2 Tischer and Hildebrandt (2012)	Quantifying the impact of critical incidents	Brand equity	Empirical Research (Online experiment)	
Essay 3 Eckert, Tischer and Hildebrandt (2010)	Quantifying market reactions to changes of intangibles	Corporate reputation	Empirical Research (Event study)	• Regression analysis • T-test
Essay 4 Tischer and Hildebrandt (2012)	Quantifying market reactions to changes of intangibles	Corporate reputation	Empirical Research (Event study)	• Regression analysis • T-test • Welch's t-test

The findings on announcement effects, as well as the additionally conducted portfolio studies, imply that the value of intangibles is not fully reflected by share prices. Consequently, there is a need for publication. Furthermore, the excess returns reveal that a

[4] *Tischer and Hildebrandt (2012)*, accepted for publication in *Journal of Business Research*.

negative reputation shift; indicating a deterioration of competitive position, reduce the shareholder value in opposition to value-increasing positive shifts.

Table 1.1 gives an overview of the research purpose, research focus, concepts under investigation and the applied methods of the four essays.

1.3 Contribution

This section provides the main contributions for marketing academics and for practitioners. For this purpose, focusing on scientific relevance first, the key findings of each essay are briefly summarized. In the following, these theoretical insights are considered with regard to their management implications.

1.3.1 Scientific relevance

This thesis contributes in several ways to the scientific literature. On the one hand, the thesis can be considered as a response to the request of van Doorn and Verhoef (2008). The first two essays support quantitatively various prior findings. For example, the findings indicate buffering effects regarding high equity brands (Dawar & Pillutla , 2000) and personal experience during a crisis (Aaker & Biel, 1993). However, the thesis goes beyond the quantification of earlier proposed effects. On the other hand, this thesis contains the first study showing announcement effects of the publication of corporate reputation rankings.

Essay 1 presents the first analysis which sheds some light on perceptional changes of the brand personality concept triggered by a CI. Accordingly, the essay extends the knowledge about effects, their strength and the affected dimensions. For example, a comparison between effects of corruption and product failure reveals that the responsibility dimension is only significantly affected in the case of corruption. This indicates, brand personality shifts differ depending on the nature of the CI.

Furthermore, the results reveal currently neglected differences between reactions of potential and loyal customers which should be taken into account in further research. Also, the existence of mediators such as perceived credibility and criticality is indicated. Additionally, the results support the efficacy of the recently proposed measurement model of Geuens et al. (2009) in Germany as well as beyond the Coca-Cola brand.

Essay 2 is the first study of CI-induced effects on customer-based brand equity which quantifies and compares attitudinal changes of diverse CI. Consequently, first insights are gained which show, among other things, effects and the affected dimensions differ depending on the nature of the CI. Additionally, an experimental design is offered (used in essay 1 as well) which is able to reduce prior design criticism and works as intended (e.g. with regard to credibility of hypothetical incidents).

Furthermore, this essay contributes to scientific literature by, on the one hand, proposing a new structural model taking into account the mediation of perceived value. The fit indices indicate the suitability of the model across both smartphone brands - Nokia and Apple – as well as for potential and loyal customers. On the other hand, the usability of various measurement scales with regard to differing concepts is supported (e.g. Lassar, Mittal & Sharma, 1995; Aaker, 1996; Yoo & Donthuy, 2001) in Germany.

Essay 3 and **4** expand mainly scientific literature by linking corporate reputation and shareholder value via announcement effects of reputation-ranking publications. Thereby, these essays are the first which do not violate the basic methodological assumptions (see e.g. McWilliams & Siegel, 1997; MacKinlay, 1997) and support effects. Moreover, the findings imply that intangibles are not fully reflected by share prices. Consequently, there is a need for publication of quantified information about intangible assets and its changes.

1.3.2 Managerial relevance

In the context of CI, managers are basically confronted with the two following questions. What can we do to reduce a potential effect before a CI happens? Or, what can we do when a CI has already happened? This thesis addresses both questions.

With regard to activities in advance of the CI, the findings on intangibles, such as brand equity and corporate reputation, indicate that value-increasing marketing efforts are also justified by creating a buffer against CI. Moreover, the efforts are paying off - and not just in the long run. The findings imply that investors take the effort or rather its outcome into account to adjust their expectations. As a result, higher values of intangible assets drive share prices and shareholder value. Consequently, the investment character of these marketing efforts is supported. Assuming the shareholder focus of management as a given, this argument justifies marketing efforts to build stronger associations best while competing for rare firm resources.

Focusing on the second question, the findings reveal mainly that critical incident effects differ significantly. As a result, there is not a general response strategy. Accordingly, concrete recommendations of action are difficult due to the novelty and uniqueness of insights nowadays. However, there are some tendencies.

On the one hand, the results indicate that differing response between potential and loyal customers could be useful. For example, if consumers are not personally affected (negative publicity) then post-event communication could concentrate on potential customers because they miss the attitude-stabilizing anchor of personal experience. In contrast, when consumers are personally affected, communication should focus on loyal customer. This applies in particular when product failures occur.

On the other hand, findings indicate that either responsibility perception or organizational associations are damaged in the case of corruption. Consequently, a communication strategy

addressing these dimensions might be more helpful to reduce damages. Furthermore, regardless of the nature of CI, the results reveal quite often an impact on the quality perceptions. Thus, a product quality highlighting communication seems to be expedient after a critical incident occurs.

In general, the thesis delivers insights which imply that companies should not be so casual about corruption. Reactions to unethical behavior are quite strong. However, the results also suggest that CI affect strong brands less. Therefore, some rare incidents may offer a chance to support positive attitudes and perceptions by adequate post crisis activities.

2 MEASURING THE IMPACT OF CRITICAL INCIDENTS ON BRAND PERSONALITY

Sven Tischer (2012)

Discussion Paper

ABSTRACT

To evaluate how occurring critical incidents change customer perceptions of brand personality, this study measures the impact on the basis of an online experiment. For this purpose, 1,132 usable responses are gathered considering the smartphone brands of Apple and Nokia as well as different critical incidents (corruption vs. product failure). Brand personality perceptions before and after these negative incidents are collected using the measurement model of Geuens, Weijters and De Wulf (2009). The measurement model is examined and the group specific factor scores are estimated. Based on these factor scores, latent means are calculated and hence reactions (personality shifts) are evaluated. The findings indicate that brand personality dimensions are not equally affected. Moreover, the results demonstrate that both brand equity and the business relationship before crisis moderate the effect of distinct critical incidents.

2.1 Introduction

In a world where product characteristics are easily copied and consumers take product quality for granted (van Rekom, Jacobs & Verlegh, 2006) a strong brand is essential to enhance firm performance. Consequently, firms try to avoid any brand damaging behavior or events. Although, a complete absence of such negative incidents is impossible. Therefore, marketing research has been intensifying to figure out which incidents destabilize the relationship between individuals and brands (e.g. Keaveaney, 1995) and how this occurs (e.g. Aaker, Fournier, Brasel, 2004; Klein & Dawar, 2004).

Contributing to these questions, this study uses brand personality conceptualized as brand relevant and an applicable set of human personality traits (Azoulay & Kapferer, 2003) to identify relational changes and potential moderators. For this purpose, the recently proposed brand personality scale of Geuens, Weijters and De Wulf (2009) is applied in an online experiment. As a result, the analysis is able to quantify changes per personality dimension in the case of critical incidents.

Roos (2002) defines such critical incidents (CI) as extraordinary events which are perceived or recalled negatively by customers before purchase, during purchase or during consumption. The possible impact of these negative perceptions has led to some quantitative studies which focus mostly on service failures (e.g. Maxham & Netemeyer, 2002; Gustafsson, Johnson & Roos, 2005; van Doorn & Verhoef, 2008). The few remaining studies quantify either effects of product harm crises (Ahluwalia, Burnkrant & Unnava, 2000; Dawar & Pillutla, 2000; Klein & Dawar, 2004; Cleeren, Dekimpe & Helsen, 2008; Dawar & Lei, 2009) or unethical marketing behavior (Ingram, Skinner & Taylor, 2005).

In order to expand knowledge about perceptional and relational changes in the case of a product harm crisis as well as unethical behavior, this study compares reactions using the concept of brand personality. To put it in a nutshell, the study focuses on product brands in

order to gain insights into immediate reactions to different critical incidents considering various brand strengths (Ahluwalia et al., 2000; Dawar & Pillutla, 2000; Cleeren et al., 2008) and relations before the incident (Ahluwalia, 2002; Dawar & Lei, 2009; van Doorn & Verhoef, 2008). As a result, the following study is the first which explores an integrated relationship-branding perspective and compares the effect of distinct critical incidents regarding various brands and personality dimensions. Moreover, by analyzing the smartphone brands Nokia and Apple in Germany, this study investigates and confirms the applicability and cross-cultural validity of the new personality scale beyond the Coca-Cola brand as required by Geuens et al. (2009).

The article first reviews the theoretical background of brand personality and critical incidents to continue with the development of hypotheses. The next sections present the research methodology, the sample and the results. Finally, discussion and limitations of this research are presented.

2.2 Theoretical background

2.2.1 Brand personality

The concept of brand personality has already been considered in research since 1958, when Martineau uses the word to characterize the special and non-material dimensions of a store. However, only Aaker (1997) revives a broader scientific interest in that animism theory-based concept. She defines brand personality as *a set of human characteristics associated with a brand* which develop by any direct or indirect brand contact (Aaker, 1997). Following Parker (2009), direct sources of these personality traits are people and their behavior associated with the brand such as celebrities, the CEO or a spokesman. Whereas, indirect sources are all kinds of information, such as product attributes, prices, marketing and communication style, as well as the brand name and the symbol itself (Parker, 2009). These

indirect personality associations are assigned to a brand on the basis of perceived brand behavior including the marketing mix and management decisions (Maehle & Supphellen, 2011).

Besides her conception, Aaker (1997) proposes a scale consisting of 42 items which reflect the five dimensions of sincerity, excitement, competence, sophistication and ruggedness. As a result, on the one hand, the proposed measurement model is examined several times, but not always with satisfactory results (e.g. Aaker, 1999; Ferrandi, Valette-Florence & Fine-Falcy, 2000; Aaker, Benet-Martinez & Garolera, 2001; Kim, Han & Park, 2001). On the other hand, Aaker's (1997) conceptionalization and scale have also been heavily criticized due to their inclusion of non-personality items (e.g. Azoulay & Kapferer, 2003; Bosnjak, Bochmann & Hufschmidt, 2007; Geuens et al., 2009), their non-generalizability at the respondent level (Austin, Siguaw & Mattila, 2003) and their cross-cultural non-replicable factor structure (e.g. Bosnjak et al., 2007; Milas & Mlačić, 2007; Geuens et al., 2009). To overcome these issues, Geuens et al. (2009) propose a new brand personality measure using the more strict conception of Azoulay and Kapferer (2003), who define brand personality as *the unique set of human personality traits both applicable and relevant to brands*.

Aaker (1997), Geuens et al. (2009) as well as the other above mentioned factor-analytic based brand personality studies share the idea that a five-factor model is able to reflect all relevant personality dimensions. These five dimensions are called in many cases analogues to human personality OCEAN and include the dimensions of **O**penness, **C**onscientiousness, **E**xtraversion, **A**greeableness und **N**euroticism (Azoulay & Kapferer, 2003). Goldberg (1990) labels them the Big Five. Inspired by these Big Five, a host of studies identify similar personality dimension (for an overview see Geuens et al., 2009).

Every personality dimension is split into facets to be reflected by various adjectives (also called markers of the Big Five by Goldberg (1992) and Saucier (1994)) which describe human personality traits. This procedure follows the psycho-lexicographical approach of Allport (1937), assuming that each relevant personality trait has become part of vocabulary via socializing and is hence mentioned in a dictionary. For example, the traits up-to-date, modern and innovative (Caprara, Barbaranelli & Guido, 2001) reflect the facets being open to new experiences and intellectual curiosity of the personality dimension Openness (Azoulay & Kapferer, 2003). Emphasizing the latter facet of this dimension, Milas and Mlačić (2007) relabel it Intellect. Also the Neuroticism dimension, including traits such as relaxed, phlegmatic and insensitive, is renamed Emotional Stability by Milas and Mlačić (2007).

Basically, due to the distinction between a sender and receiver perspective, brand personality is a major component of both brand identity (sender) and brand image (receiver). Consequently, on the one hand, Aaker and Joachimsthaler (2000) classify brand personality as one of the four brand identity elements in addition to the product, organization and symbol. On the other hand, following Plummer (1985), Keller (1993) identifies brand personality as one of the non-product related attributes of brand image perceived by consumers. Summed up, the concept of brand identity covers the desired public brand personality of a company (Kapferer, 2008), whereas, brand image focuses on the perceived one. Therefore, brand personality is an appropriate instrument to manage a brand in a way that consumers build strong relations with it (Fournier, 1998).

2.2.2 Critical incidents

Flanagan (1954) first uses the term critical incident by labeling a set of observation procedures for human behavior as critical incident technique. These procedures gather observed incidents with special significance meeting systematically defined criteria

(Flanagan, 1954). Bitner, Booms & Tetreault (1990) describe such an incident as critical when contributing significantly either positively or negatively to an activity or phenomenon. Focusing on negative incidents as defined by Roos (2002; see introduction), a negatively changed buying behavior can be triggered by these incidents (e.g. Gustafsson et al., 2005; Bitner et al., 1990). This would mean that companies lose operating efficiencies and future revenue streams as a result of customers who reduce their spending and purchase frequency, purchase at discount prices or switch to another supplier.

Different causes may trigger these consequences. In accordance with Keaveney (1995), CI result from either pricing problems, lack of convenience, core service (product) failures, service encounter failures, inadequate responses to failures, attraction by competitors or ethical problems. Concentrating on service failures, Keaveney (1995) distinguishes only two ethical problems while interacting with the customer: dishonest or intimidating behavior and conflicts of interest related to commission-based recommendations.

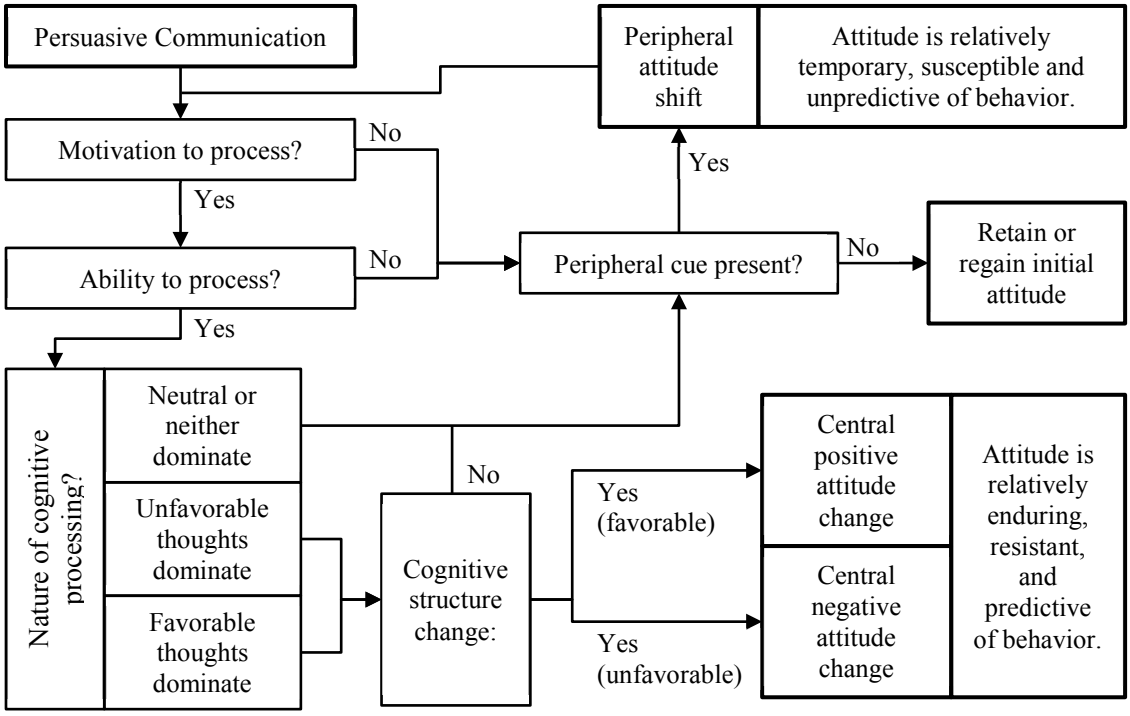
However, public awareness has changed with regard to what is deemed to be an ethical problem. Furthermore, due to better educated, increasingly skeptical and demanding consumers (Mangold & Faulds, 2009) and their ability to publish negative incidents easily via the internet, customers do not experience most CI personally nowadays. Instead, people perceive especially ethical problems in the media as negative publicity. As a consequence, Shleifer (2004) takes a more general perspective on ethical problems and differentiates, additionally to Keaveney (1995), between employment of children, excessive executive payments, corporate earnings manipulation, involvement of universities in commercial activities and corruption.

In order to compare perceptional changes of brand personality with regard to two distinct critical incidents, this study quantifies immediate reactions after becoming aware of a product failure and an ethical problem such as corruption.

2.2.3 Information processing (cognitive response theory)

Cognitive response theory respectively the Elaboration Likelihood model (ELM) of Petty and Cacioppo (1986) explains differing reactions to CI and their causes with regard to customer-brand relation and transmitting media. ELM posits a central and a peripheral route of information processing for persuasion (see Figure 2.1). Depending on the route of information processing, stability of attitudes and hence the willingness to change them when critical incidents occur differ significantly.

Figure 2.1: Elaboration Likelihood model (cognitive response theory, Petty & Cacioppo, 1986)



Persuasion along the central route implicates an adoption and storage in memory of new cognitions due to dealing intensively with new information. This effortful elaboration implies the motivation and ability to process information which depends on personal relevance, initial attitudes, prior knowledge as well as the quality of arguments. Attitudes formed following this central route are expected to be relatively easily accessible, stable over time and resistant to competing messages (Petty, Haughtvedt & Smith, 1995). In contrast, the peripheral route

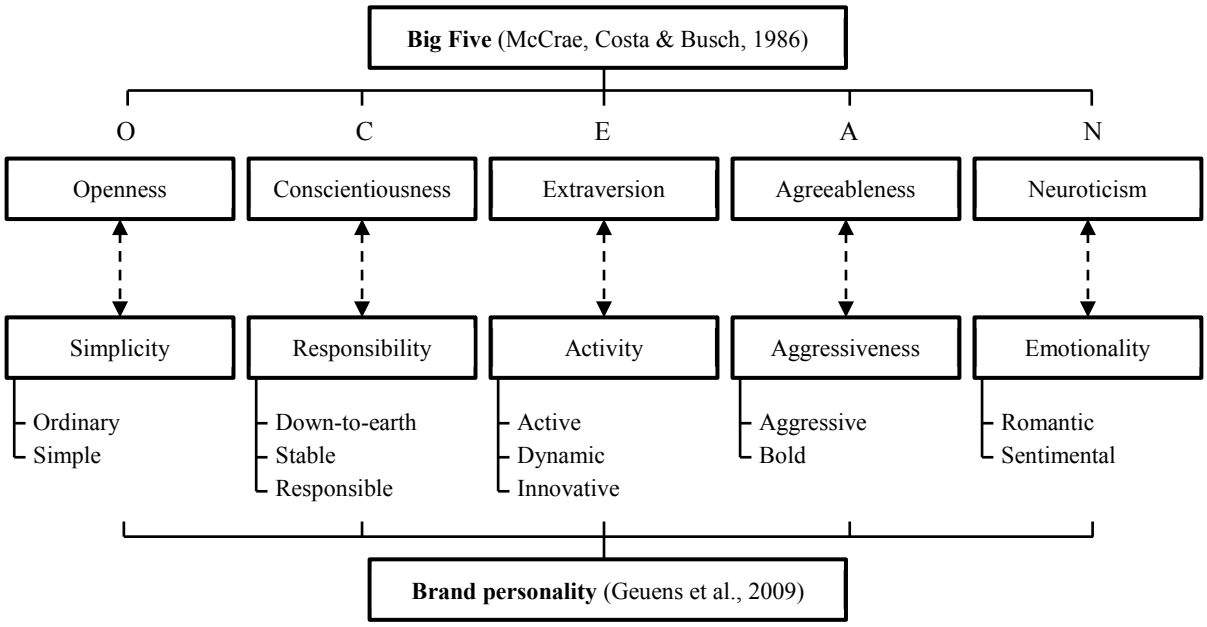
refers to attitude formation and changes on the basis of simple cues such as source attractiveness, credibility or message length which are relatively temporary (Petty, Cacioppo, Strathman & Priester, 2005).

2.3 Development of hypotheses

2.3.1 Measurement hypotheses

In order to measure reactions, first, an appropriate measurement model has to be chosen. Due to above mentioned weaknesses of Aaker's (1997) brand personality scale, this study adopts the conception, factor structure and measures of Geuens et al. (2009) to take the within-brand variance at the respondent level into account during analyses. Furthermore, Geuens et al. (2009) have already shown the appropriateness of their scale to measure personality of mobile phone brands in general and of Nokia and Apple (iPhone) in particular. As depicted in Figure 2.2, their proposed scale consists of 12 items reflecting the dimensions Responsibility, Activity, Aggressiveness, Simplicity and Emotionality.

Figure 2.2: Measurement model of brand personality derived from a five factor model (Big Five)
(following McCrae, Costa & Busch, 1986; Geuens et al., 2009)



Following Geuens et al. (2009), these 12 markers cover all brand relevant facets of the human personality dimensions (OCEAN) and reproduce the Big Five quite well. They rename the dimensions Conscientiousness to Responsibility, Extraversion to Activity, Agreeableness to Aggressiveness, Openness to Simplicity and Neuroticism (Emotional stability) to Emotionality in accordance with (in line with) John and Srivastava (1999) to reflect more precisely the contained facets (Geuens et al., 2009). Based on the results in Belgium and in the US (iPhone), the following hypothesis is proposed:

Hypothesis 1: The scale of Geuens et al. (2009) is appropriate to measure brand personality of the smartphone brands Nokia and Apple.

This leads to the following sub hypotheses regarding the operationalizing of personality dimensions and their corresponding indicators:

Hypothesis 1a: The traits down to earth, stable and responsible reflect the dimension Responsibility.

Hypothesis 1b: The markers active, dynamic and innovative reflect the dimension Activity.

Hypothesis 1c: The traits aggressive and bold reflect the dimension Aggressiveness.

Hypothesis 1d: The markers ordinary and simple reflect the dimension Simplicity.

Hypothesis 1e: The dimension Emotionality is reflected by the markers romantic and sentimental.

2.3.2 Reaction hypotheses

Keller (1993) postulates that negative associations are formed on the basis of new negative information (knowledge). Several studies confirm basically this relationship when a critical incident occurs (e.g. Ahluwalia et al., 2000; van Heerde, Helsen & Dekimpe, 2007). However, due to different desired brand personalities and the absence of an optimal one in general, the

question arises: What are negative personality associations? Regarding brand personality the negativity of a change depends on the perspective as well as on the desired and perceived personality or rather the gap between them. Consequently, the following more general hypothesis is proposed:

Hypothesis 2: A critical incident induces a change of (perceptional) brand personality.

However, closer examination reveals first indications that perceptions, and hence the impact of critical incidents, vary depending on customer-brand relation, crisis and the medium which transmits the message. These variations are attributable to differing cognitive responses and perceived risks.

2.3.2.1 Hypotheses due to customer-brand relation

With regard to customer-brand relation, following the ELM (Petty & Cacioppo, 1986), the reaction is expected to be moderated by both the relationship and the level of brand equity before crisis. The moderating relationship-effect is attributable to more favorable and stable attitudes of actual customers which are formed along the central route based on their own experiences and effortful elaboration with the brand. The pre-crisis level of brand equity moderates the reaction because of more often and favorable news coverage of a high equity brand. Consequently, compared to a low equity brand, consumers form more favorable and stable attitudes towards a high equity brand due to repetitions and greater number of senders (message sources and hence credibility increases).

Various studies confirm these moderators using the concepts familiarity (Ahluwalia, 2002; Cleeren et al., 2008; Dawar & Lei, 2009), commitment (Ahluwalia et al., 2000; Ingram et al., 2005) and brand equity (Dawar & Pillutla, 2000; Cleeren et al., 2008). Specifically, this means critical incidents have less influence on familiar customers, customers who are highly

committed to a brand as well as customers with substantial brand equity. The authors attribute these buffering effects to more likely biased processing of loyal customers (Ahluwalia et al., 2000), their opportunity to increase their personal experience during crisis (Aaker & Biel, 1993) and their tendencies to resist or discount disconfirmatory information (Dawar & Pillutla, 2000).

Assuming that these concepts indicate an outcome of a more or less intensive elaboration (cognitive response) before crisis, their findings and explanations are in line with ELM (Petty & Cacioppo, 1986). Furthermore, supposing that loyal customers possess more brand knowledge as well as stronger associations (Romaniuk, 2008) and are hence more familiar and committed compared to potential customers, consistent with prior research, the following hypotheses result:

Hypothesis 3: Compared to non-customers, current customers react and change their personality perception less intensively.

Hypothesis 4: Higher brand equity leads to smaller effects of the critical incident.

Based on the significantly higher brand equity of Apple (see Millward Brown, 2012; BrandZ) and the fact that Apple is considered to be a pioneer in producing smartphones, a more stable brand perception and brand personality is assumed. This stability results from a more often positive reporting with regard to the investigated product category compared to Nokia the less successful brand in 2011. Consequently, hypothesis 4 is refined and split into the following sub hypotheses:

Hypothesis 4a: The critical incidents affect the perceived brand personality of Apple customers less than Nokia customers.

Hypothesis 4b: Compared to Apple, potential customers of Nokia change their personality perception more.

2.3.2.2 Hypotheses due to the nature of crisis

According to Dawar and Lei (2009), the influence of the nature of crisis depends on whether key benefit associations are affected. This implies that different critical incidents influence different brand dimensions. Hence, transferred to brand personality, affected personality traits vary depending on the nature of crisis. This variation is due, above all, to differing customer perceptions of financial, functional, physical, social and/or psychological risks (Weißgerber, 2007).

A product failure goes usually hand in hand with financial (loss of investment) and functional (malfunction) risks, supplemented by physical risks in some cases. Due to the used settings (respondents are not in danger to be directly affected, see Chapter 4.1), only social and psychological risks are relevant for both product failure and corruption. More precisely, the risk is a loss of societal status due to lacking acceptance of brand usage as well as questioning of the emotional bond or self-expression benefits (Weißgerber, 2007).

Corruption as well as a product failure represents misbehavior of management possibly associated with the brand. Whereas corruption is a violation of ethical principles and illegal, a product failure is usually a consequence of lacking duty of care during the development or production of goods. Both incidents do not indicate responsible actions. Thus, the following hypotheses are proposed:

Hypothesis 5a: In the event of corruption, Responsibility (RES) goes down.

Hypothesis 5b: Responsibility (RES) decreases in the case of a product failure.

Moreover, corruption may indicate that a person (brand) is not innovative or dynamic enough to achieve objectives legally. In contrast, a product failure is a lack of action (testing and debugging) and an indicator of being less innovative. Hence, the next hypotheses are:

Hypothesis 6a: In the event of corruption, Activity (ACT) is negatively affected.

Hypothesis 6b: Activity (ACT) decreases in the case of a product failure.

From the customer's perspective, corruption is a deliberate misconduct of management to achieve financial objectives. This action, regardless of ethics, represents an aggressive behavior originated by base motives. Consequently, the following hypothesis is offered:

Hypothesis 7: In the case of corruption, the Aggressiveness increases.

In addition, depending on the nature of crisis, perceived seriousness (criticality) varies due to the potential amount of damage, geographic and chronological proximity as well as whether or not the people are directly affected. Laufer, Gillespie, McBride and Gonzalez (2005) show that perceived severity mediates the impact of critical incidents. Dawar and Lei (2009) confirm this mediation on negative perceptions measuring seriousness. Thus, the following hypothesis is proposed:

Hypothesis 8: Less critically perceived CI affect brand personality less.

2.3.2.3 Hypothesis due to transmitting medium

With regard to the medium transmitting bad news, in accordance with ELM (Petty & Cacioppo, 1986), the quality of arguments as well as the credibility of the medium (e.g. newspaper, expert) is crucial to affect attitudes. This means the more credible the medium is perceived, the more likely and more extensive the processing of information is. Consequently, the final hypothesis is offered:

Hypothesis 9: Less credibly perceived news affects brand personality less.

2.4 Methodology

2.4.1 Study design

In order to test these specified hypotheses, attitudinal data are gathered via the internet using an experimental pretest-posttest-control design. The experimental design considers

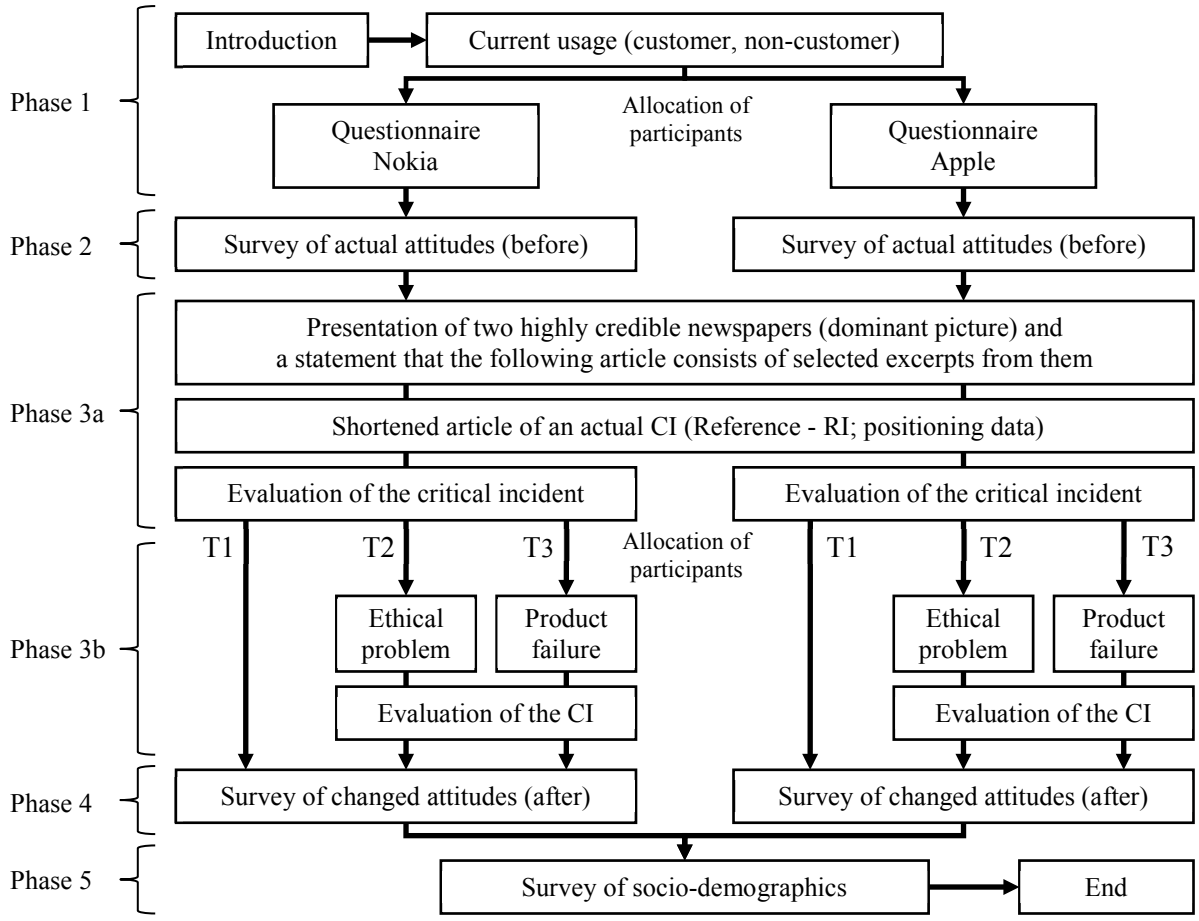
additionally three independent variables – level of brand equity (low vs. high, Nokia vs. Apple respectively), current relationship (customer vs. non-customer) and the nature of the critical incident (product failure vs. ethical problem). Consequently, the design consists of 8 treatment and 4 control groups (2x2x3). All test subjects are assigned randomly to a treatment or control group except current customers of the brands under investigation. Nokia and Apple customers are allocated randomly to a treatment or control group in their respective survey to reach or exceed a minimum threshold of responses in every group. This means, all responses regarding Nokia do not contain the responses of customers who use currently an Apple mobile phone and vice versa (see Figure 2.3).

The treatments are fictitious articles claiming a product failure or corruption happened recently in and limited to East Asia. Consequently, the incidents do not concern the participants personally. Focusing on attitudinal changes triggered by the incident, these articles exclude any kind of company response. In order to maximize credibility, the articles are created on the basis of past CI in the mobile phone industry (malfunction of batteries and bribery to receive a government order). Also, all participants are exposed first to a well-known critical incident in the industry. For this purpose, this study takes advantage of the data protection discussion regarding smartphones which collect and save positioning data without the knowledge of its user. To offer or rather recall this information concerning both brands, two existing articles of highly credible German-language newspapers are combined. In addition, respondents are informed about the source and are exposed to a picture of cited newspapers speculating that memories of this picture increase the credibility of the fictional treatments.

Examining the success of manipulation and the influence of these mediators, subsequent to every article presentation, respondents evaluate their knowledge, perceived credibility and criticality of the critical incident. The article presentation (one per control group and two per

treatment group) follows a second measurement of all brand equity dimensions. Consequently, pretest results reflect actual attitudes to a specific smartphone brand based on past perceptions and/or direct experiences, whereas, the second measurement covers the reaction to critical incidents. Finally, socio-demographics are collected.

Figure 2.3: Experimental design



2.4.2 Model evaluation and hypotheses tests

Before evaluating the measurement model, this study examines first the assumptions of varying perceived personalities with regard to loyal and potential customers as well as distinct brands. For this purpose, descriptive statistics are compared and significances of personality differences between groups are tested using a one-way ANOVA followed up by multiple comparisons with Bonferroni correction.

The evaluation of the measurement model consists of analyses regarding reliability, validity, model fit and invariance across groups. Starting with examinations of reliability and validity, a confirmatory factor analysis is conducted for each group. To assess the model fit, this study uses LISREL (version 8.80) with mean structures (Sörbom, 1974) to consider item means and invariance across samples according to Baumgartner and Steenkamp (2006). The estimated parameters (Maximum Likelihood Estimation) show the effect of variables in an absolute sense and are used to compare similar models in other populations (Bagozzi, 1977). Consequently, configural, metric, strong factorial and strict factorial invariance are sequently analyzed using multi-sample-analyses based on covariances and means.

Model evaluation follows an analysis of potential mediators such as knowledge, credibility and criticality. Between-subject effects are examined using ANOVA and multiple comparisons with Bonferroni correction. Within-subject effects of paired samples are analyzed to identify differences in perceptions of distinct incidents (reference incident (RI) to corruption (T2) or product failure (T3)).

In order to evaluate reactions to critical incidents, relative changes in latent variables are considered. To determine these latent variables, LISREL estimates factor scores taking into account model structure, group segmentation and actual attitudes (first measurement). Based on these factor scores, latent variables are calculated before and after the treatments for each respondent, assuming stable factor scores over time. Finally, changes in latent variables are examined using between- and within-subject analyses as well as parametric and non-parametric tests.

2.5 Sample

2.5.1 Data collection and profile of respondents

The data are collected online using a snowball-sampling. For this purpose, an internet link was spread via student mailing lists asking them to forward it via Facebook to friends. A total of 1,132 usable completed responses were gathered. 644 out of these 1,132 respondents (56.9%) used a smartphone at the date of the survey. Remaining treatments unconsidered, in comparison to 269 responses of current customers (CU) and 263 of non-customers (NC) regarding the Nokia survey, 243 current customer and 357 non-customer responses are collected regarding the Apple survey.

The socio-demographics reveal that the sample is balanced with a proportion of 50.7 percent female to 49.3 percent male respondents. In order to test for significant differences in distribution between groups, Pearson chi-square tests are applied followed up by comparisons of column proportions with adjusted p-values (Bonferroni method, $p < .05$). With regard to gender, all four groups are similar ($\chi^2(3) = 5.22; .156$).

Due to the addressing of students first, the sample includes an above-average share of 74.4% being students. Consequently, both the age cohort of 21- to 30-year old respondents and the lowest income group are over-represented. Specifically, 78.5 percent belong to this age cohort whereas 70.5 percent of participants earn less than 1,001€ per month net. However, chi-square test results reveal differences across groups with regard to age ($\chi^2(18) = 30.47; .033$) and monthly net income ($\chi^2(9) = 42.17; .000$). But comparisons of column proportions of age show that only the number of Nokia customers and potential Apple customers differ significantly in the youngest age cohort. Hence, due to the small amount of observations involved, this difference seems negligible. In contrast, results regarding net

income leave no doubt that the Apple-customer group differs significantly from the remaining three comparable groups (see Table 2.1).

Table 2.1: Crosstab and comparisons of column proportions (net income and group)

Net income (per month)		Nokia		Apple		Total
		NC*	CU**	NC*	CU**	
0 - 1,000€	Count	180_a	180_a	245_a	114_b	719
	% within net income	75.9%	72.3%	75.4%	54.5%	70.5%
1,001 - 2,000€	Count	45_a	49_a	50_a	66_b	210
	% within net income	19.0%	19.7%	15.4%	31.6%	20.6%
2,001 - 3,000€	Count	9_a	16_a	22_a	16_a	63
	% within net income	3.8%	6.4%	6.8%	7.7%	6.2%
>3,000€	Count	3_b	$4_{a.\ b}$	$8_{a.\ b}$	13_a	28
	% within net income	1.3%	1.6%	2.5%	6.2%	2.7%
Total	Count	237	249	325	209	1,020***
	% within net income	100.0%	100.0%	100.0%	100.0%	100.0%

* Non-customer ** Customer *** Difference to 1,032 responses are missing values [a,b] Each subscript letter denotes a subset of group categories whose column proportions do not differ significantly from each other at the .05 level (adjusted p-values, Bonferroni method).

Table 2.2: Crosstab and comparisons of column proportions (occupation and group)

Occupation		Nokia		Apple		Total
		NC*	CU**	NC*	CU**	
Employees	Count	24_c	$48_{a.\ b}$	$48_{a.\ c}$	54_b	174
	% within net income	9.2%	18.0%	13.6%	22.2%	15.5%
Freelancer	Count	5_a	6_a	13_a	13_a	37
	% within net income	1.9%	2.2%	3.7%	5.3%	3.3%
Civil servants	Count	8_a	2_a	6_a	3_a	19
	% within net income	3.1%	.7%	1.7%	1.2%	1.7%
Students	Count	218_c	$196_{a.\ b}$	$264_{a.\ c}$	157_b	835
	% within net income	83.5%	73.4%	75.0%	64.6%	74.4%
Pupils	Count	1_a	2_a	7_a	5_a	15
	% within net income	.4%	.7%	2.0%	2.1%	1.3%
Others	Count	5_a	13_a	14_a	11_a	43
	% within net income	1.9%	4.9%	4.0%	4.5%	3.8%
Total	Count	261	267	352	243	1,123***
	% within net income	100.0%	100.0%	100.0%	100.0%	100.0%

* Non-customer ** Customer *** Difference to 1,032 responses are missing values [a,b] Each subscript letter denotes a subset of group categories whose column proportions do not differ significantly from each other at the .05 level (adjusted p-values, Bonferroni method).

This means, while the proportion of low paid persons earning monthly a maximum of 1,000€ is significant smaller in the Apple customers group, persons with a net income between 1,001€ and 2,000€ are over-represented in comparison to other groups. These higher incomes reflect the significantly higher proportion of employed persons in the Apple-customer group. Consequently, compared to the groups of potential customers of Apple or Nokia and loyal customers of Nokia, students are under-represented in the Apple customer group (see Table 2.2). As a result, the chi-square test leads to a rejection of hypothesized similar proportions regarding occupation in the groups ($\chi^2(15) = 40.14$; .000).

2.5.2 Missing values

The fact that a forced choice should be avoided results in some missing values. The analysis of missing values regarding measurement models reveals that in only 846 out of 1,132 cases are the data complete. The remaining 286 cases have in total 1,637 missing values across all 24 variables (2 x 12 variables, PRE - POST). Overall, 6.03 percent of data are missing. However, Little´s (1988) test indicates on a five percent significance level that data are missing completely at random (MCAR) for both the overall sample ($\chi^2(3465) = 3151.00$; 1.000) and the subsamples of Nokia-NC ($\chi^2(1497) = 1387.41$; .979), Nokia-CU ($\chi^2(1384) = 1402.71$; .357), Apple-NC ($\chi^2(401) = 437.86$; .099) and Apple-CU ($\chi^2(850) = 848.84$; .505). In other words, lack of data depends neither on observed nor on missing values (Rubin, 1976). Based on these results and to keep the sample size, missing values of the measurement model are imputed using the expectation-maximization (EM) algorithm. The imputation procedure is executed separately for the subsamples to avoid a loss of group specific characteristics.

2.6 Results

2.6.1 Brand personality (item level)

Table 2.3 shows descriptive statistics of the first measurement (actual attitudes) for both the whole sample and the subsamples. Furthermore, this table reports for each indicator the results of ANOVA with multiple comparisons. To assess the outcomes of ANOVA the significance level is adjusted to $p < 0.01$ due to shown deviations from a normal distribution and partly absence of homogeneity of variances. Although ANOVA is considered to be robust against such violations, in terms of multiple testing an additional non-parametric test is performed. This Kruskal-Wallis test and ANOVA indicate a significant main effect for group segmentation with regard to each item.

Focusing on item means, differences between both brands confirm the assumption of varying perceptional personalities with some minor exceptions. Comparing loyal customers (CU) of Nokia and Apple, outcomes indicate exceptions only for two responsibility items (RES2 & RES3). In contrast, multiple comparisons between potential customers (NC) reveal insignificant differences in the same responsibility items and in both emotionality items. The results regarding responsibility indicate that current usage is more important to gain new information about personality traits like stability and responsibility.

However, comparisons between loyal and potential customers for both brands show not only significant differences between means of the responsibility items, but activity items also differ significantly between customer segments. Furthermore, just considering Apple, customer segments vary significantly regarding both emotionality items and one simplicity item (SIM1). To conclude, in principle, associations differ between loyal and potential customers for Nokia and Apple.

Table 2.3: Descriptive statistics of actual attitudes (first measurement) and test of between-subject effects

PRE means (s.d.)	**Overall** n=1132	Skewness / Kurtosis*	**Nokia** NC** n=263	**Nokia** CU*** n=269	**Apple** NC** n=357	**Apple** CU*** n=243	**ANOVA**** η^2 Model	η^2 Intercept	η^2 Segment	Kruskal-Wallis-Test
RES1	**3.69** (1.54)	- .08 / - .76	**3.84**$_a$ (1.50)	**4.46** (1.39)	**2.93** (1.44)	**3.80**$_a$ (1.39)	.14	.87	.14	.000
RES2	**4.46** (1.50)	- .42 / - .39	**4.07**$_b$ (1.51)	**4.73**$_c$ (1.36)	**4.14**$_b$ (1.51)	**5.04**$_c$ (1.40)	.07	.90	.07	.000
RES3	**3.58** (1.54)	.04 / - .64	**3.28**$_d$ (1.48)	**3.82**$_e$ (1.52)	**3.24**$_d$ (1.51)	**4.11**$_e$ (1.46)	.06	.85	.06	.000
ACT1	**4.30** (1.79)	- .23 / - .99	**2.90** (1.31)	**3.46** (1.46)	**4.95** (1.53)	**5.80** (1.20)	.39	.90	.39	.000
ACT2	**4.31** (1.70)	- .25 / - .82	**3.06** (1.33)	**3.63** (1.47)	**4.86** (1.51)	**5.63** (1.20)	.33	.90	.33	.000
ACT3	**4.71** (1.85)	- .41 / - .98	**3.20** (1.37)	**3.74** (1.58)	**5.45** (1.53)	**6.33** (0.91)	.44	.92	.44	.000
AGG1	**3.51** (1.91)	.34 / -1.04	**2.26**$_f$ (1.26)	**2.41**$_f$ (1.28)	**4.63**$_g$ (1.76)	**4.44**$_g$ (1.79)	.34	.83	.34	.000
AGG2	**3.51** (1.69)	.26 / - .83	**2.40**$_h$ (1.18)	**2.63**$_h$ (1.26)	**4.46**$_i$ (1.55)	**4.29**$_i$ (1.53)	.31	.86	.31	.000
SIM1	**3.70** (1.69)	.19 / - .88	**4.86**$_j$ (1.42)	**4.52**$_j$ (1.48)	**3.11** (1.37)	**2.41** (1.25)	.33	.88	.33	.000
SIM2	**4.03** (1.54)	- .15 / - .64	**4.59**$_k$ (1.29)	**4.62**$_k$ (1.31)	**3.51**$_l$ (1.51)	**3.54**$_l$ (1.61)	.12	.89	.12	.000
EMO1	**1.84** (1.08)	1.43 / 2.24	**1.70**$_m$ (1.07)	**1.80**$_m$ (1.02)	**1.76**$_m$ (1.02)	**2.17** (1.17)	.03	.75	.03	.000
EMO2	**2.09** (1.30)	1.10 / .48	**1.67**$_n$ (1.05)	**1.95**$_n$ (1.17)	**2.15**$_n$ (1.34)	**2.64** (1.40)	.07	.73	.07	.000

* Standard Errors: .073 (Skewness), .145 (Kurtosis) ** Non-Customer *** Customer **** All corrected models, intercepts and fixed factors (group) are significant on $p < .01$; Levene-Tests are only not significant for all RES items and the EMO1 item on $p < .05$

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Based on the higher brand equity of Apple (see Millward Brown, 2012; BrandZ) and the results of Table 2.3, one could conclude that a brand personality which is perceived more active, dynamic and innovative (Activity) is a competitive advantage. Furthermore, a certain degree of aggressiveness and exclusivity (not ordinary) seems to be useful. In general, the higher relevance of these personality traits (ACT1-3, AGG1 & 2 and SIM1) is supported by the estimated effect sizes of segmentation too. Finally, focusing on more relevant brand associations, the conclusion can still be drawn that both brands differ considerably**.**

2.6.2 Assessing reliability and validity

Table 2.4 and 2.5 report results of confirmatory factor analysis including indicator reliability, composite reliability, average variance extracted (AVE) and correlations between latent variables for each group. According to Bagozzi and Baumgartner (1994) calling for values equal to or greater than .40, all indicators are reliable. Consequently, indicator reliability is considered to be given.

Table 2.4: Indicator reliability (First measurement)

PRE (t-value)		RES			ACT			AGG		SIM		EMO	
		RES1	RES2	RES3	ACT1	ACT2	ACT3	AGG1	AGG2	SIM1	SIM2	EMO1	EMO2
Nokia	NC*	.59	.66 (13.09)	.74 (13.61)	.79	.86 (22.03)	.71 (18.31)	.55	.85 (7.82)	.90	.52 (6.67)	.81	.88 (14.54)
	CU**	.67	.74 (15.46)	.69 (14.86)	.77	.83 (21.05)	.79 (20.28)	.52	.83 (8.65)	.94	.40 (5.56)	.72	.90 (11.79)
Apple	NC*	.42	.55 (11.21)	.71 (11.75)	.55	.77 (15.32)	.59 (13.99)	.64	.66 (5.40)	.62	.41 (6.24)	.64	.72 (8.87)
	CU**	.62	.62 (11.75)	.59 (11.47)	.69	.64 (12.64)	.59 (12.13)	.64	.64 (5.00)	.62	.41 (4.84)	.88	.58 (7.15)

* Non-customer ** Customer

For evaluating internal consistency, this study uses Cronbach's alpha, composite reliability as well as the AVE. Cronbach's alpha exceeds the minimum level of acceptability of .70 (Nunnally, 1978) for all groups and constructs except the simplicity construct regarding both Apple groups. In contrast, composite reliability and AVE fully meet the limits of > .60 (Bagozzi and Yi, 1988) and > .50 (Fornell and Larcker, 1981) respectively. Consequently, due to the limited suitability of Cronbach's alpha (see Gerbing & Anderson, 1988) and the successful tests of composite reliability as well as AVE, the exceptions are negligible regarding simplicity. Finally, following Anderson and Gerbing (1988), significance of all t-tests imply indicators which measure effectively the same constructs. Therefore, internal consistency is considered to be given.

Table 2.5: Correlations of latent variables & reliability measures (First measurement)

PRE		NC*					CU**				
		RES	ACT	AGG	SIM	EMO	RES	ACT	AGG	SIM	EMO
Nokia	RES	1.00					1.00				
	ACT	.61	1.00				.59	1.00			
	AGG	.09	.42	1.00			.23	.47	1.00		
	SIM	-.03	-.36	-.18	1.00		.12	-.31	-.15	1.00	
	EMO	.36	.49	.39	-.30	1.00	.34	.37	.46	-.06	1.00
	Cronb. α	.86	.91	.81	.81	.91	.87	.92	.79	.76	.89
	Rel (ξ_j)	.85	.92	.82	.83	.92	.88	.92	.80	.79	.90
	AVE	.66	.79	.70	.71	.85	.70	.80	.67	.67	.81
Apple	RES	1.00					1.00				
	ACT	.64	1.00				.59	1.00			
	AGG	.05	.24	1.00			-.08	.04	1.00		
	SIM	-.06	-.39	.01	1.00		-.09	-.34	.30	1.00	
	EMO	.43	.36	.20	.13	1.00	.41	.29	.19	.30	1.00
	Cronb. α	.79	.84	.78	.67	.79	.83	.83	.77	.66	.83
	Rel (ξ_j)	.79	.84	.79	.68	.81	.83	.84	.78	.68	.84
	AVE	.56	.64	.65	.52	.68	.61	.64	.64	.52	.73

* Non-customer ** Customer

Assessing construct validity, first, following Fornell and Larcker (1981), the results of construct reliability imply convergence validity. Second, discriminant validity is given using the Fornell and Larcker (1981) test. AVE of all constructs exceeds the squared correlation between the considered and all other constructs. Third, according to Hildebrandt (1984), overall model fit is indicative of nomological validity (see next section). Finally, content validity is considered to be given due to positive judgments and reapplications of scales by experts (Cronbach and Meehl, 1955).

2.6.3 Measurement model evaluation (fit indices)

Evaluating overall model fit, the fit indices shown in Table 2.6 suggest an acceptable fit for both multi-sample analysis and all analyses for separate groups applying the combination rules of Hu and Bentler (1999). This means, despite severe criticism against global cut-off values (see e.g. Barrett, 2007; Chen, Curran, Bollen, Kirby and Paxton, 2008), this study uses .95 for NNFI and .08 for SRMR (Hu and Bentler, 1999) as well as .95 for CFI (Carlson and

Mulaik, 1993). Additional frequently-used fit indices are reported. Also NFI (> .90; Arbuckle, 2008), RMSEA (< .10; MacCallum, Browne and Sugawara, 1996) and chi-square-value divided by degrees of freedom (χ^2/d.f. < 3; Homburg & Giering, 1996) indicate an acceptable fit. As a result, hypothesis 1 is supported (appropriateness of Geuens et al. (2009) proposed measurement scale of brand personality).

Table 2.6: Fit indices of the measurement model

PRE		X^2	d.f.	p-value	X^2/df	RMSEA	LO/HI90	P-CLOSE	NFI	NNFI	CFI	GFI	AGFI	SRMR
Multi-Group-Analysis		379.73	176	.000	2.16	.064	.055/ .073	.01	.95	.96	.97			
Nokia	NC*	101.40	44	.000	2.30	.071	.053/ .089	.03	.96	.96	.97	.94	.89	.046
	CU**	100.80	44	.000	2.29	.069	.052/ .087	.04	.96	.97	.98	.94	.90	.048
Apple	NC*	104.81	44	.000	2.38	.062	.047/ .078	.09	.95	.95	.97	.95	.92	.053
	CU**	72.72	44	.004	1.65	.052	.029/ .073	.42	.95	.97	.98	.95	.92	.053

* Non-Customer ** Customer

After supporting the equality of factor and model structure across groups with multi-sample analyses using same pattern and starting values (configural invariance), Table 2.7 contains the results of the additionally required invariance tests. Following Little, Card, Slegers and Ledford (2007), the respective invariance across groups is rejected if the descriptive fit index of NNFI changes more than .01 compared to the prior and weaker invariance level. Based on this criterion, the results suggest an absence of factorial invariance with regard to the measurement model. This means, latent variable means are not similar across brands and segments. As a consequence, immediate reactions triggered by various critical incidents are not directly comparable in an absolute sense across groups. Therefore, group specific factor scores are estimated on the basis of the measurement model structure to compute and compare relative changes across groups and incidents (see Section 2.6.5).

Table 2.7: Invariance analysis across groups

PRE	X^2	d.f.	p-value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI
Metric invariance	496.51	197	0.000	2.52	0.073	0.065	0.082	0.00	0.94	0.95	0.96
Strong factorial invariance	656.70	218	0.000	3.01	0.084	0.077	0.092	0.00	0.92	0.93	0.94
Strict factorial invariance	1414.38	254	0.000	5.57	0.124	0.120	0.130	0.00	0.82	0.83	0.84

2.6.4 Investigation of potential mediators

Differences between participants' knowledge of the reference incident (RI) imply that this incident is widely known with regard to Apple and has been lost in the media with regard to Nokia. In contrast to approximately 77% (86%) questioned about Apple, just about 20% (21%) of potential customers (loyal customers) questioned about Nokia know this critical incident. Hence, the Pearson chi-square test indicates that the knowledge differs significantly between the groups ($\chi^2(3) = 414.17$; .000).

Reflected by a chi-square test ($\chi^2(3) = 6830$; .078) the hypothetical case of corruption (T2) is similarly unknown across groups (Nokia-NC - 97%, CU - 99%, Apple-NC - 93% and CU - 96%). Due to better known hypothetical product failure (T3) regarding Apple, variations are unexpectedly significant ($\chi^2(3) = 21.72$; .000). Although this critical incident is based on an event which happened to Nokia several years ago, 27% (31%) of Apple respondents claim to know the incident in contrast to 9% (14%) of potential (loyal) customers of Nokia.

Against this background, varying credibility is expected between brands for the reference incident and the product failure. However, analyses of potential mediators do not indicate significant variations between groups (see Table 2.8 to 2.10). Comparing both hypothetical incidents within groups reveals that only credibility differs significantly between loyal Nokia customers (see Table 2.11).

Table 2.8: Descriptive statistics for evaluations of the actual incident and test of between-subject (group) effects

RI **means** (s.d.)	**Overall** n=1132	Skewness / Kurtosis*	**Nokia** NC** n=263	CU*** n=269	**Apple** NC** n=357	CU*** n=243	**ANOVA**** η^2 Model	Intercept	Segment	Kruskal-Wallis-Test
Credibility	**5.06** (1.52)	- .48 / - .46	**5.07_a** (1.49)	**5.00_a** (1.44)	**5.08_a** (1.62)	**5.09_a** (1.52)	x	x	x	.702
Criticality	**5.48** (1.54)	- .94 / .19	**5.81_b** (1.38)	**5.70_b** (1.39)	**5.71_b** (1.39)	**4.53** (1.71)	.10	.93	.10	.000

* Standard Errors: .073 (Skewness), .145 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (groups) are significant on $p < .01$; Levene's test of equality of error variances is significant for both items ($p < .05$)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 2.9: Descriptive statistics for evaluations of corruption and test of between-subject (group) effects

T2 **means** (s.d.)	**Overall** n=426	Skewness / Kurtosis*	**Nokia** NC** n=107	CU*** n=102	**Apple** NC** n=135	CU*** n=82	**ANOVA**** η^2 Model	Intercept	Segment	Kruskal-Wallis-Test
Credibility	**4.75** (1.24)	- .08 / - .33	**5.01_a** (1.20)	**4.59_a** (1.28)	**4.73_a** (1.19)	**4.62_a** (1.28)	x	x	x	.126
Criticality	**5.20** (1.40)	- .56 / - .11	**5.30_b** (1.39)	**5.24_b** (1.39)	**5.50_b** (1.27)	**4.55** (1.45)	.06	.93	.06	.000

* Standard Errors: .118 (Skewness), .236 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (segment) are significant on $p < .01$; Levene's test of equality of error variances is not significant for both items ($p < .05$)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 2.10: Descriptive statistics for evaluations of the product failure and test of between-subject effects

T3 **means** (s.d.)	**Overall** n=457	Skewness / Kurtosis*	**Nokia** NC** n=101	CU*** n=107	**Apple** NC** n=137	CU*** n=112	**ANOVA**** η^2 Model	Intercept	Segment	Kruskal-Wallis-Test
Credibility	**5.02** (1.46)	- .50 / - .26	**5.11_a** (1.62)	**5.07_a** (1.41)	**4.99_a** (1.41)	**4.94_a** (1.43)	x	x	x	.646
Criticality	**4.98** (1.58)	- .54 / - .30	**5.41_b** (1.53)	**$4.86_{b,c}$** (1.51)	**5.15_b** (1.50)	**4.50_c** (1.65)	.04	.91	.04	.000

* Standard Errors: .114 (Skewness), .228 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (segment) are significant on $p < .01$; Levene's test of equality of error variances is not significant for both items ($p < .05$)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 2.11: Independent samples test of mean differences (test between subjects within groups - T2 to T3)

T2 to T3			Levene's test			t-test for Equality of Means					Independent-Samples Mann-Whitney U Test
			F	Sig.	EV***	Mean Difference	Std. Error	t	d.f.	Sig. (2-tailed)	
Credibility	Nokia	NC*	10.272	.002	EV not assumed	-.100	.199	-.502	184	.617	.262
		CU**	.917	.339	EV assumed	-.481	.187	-2.566	207	.011	.008
	Apple	NC*	1.977	.161	EV assumed	-.252	.158	-1.592	270	.113	.064
		CU**	.589	.444	EV assumed	-.316	.199	-1.586	192	.114	.077
Criticality	Nokia	NC*	1.625	.204	EV assumed	-.107	.202	-.528	206	.598	.389
		CU**	.138	.711	EV assumed	.375	.202	1.863	207	.064	.078
	Apple	NC*	3.227	.074	EV assumed	.343	.169	2.031	270	.043	.056
		CU**	1.582	.210	EV assumed	.053	.228	.234	192	.815	.834

* Non-customer ** Customer *** Equal variances

Table 2.12: Descriptive statistics and test of within-subject effects (reference CI to T1 and T2)

Reference CI (RI) to T2 and T3				Paired Differences			t-value	d.f.	Sig. (2-tailed)	Wilcoxon signed rank test
				Mean***	s.d.	Std. Error				
Credibility	Nokia	NC*	RI - T2	.20	1.62	.156	1.256	106	.212	.149
			RI - T3	.01	1.68	.167	.059	100	.953	.802
		CU**	RI - T2	.35	1.40	.139	2.495	101	.014	.017
			RI - T3	.03	1.49	.144	.195	106	.846	.914
	Apple	NC*	RI - T2	.42	1.66	.143	2.905	134	.004	.007
			RI - T3	.09	1.47	.125	.699	136	.486	.390
		CU**	RI - T2	.66	1.98	.218	3.017	81	.003	.001
			RI - T3	.08	1.62	.153	.526	111	.600	.509
Criticality	Nokia	NC*	RI - T2	.52	1.72	.166	3.152	106	.002	.002
			RI - T3	.35	1.80	.179	1.932	100	.056	.041
		CU**	RI - T2	.72	1.41	.140	5.127	101	.000	.000
			RI - T3	.73	2.15	.208	3.503	106	.001	.000
	Apple	NC*	RI - T2	.01	1.52	.131	.056	134	.955	.814
			RI - T3	.77	1.60	.137	5.662	136	.000	.000
		CU**	RI - T2	-.02	2.05	.226	-.108	81	.914	.884
			RI - T3	.22	2.29	.218	.993	111	.323	.352

* Non-customer ** Customer *** Bigger values represent higher losses (negative differences)

Contrary to expectations that a less known product failure is perceived less credible than the reference incident, the results in Table 2.12 do not reveal significant effects within

subjects regarding credibility. In contrast, in the case of corruption (T2), credibility decreases except for Nokia-NC. In short, the experimental design works as intended. Hypothetical incidents are perceived as credible (mean > 4.5).

Considering the evaluations of criticality between groups, the biased information processing of current Apple customers is striking compared to other groups. Apple customers perceive the reference and both hypothetical treatments similar and less critical. However, perceived criticality of hypothetical incidents does not differ significantly for other groups either. Nevertheless, criticality decreases significantly in comparison to the reference for both Nokia groups regarding corruption as well as for Nokia-CU and Apple-NC regarding product failure.

2.6.5 Reactions to critical incidents (changes in latent means)

Variations between latent means before and after the treatments are the basis to determine reactions. These latent means are calculated construct and group specific using the estimated factor scores (see Appendix 2.1). Table 2.13 presents the resulting percentage changes of means for each brand personality dimension sorted by groups. Furthermore, the table contains the corresponding significance level of the paired sample tests (see Appendix 2.2 for detailed results). Overall, results clearly demonstrate the impact of CI on perceived brand personality and support hypothesis 2. However, closer examination reveals considerable differences in reactions.

The comparison of reaction intensities between loyal and potential customers within brands reveals that loyal customers react less intensely. These findings indicate that potential customers (NC) lack a comprehensive elaboration strengthening their associations towards the brand. Therefore, the more intense reactions of potential customers support hypothesis 3.

Table 2.13: Percentage changes of perceived personality constructs (total effects)

Relative changes (total)			RES	ACT	AGG	SIM	EMO
T1	Nokia	NC* n=55	- 11.4 % +++	- 9.9 % +++	5.2 %	- 10.2 % +++	- 8.0 % +++
		CU** n=60	- 7.9 % +++	- 7.7 % +++	2.5 %	- 7.0 % ++	- 6.8 % ++
	Apple	NC* n=85	- 4.6 % ++	- 3.0 % +	1.7 %	- 3.9 %	- 1.7 %
		CU** n=49	- 1.6 %	- 0.7 %	1.2 %	0.2 %	0.1 %
T2	Nokia	NC* n=107	- 19.0 % +++	- 14.7 % +++	11.7 % +++	- 8.1 % +++	- 13.0 % +++
		CU** n=102	- 14.6 % +++	- 11.9 % +++	6.3 % +	- 5.6 % +	- 10.8 % +++
	Apple	NC* n=135	- 10.1 % +++	- 6.8 % +++	4.4 % +++	- 3.6 %	- 5.1 % ++
		CU** n=82	- 5.3 % +++	- 3.4 % +++	3.3 % +	- 2.6 %	- 3.3 %
T3	Nokia	NC* n=101	- 14.7 % +++	- 12.2 % +++	3.3 %	- 5.2 % ++	- 5.4 % +++
		CU** n=107	- 10.1 % +++	- 9.6 % +++	1.2 %	- 2.7 %	- 3.6 %
	Apple	NC* n=137	- 6.3 % +++	- 4.6 % +++	1.1 %	- 2.2 %	- 3.4 % +++
		CU** n=112	- 3.1 % +++	- 2.2 % +++	1.0 %	- 0.7 %	- 1.9 %

* Non-customer ** Customer + $p < 0.1$ ++ $p < 0.05$ +++ $p < 0.01$ (2-tailed paired samples t-test)

Comparing percentage changes in light of hypotheses 4a and b, smaller latent mean shifts confirm the buffering effect of brand equity with regard to Apple. However, assuming additive effects of reference and hypothetical incidents for groups exposed to both (T2 & T3), more intense responses regarding Nokia may be attributable to clearly diverging knowledge of the reference incident. Therefore, based on the assumption that reference incident reactions are comparable across subsamples of one brand and customer group, Table 2.14 shows the adjusted percentage changes of latent means. Moreover, to examine the significance of the additional exposure to corruption or product failure, latent mean shifts (delta) are analyzed in comparison to the control groups (T1) which are only confronted with RI (for detailed results see Appendix 2.3 and 2.4). Taking these adjustments into account, findings support

hypotheses 4a and b. More precisely, reactions are more intense (mean differences are bigger) for Nokia comparing loyal or potential customers between brands (see Table 2.14).

Table 2.14: Percentage latent means changes of perceived personality constructs (adjusted effects)

Relative changes (adjusted)			RES	ACT	AGG	SIM	EMO
T2	Nokia	NC*	- 7.6 % +	- 4.8 %	6.5 %	2.2 %	- 5.0 %
		CU**	- 6.7 % ++	- 4.3 %	3.9 %	1.3 %	- 4.0 %
	Apple	NC*	- 5.4 % ++	- 3.8 % +	2.7 %	0.2 %	- 3.5 %
		CU**	- 3.7 %	- 2.7 %	2.1 %	- 2.8 %	- 3.4 %
T3	Nokia	NC*	- 3.3 %	- 2.3 %	- 1.9 %	5.0 %	2.6 %
		CU**	- 2.2 %	- 2.0 %	- 1.2 %	4.3 %	3.3 %
	Apple	NC*	- 1.7 %	- 1.6 %	- 0.6 %	1.7 %	- 1.7 %
		CU**	- 1.5 %	- 1.5 %	- 0.3 %	- 0.9 %	- 1.9 %

* Non-customer ** Customer + $p < 0.1$ ++ $p < 0.05$ +++ $p < 0.01$ (2-tailed independent samples t-test)

Furthermore, in addition to noticeable simplicity reductions of loyal Apple customers, reaction intensities in Table 2.14 reveal a clear rank order except once (see T3, Apple - emotionality). This rank order corresponds considerably to brand equity order.

Table 2.13 indicates responsibility decreases after all CI, with one exception. In conformity with the theory that new information only induces a revaluation, Apple customers do not change their responsibility perception in the case of the well-known reference incident. Focusing on hypothesis 5a, despite significant total effects in the case of corruption, comparisons between control and treatment groups show a significant responsibility decrease in 3 out of 4 groups (all except Apple-CU, see Appendix 2.3). In contrast, results regarding product failure reveal insignificant responsibility shifts (see Appendix 2.4). Consequently, hypothesis 5b is not supported.

Considering activity perception changes with regard to hypotheses 6a and b, the results are similar. Despite significant and negative total effects in both cases, t-tests for equality of means (delta of latent means) between control and experimental groups support hypothesis 6a only once and never hypothesis 6b. However, non-parametric test results do not confirm

support for hypothesis 6a (see Appendix 2.3). Therefore, hypothesis 6 is considered to be not supported.

Although aggressiveness increases in conformity with hypothesis 7, only the positive total effects are significant in the event of corruption (see Table 2.13 and 2.14). Consequently, hypothesis 7 is not supported.

To evaluate hypothesis 8, that less critical perceived incidents induce a less intense perceptional change of brand personality, only seven treatment combinations are available with significantly differing criticality judgments (see Table 2.11 and 2.12). Assessing reactions based on the number of less affected personality dimensions, all combinations support this hypothesis. This means, lower criticality perception diminishes critical incident effects.

With regard to hypothesis 9, presuming that less credible incidents have a minor effect on brand personality, results are contradictory. On the one hand, focusing on reactions between RI and T2 regarding Nokia customers (see Table 2.13 and 2.14), findings support this hypothesis. On the other hand, evaluating reactions for the remaining 4 significant credibility changes (see Table 2.11 and 2.12), supportive results do not exist. However, criticality and credibility effects overlap comparing reactions to hypothetical incidents. But significant findings regarding criticality imply that perceived criticality dominates the effect over credibility.

Overall, corruption results in a more intense immediate reaction compared to the product failure for all groups except the customers of Apple. In conclusion, the following table presents all results with regard to reaction hypotheses.

Table 2.15: Overview of results (reaction hypotheses)

Reaction hypotheses		Corruption	Product failure
2	CI induce a perceptional change of BP	Supported	
3	Customers react less intensively than NC	Supported	
4a	Brand equity buffers negative effects (CU)	Supported	Supported
4b	Brand equity buffers negative effects (NC)	Supported	Supported
5a	Responsibility goes down (corruption)	Support in 3/4	X
5b	Responsibility goes down (product failure)	X	Not supported
6a	Activity decreases (corruption)	Support in 1/4	X
6b	Activity decreases (product failure)	X	Not supported
7	Aggressiveness increases (corruption)	Not supported	X
8	Less critically perceived CI affect BP less	Support in 1/5	
9	Less credibly perceived CI affect BP less	Supported	

2.7 Discussion

Nowadays, critical incidents occur quite often and are present in the media. Consequently, consumers are frequently confronted, deliberately or otherwise, with negative publicity. Therefore, in order to be able to minimize negative impact and to manage marketing response adequately, companies have to understand customer reactions in such a case. For this reason, this paper addresses the essential questions: When and to which extent do such critical incidents change brand perception? More precisely, this study examines which brand personality dimensions are affected depending on the nature of CI and which moderators are relevant.

For this purpose, an online experiment is conducted whose design increases external validity and overcomes some criticisms of previous experiments (e.g. Cleeren et al., 2008; van Heerde et al., 2007, Grewal, Roggeveen & Tsiros, 2008). Therefore, first, participants receive information about the critical incidents via internet as negative publicity (Ahluwalia et al., 2000) in their familiar surroundings. Second, incidents are based on actual historical events

and are transmitted via real credible media. Third, the analysis considers simultaneously various customer segments, incidents and brands on the basis of a large sample. Finally, effects are examined taking into account real brands and business relations.

What determines the impact of critical incidents? First of all, the nature of crisis and the degree to which people are personally affected play an important role. Regarding the nature of CI, reactions measured indicate corruption induces greater perceptional changes than product failure. This finding verifies the increase in importance of ethical behavior today (Shleifer, 2004). But this rank order may differ when people are personally affected. Moreover, criticality perception and the customer-brand relation in terms of strength (customer based brand equity) and status (business relation) moderate the impact according to findings.

The comparison of moderators shows that high brand equity is the best buffer against negative impacts of critical incidents as hypothesized earlier (Hess, Ganesan and Klein, 2003; Tax, Brown & Chandrashekaran, 1998). However, as supposed by Dawar and Pillutla (2000), the current usage of a brand also reduces clearly the negative effect. In other words, if a critical incident occurs, then actual customers shift their attitudes less due to the attitude stabilizing anchor - their current usage. But this reaction intensity order may be the other way around when personally affected.

In principle, the obtained results confirm indirectly the existence of moderators such as commitment (e.g. Ingram et al., 2005) and familiarity (e.g. Ahluwalia, 2002). Taking for granted that commitment is a key factor for successful sales (Morgan & Hunt, 1994), loyal customers possess a high commitment because they have already bought the brand. Overall, all these moderators have in common that more stable attitudes reduce the effect of external and potentially attitude changing incidents. Furthermore, cognitive response theory (Petty & Cacioppo, 1981) explains both the underlying cause of stable attitudes (perceptions) and their buffering effect as results of prior necessary intensive elaboration.

With regard to affected personality dimensions, findings suggest that the number and type as well as the effect size depend on the type of CI and the above mentioned moderators. The reactions to corruption and the reference incident indicate that responsibility is more affected when companies or their staff consciously behaves incorrectly. Moreover, such misbehavior seems to affect aggressiveness as well but not significantly.

However, assuming that responsibility is a key dimension of personality to commit to a business relation, the perceived responsibility shifts are crucial for future development of companies. Also, robust personality perceptions of Apple customers in both hypothetical incidents imply that critical incidents do not have to affect perceptions negatively. But the lacking of strong reactions following the reference incident with regard to Apple is attributable to prior elaboration of the incident.

Significant reductions of simplicity (SIM) and emotionality (EMO) triggered by the RI regarding Nokia contradicts the statement of Dawar and Lei (2009) that core associations shift only when directly affected by crisis. When respondents are personally affected, immediate reactions imply a general linear downgrade of positive associations towards the brand. However, apparently most respondents interpreted simplicity (SIM) as a negative trait and not in terms of easy to handle (higher association level of Nokia compared to Apple).

Finally, if CI and the corresponding bad news occur rarely for a company, then appropriate handling can be an opportunity to improve brand personality perceptions in the long run. In principle, post crisis communication should focus especially on significantly damaged dimensions of personality. Additionally, post crisis communication should address potential customers differently due to their lacking opportunity of perception stabilizing usage of the brand.

2.8 Limitations and future research

This analysis may be subject to some limitations. First, this study focuses on one product class with basically utilitarian products and high involvement choice processes. Therefore, future research has to figure out whether and in which ways effects vary in other combinations of utilitarian, hedonistic as well as low and high involvement goods.

Second, personality shifts considered here are immediate reactions. Effects in the long run may differ considerably. Differences may result from more frequent confrontations with a CI or a more intensive and compensating personal experience during crises. As a result, a more intense elaboration can lead to different outcomes (Petty et al., 2005).

Third, data are collected using snowball-sampling and a self-administered online experiment. Consequently, sample composition and representativeness might raise some concerns about the generalizability of results. However, taking the typical target group of smartphones into account, the used sample seems adequate containing mainly young technically inclined people and an above average share of smartphone users (56.9%).

Fourth, the experimental design and the context of research possibly limit the external validity and generalizability of findings. On the one hand, immediate shifts may differ to reactions in the long run. Moreover, being exposed more often to a critical incident may lead to modified attitudinal changes. On the other hand, people personally affected by a critical incident probably react more emotionally and hence differently.

Fifth, the applied methodology requires multivariate normal distributed variables, but variables of the used sample are not even univariate normal distributed. However, following Boomsma and Hoogland (2001), Yuan, Bentler and Zhang (2005), Ryu (2011) and West, Finch and Curran (1995), violations are less critical for large samples (> 200) and positive or negative skewness and kurtosis below 2.0 and 7.0 respectively.

Finally, these limitations, other types of critical incidents, other cultures, brands and branches as well as other measurement models are possible fruitful lines for further research.

Appendix

Appendix 2.1: Latent variable means (calculated on the basis of estimated factor scores)

Latent means (s.d.)			RES		ACT		AGG		SIM		EMO	
			PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Nokia	NC*	**T1** n=55	3.45 (1.09)	3.06 (1.24)	2.84 (1.15)	2.56 (1.31)	2.02 (.95)	2.13 (.95)	4.45 (1.16)	4.00 (1.48)	1.58 (.97)	1.46 (.87)
		T2 n=107	3.17 (1.03)	2.57 (1.02)	2.79 (1.12)	2.38 (1.05)	1.95 (.86)	2.18 (.94)	4.38 (1.25)	4.03 (1.43)	1.51 (.95)	1.31 (.64)
		T3 n=101	3.27 (1.20)	2.79 (1.15)	2.66 (1.08)	2.33 (1.03)	1.97 (.98)	2.04 (.95)	4.58 (1.44)	4.34 (1.27)	1.55 (.87)	1.47 (.78)
	CU**	**T1** n=60	3.87 (1.00)	3.57 (.99)	3.34 (1.03)	3.08 (1.02)	2.18 (.89)	2.23 (.92)	4.24 (1.32)	3.94 (1.26)	1.39 (.71)	1.29 (.71)
		T2 n=102	3.77 (1.08)	3.22 (1.09)	3.01 (1.23)	2.65 (1.16)	1.96 (.86)	2.09 (.98)	4.43 (1.37)	4.18 (1.28)	1.32 (.74)	1.17 (.62)
		T3 n=107	3.85 (1.05)	3.46 (1.23)	3.20 (1.29)	2.90 (1.31)	2.02 (.86)	2.04 (.93)	4.30 (1.52)	4.18 (1.55)	1.35 (.77)	1.30 (.72)
Apple	NC*	**T1** n=85	2.57 (.77)	2.45 (.79)	3.76 (1.05)	3.65 (1.15)	4.44 (1.30)	4.52 (1.13)	1.75 (.91)	1.68 (.89)	1.35 (.61)	1.33 (.65)
		T2 n=135	2.61 (.83)	2.35 (.87)	3.84 (1.04)	3.58 (1.18)	4.37 (1.28)	4.57 (1.16)	1.80 (.86)	1.73 (.98)	1.41 (.60)	1.34 (.61)
		T3 n=137	2.57 (.85)	2.40 (.86)	3.75 (1.12)	3.58 (1.17)	4.47 (1.40)	4.51 (1.26)	1.79 (.95)	1.75 (.91)	1.42 (.65)	1.37 (.66)
	CU**	**T1** n=49	4.46 (.89)	4.39 (1.10)	6.10 (.86)	6.05 (.88)	4.76 (1.43)	4.82 (1.32)	1.10 (.77)	1.10 (.80)	2.16 (.84)	2.16 (.95)
		T2 n=82	4.45 (1.02)	4.21 (1.09)	6.09 (1.00)	5.89 (1.12)	4.45 (1.29)	4.60 (1.26)	0.98 (.80)	0.95 (.78)	2.15 (.94)	2.08 (.93)
		T3 n=112	4.50 (1.09)	4.35 (1.17)	6.13 (1.03)	6.00 (1.01)	4.56 (1.43)	4.61 (1.34)	0.94 (.79)	0.93 (.81)	2.20 (1.14)	2.16 (1.19)

* Non-customer ** Customer

Appendix 2.2: Latent variable means (calculated on the basis of estimated factor scores)

Paired samples test (PRE – POST)			NC*					CU**				
			RES	ACT	AGG	SIM	EMO	RES	ACT	AGG	SIM	EMO
Nokia	T1	Mean (s.d.)	.39 (.75)	.28 (.72)	-.11 (.83)	.46 (1.15)	.13 (.30)	.31 (.48)	.26 (.38)	-.05 (.69)	.30 (1.00)	.09 (.35)
		t	3.880	2.897	-.946	2.947	3.098	4.899	5.211	-.598	2.303	2.064
		df			54					59		
		Sig.***	.000	.005	.349	.005	.003	.000	.000	.552	.025	.043
	T2	Mean (s.d.)	.60 (.49)	.41 (.53)	-.23 (.72)	.35 (1.05)	.20 (.52)	.55 (.83)	.36 (.67)	-.12 (.64)	.25 (1.43)	.14 (.43)
		t	12.582	7.952	-3.283	3.497	3.858	6.697	5.462	-1.970	1.761	3.338
		df			106					101		
		Sig.***	.000	.000	.001	.001	.000	.000	.000	.052	.081	.001
	T3	Mean (s.d.)	.48 (.62)	.32 (.58)	-.07 (.87)	.24 (.97)	.08 (.31)	.39 (.72)	.31 (.52)	-.03 (.50)	.12 (1.05)	.05 (.45)
		t	7.761	5.655	-.760	2.470	2.739	5.638	6.113	-.516	1.139	1.118
		df			100					106		
		Sig.***	.000	.000	.449	.015	.007	.000	.000	.607	.257	.266
Apple	T1	Mean (s.d.)	.12 (.47)	.11 (.54)	-.07 (.61)	.07 (.58)	.02 (.34)	.07 (.60)	.04 (.42)	-.06 (.56)	.00 (.76)	.00 (.57)
		t	2.355	1.890	-1.108	1.079	.625	.828	.739	-.730	-.022	-.015
		df			84					48		
		Sig.***	.021	.062	.271	.284	.534	.412	.463	.469	.982	.988
	T2	Mean (s.d.)	.26 (.45)	.26 (.68)	-.19 (.76)	.07 (.67)	.07 (.33)	.24 (.69)	.21 (.62)	-.15 (.73)	.03 (.50)	.07 (.51)
		t	6.740	4.461	-2.931	1.143	2.524	3.125	3.009	-1.813	.456	1.276
		df			134					81		
		Sig.***	.000	.000	.004	.255	.013	.002	.003	.074	.649	.206
	T3	Mean (s.d.)	.16 (.35)	.17 (.49)	-.05 (.71)	.04 (.52)	.05 (.21)	.14 (.54)	.14 (.41)	-.04 (.69)	.01 (.46)	.04 (.55)
		t	5.376	4.146	-.785	.890	2.658	2.744	3.576	-.691	.158	.787
		df			136					111		
		Sig.***	.000	.000	.434	.375	.009	.007	.001	.491	.875	.433

* Non-customer ** Customer *** 2-tailed test

Appendix 2.3: Independent samples test (comparing reactions of control group and product failure – T1 to T2)

Control Group - Corruption			Levene's Test			t-test for equality of means					Independent-Samples Mann-Whitney U Test
			F	Sig.	EV***	Mean Difference	Std. Error	t	df	Sig. (2-tailed)	
Delta-RES	Nokia	NC*	5.059	.026	EV not assumed	.207	.112	1.841	79	.069	.019
		CU**	12.925	.000	EV not assumed	.242	.103	2.351	160	.020	.026
	Apple	NC*	0.024	.876	EV assumed	.144	.064	2.264	218	.025	.037
		CU**	0.373	.543	EV assumed	.166	.119	1.397	129	.165	.147
Delta-ACT	Nokia	NC*	4.706	.032	EV not assumed	.129	.110	1.167	85	.246	.260
		CU**	9.369	.003	EV not assumed	.104	.082	1.271	160	.206	.295
	Apple	NC*	4.828	.029	EV not assumed	.148	.083	1.789	205	.075	.133
		CU**	3.303	.071	EV assumed	.162	.100	1.613	129	.109	.208
Delta-AGG	Nokia	NC*	0.204	.652	EV assumed	-.124	.126	-.984	160	.326	.663
		CU**	0.363	.548	EV assumed	-.070	.107	-.657	160	.512	.861
	Apple	NC*	3.225	.074	EV assumed	-.117	.098	-1.198	218	.232	.387
		CU**	2.059	.154	EV assumed	-.088	.122	-.725	129	.470	.551
Delta-SIM	Nokia	NC*	0.012	.914	EV assumed	-.102	.179	-.571	160	.569	.325
		CU**	2.382	.125	EV assumed	-.046	.210	-.219	160	.827	.811
	Apple	NC*	0.320	.572	EV assumed	-.002	.088	-.025	218	.980	.906
		CU**	8.257	.005	EV not assumed	.027	.122	.225	73	.822	.872
Delta-EMO	Nokia	NC*	3.377	.068	EV assumed	.069	.076	.904	160	.367	.396
		CU**	0.475	.492	EV assumed	.048	.066	.735	160	.463	.219
	Apple	NC*	0.333	.564	EV assumed	.050	.046	1.074	218	.284	.178
		CU**	0.273	.603	EV assumed	.073	.097	.759	129	.449	.496

* Non-customer ** Customer *** Equal variances

Appendix 2.4: Independent samples test (comparing reactions of control group and product failure - T1 to T3)

Control Group - Product failure			Levene's Test			t-test for equality of means					Independent-Samples Mann-Whitney U Test
			F	Sig.	EV***	Mean Difference	Std. Error	t	d.f.	Sig. (2-tailed)	
Delta-RES	Nokia	NC*	0.739	.391	EV assumed	.086	.112	.765	154	.445	.498
		CU**	3.436	.066	EV assumed	.083	.104	.805	165	.422	.777
	Apple	NC*	3.691	.056	EV assumed	.044	.055	.786	220	.432	.421
		CU**	0.786	.377	EV assumed	.069	.096	.718	159	.474	.353
Delta-ACT	Nokia	NC*	2.163	.143	EV assumed	.042	.106	.400	154	.689	.797
		CU**	2.003	.159	EV assumed	.053	.077	.687	165	.493	.848
	Apple	NC*	0.340	.561	EV assumed	.060	.070	.857	220	.393	.477
		CU**	0.000	.986	EV assumed	.092	.070	1.315	159	.190	.420
Delta-AGG	Nokia	NC*	0.342	.560	EV assumed	.039	.143	.275	154	.784	.218
		CU**	4.512	.035	EV not assumed	.029	.102	.280	94	.780	.321
	Apple	NC*	0.671	.414	EV assumed	.026	.093	.284	220	.777	.570
		CU**	2.039	.155	EV assumed	.014	.111	.123	159	.902	.994
Delta-SIM	Nokia	NC*	0.402	.527	EV assumed	-.218	.173	-1.255	154	.211	.260
		CU**	0.005	.945	EV assumed	-.180	.167	-1.079	165	.282	.355
	Apple	NC*	0.149	.699	EV assumed	-.028	.075	-.376	220	.708	.317
		CU**	10.576	.001	EV not assumed	.009	.117	.079	64	.937	.877
Delta-EMO	Nokia	NC*	0.793	.375	EV assumed	-.042	.051	-.824	154	.411	.806
		CU**	0.099	.754	EV assumed	-.046	.067	-.689	165	.492	.417
	Apple	NC*	10.703	.001	EV not assumed	.026	.041	.636	127	.526	.928
		CU**	0.965	.327	EV assumed	.042	.095	.442	159	.659	.575

* Non-customer ** Customer *** Equal variances

3 BRAND EQUITY – HOW IS IT AFFECTED BY CRITICAL INCIDENTS AND WHAT MODERATES THE EFFECT

Sven Tischer and Lutz Hildebrandt (2012)

Discussion Paper

ABSTRACT

To explore how occurring critical incidents affect customer-brand relations, this study measures the impact on the basis of an online experiment. For this purpose, 1,122 usable responses are gathered considering the smartphone brands of Apple and Nokia as well as different scenarios. The respective reactions to these negative incidents are evaluated using the concept of customer-based brand equity. More precisely, a structure equation model is specified and differences in latent factor means are estimated taking into account perceived quality, various brand associations, loyalty and overall brand equity. The findings indicate that brand equity dimensions are not equally affected. Moreover, the results demonstrate that both brand equity and the business relationship before crisis moderate the effect of distinct critical incidents.

3.1 Introduction

In comparison to the past, relations between customers and brands are less exclusive today (Rust, Lemon & Zeithaml, 2004). Therefore, in order to retain competitive advantages, it is becoming much more important to improve or, at least, to maintain established customer-brand relations. As a result, marketing research has been intensifying to figure out which incidents destabilize these relationships (e.g. Keaveaney, 1995) in which ways (e.g. Aaker, Fournier & Brasel, 2004; Klein & Dawar, 2004).

Roos (2002) defines such critical incidents (CI) as extraordinary events which are perceived or recalled negatively by customers before purchase, during purchase or during consumption. The possible impact of these negative perceptions, especially on loyalty, have led to many qualitative studies to be analyzed (e.g. Bitner, Booms & Tetreault, 1990; Gardial, Fisher, Flint & Woodruff, 1996; Roos, Edvardsson, & Gustafsson, 2004). In contrast, just a few studies quantify effects of critical incidents, but most of them focus on service failures (e.g. Maxham & Netemeyer, 2002; Gustafsson, Johnson & Roos, 2005; van Doorn & Verhoef, 2008). The remaining quantitative studies analyze either product harm crises (Ahluwalia, Burnkrant & Unnava, 2000; Dawar & Pillutla, 2000; Klein & Dawar, 2004; Cleeren, Dekimpe & Helsen, 2008; Dawar & Lei, 2009) or unethical marketing behavior (Ingram, Skinner & Taylor, 2005).

All of these studies aim to shed some light on negative information processing in the case of occurring critical incidents in order to be able to develop impact-minimizing marketing strategies. Consequently, the following questions arise: When will the customer-brand relation be damaged and, if so, to which extent? Which brand dimensions are affected by critical incidents and should be addressed afterwards? Does the kind of critical incident matter? Are there moderators which influence the information processing?

Addressing these questions, this study follows Dawar and Pillutla (2000) and uses the concept of customer-based brand equity (CBBE) to quantify relational changes. For this purpose, an experimental design was developed reducing some criticized weaknesses of such experiments. By focusing on product brands, this study gains insights into immediate reactions to different critical incidents considering various brand strengths (Ahluwalia et al., 2000; Dawar & Pillutla, 2000; Cleeren et al., 2008) and previous relations (Ahluwalia, 2002; Dawar & Lei, 2009; van Doorn & Verhoef, 2008). As a result, this study is the first which explores an integrated relationship-branding perspective and compares the effect of distinct critical incidents regarding various brand equity dimensions.

The article first reviews literature to develop the conceptual framework and hypotheses. The following sections present the research methodology, the sample and the results. In the end, discussion and limitations of this research are presented.

3.2 Conceptual framework

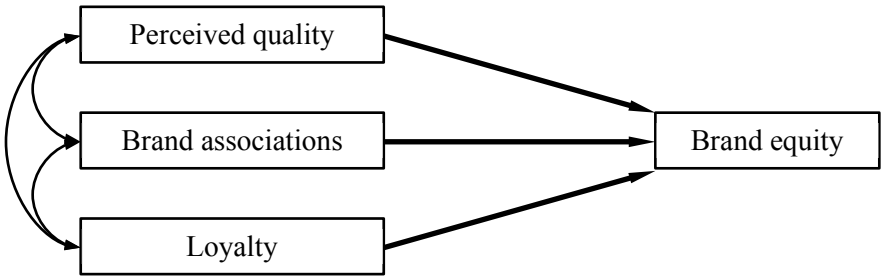
3.2.1 Brand equity and its dimensions

Given the increased importance of brand equity since its conception by Aaker (1991), various brand measures have been developed. Ailawadi, Lehmann and Neslin (2003) classify these measures as product-market outcomes, financial market outcomes or customer mind-set measures. In order to quantify changes in customer-brand relations, this study employs customer mind-set measures adapting the multidimensional concept of CBBE defined by Keller (1993) as *differential effect that brand knowledge has on consumer response to the marketing of that brand*.

Based on the 4 CBBE-dimensions proposed by Aaker (1996), only perceived quality, brand associations and loyalty are taken into account to analyze relational changes (see Figure

3.1). This study excludes the fourth dimension (awareness) because a person unaware of a brand does not possess a customer-brand relation. Hence, there is nothing to be damaged.

Figure 3.1: Conceptual model of brand equity including relevant dimensions



Perceived quality is, in contrast to objective quality, a consumer's subjective judgement about *a product's overall excellence or superiority* (Zeithaml, 1988). This means, whereas objective quality refers to *measureable and verifyable superiority on some predetermined ideal standard* (Zeithaml, 1988), perceived quality depends more on personal product experience, personal needs and the individual consumption situation (Yoo, Donthu & Lee, 2000). Furthermore, perceived quality represents a highly abstract global assessment rather than the sum of individual quality elements (Yoo & Donthu, 2001). Consequently, following Zeithaml (1988), high perceived quality beguiles consumers into buying this brand rather than competing ones.

Brand associations are defined as *anything linked to the memory of a brand* (Aaker, 1991). These associations may be caused by various sources and differ in strength and uniqueness (Keller, 1993). Despite the wide range of sources, Aaker (1996) identifies the main categories of product, personality and organization related brand associations. Growing experience and/or exposure will strengthen these associations (Aaker, 1991). Finally, positive associations signal high quality and commitment leading to more favorable buying decisions for the brand (Yoo et al., 2000).

Loyalty is defined by Aaker (1991) as *the attachment that a customer has to a brand*. This brand attachment can be conceptualized from a behavioral or an attitudinal perspective. Whereas behavioral loyalty focuses on repurchase behavior, attitudinal loyalty reflects the intention or *tendency to be loyal to a focal brand* (Yoo & Donthu, 2001). In the end, consumers with a high level of loyalty increase brand equity by purchasing a brand routinely and resisting other brand offers (Yoo et al., 2000).

3.2.2 Critical incidents (CI)

Bitner et al. (1990) describe an incident which contributes significantly either positively or negatively to an activity or phenomenon as critical. Focusing on negative incidents as defined by Roos (2002; see introduction), a negatively changed buying behavior can be triggered by these incidents (e.g. Gustafsson et al., 2005; Bitner et al., 1990). This would mean that companies lose operating efficiencies and future revenue streams as a result of customers who reduce their spending and purchase frequency, purchase at discount instead of full prices or switch to another supplier.

Different causes may trigger these consequences. According to Keaveney (1995), CI result from either pricing problems, lack of convenience, core service (product) failures, service encounter failures, inadequate response to failures, attraction by competitors or ethical problems. Concentrating on service failures, Keaveney (1995) distinguishes only two ethical problems occuring while interacting with the customer: dishonest or intimidating behavior and conflicts of interest related to commission-based recommendations.

However, public awareness has changed with regard to what is deemed to be an ethical problem. Furthermore, due to better educated, increasingly skeptical and demanding consumers (Mangold & Faulds, 2009) and their ability to publish negative incidents easily via the internet, customers do not experience most CI personally nowadays. Instead, people

perceive especially ethical problems in the media as negative publicity. As a consequence, Shleifer (2004) takes a more general perspective on ethical problems and differentiates, additionally to Keaveney (1995), between employment of children, excessive executive payments, corporate earnings manipulation, involvement of universities in commercial activities and corruption.

In order to compare the results of this study with existing analyses, attitudinal changes concerning a product failure are quantified. Also, due to the increased importance of ethical problems and to compare distinct CI, this study examines changes in the customer-brand relation becoming aware of corruption.

3.3 Development of hypotheses

3.3.1 Relations between brand equity and its dimensions (model hypotheses)

According to Aaker (1996), loyalty is a key indicator of brand equity and can be strengthened by perceived quality and brand associations. Myers (2003) refines this statement, arguing that brand loyalty is a dependent variable of perceived quality and the components of brand associations. Additionally, Buil, de Chernatony and Martinez (2008) claim perceived value, brand personality and organizational associations reflect the relevant brand associations and complete the structural model. Hence, the following hypotheses are proposed:

Hypothesis 1: Rising attitudinal loyalty (LOY) enhances brand equity (EQU).

Hypothesis 2: Higher perceived quality (PQU) increases loyalty (LOY).

Hypothesis 3a: The greater the perceived value (PVA), the greater the loyalty.

Hypothesis 3b: The greater the brand personality (BPE), the greater the loyalty (LOY).

Hypothesis 3c: The greater the organizational associations (ORG), the greater the loyalty (LOY).

Integrating the concept of perceived value takes into account that a high quality perception is necessary, but not sufficient, to become a loyal customer due to perceived price-performance ratio. Therefore, perceived value is assumed to mediate the effect towards loyalty. As a result of Germany-wide similar prices for the same brands, the following hypotheses are proposed:

Hypothesis 4a: Perceived value (PVA) mediates the influence of perceived quality (PQU) on loyalty (LOY).

Hypothesis 4b: The greater the perceived quality (PQU), the greater the perceived value (PVA).

Given that perceived value has to be positive to increase loyalty, organizational associations, such as credibility, esteem and trust, will affect loyalty only in addition to perceived value. Consequently, considering the interdependencies of these organizational associations and following Sirdesmukh, Singh and Sabol (2002), perceived value is assumed to be a mediator between organizational associations and loyalty. In addition, an effect of organizational associations might exist detached from product or service characteristics.

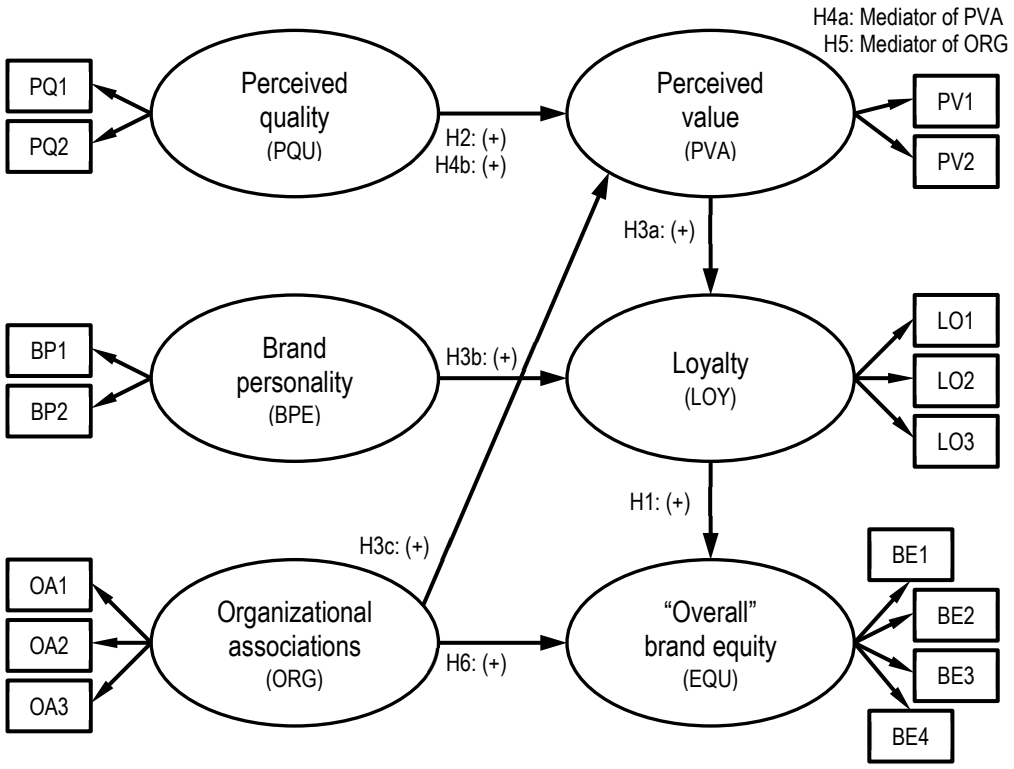
Therefore, the following hypotheses are proposed:

Hypothesis 5: Perceived value (PVA) mediates the influence of organizational associations (ORG) on loyalty (LOY).

Hypothesis 6: The greater the organizational associations (ORG), the greater the overall brand equity (EQU).

Derived from these insights and the corresponding hypotheses, the structural model is specified taking into account the mediation of perceived value (see Figure 3.2).

Figure 3.2: Structural model and model hypotheses



3.3.2 Effects of critical incidents (processing or reaction hypotheses)

Keller (1993) postulates that negative associations are formed on the basis of new negative information (knowledge). Consequently, a reduction of positive attitudes towards the brand is expected when a critical incident occurs. Several studies confirm this negative impact (e.g. Ahluwalia et al., 2000; van Heerde, Helsen & Dekimpe, 2007). Therefore, the following hypothesis is proposed:

Hypothesis 7: A negative critical incident (CI) reduces positive attitudes.

However, closer examination reveals indications that perceptions, and hence the impact of critical incidents, vary depending on customer-brand relation, crisis and the medium which transmits the message.

With regard to customer-brand relation, various studies show a moderating effect of pre-crisis levels using the concepts familiarity (Ahluwalia, 2002; Cleeren et al., 2008; Dawar &

Lei, 2009), commitment (Ahluwalia et al., 2000; Ingram et al., 2005) and brand equity (Dawar & Pillutla, 2000; Cleeren et al., 2008). Specifically, this means critical incidents have less influence on familiar customers, customers who are highly committed to a brand as well as customers with substantial CBBE. These buffering effects can be caused, on the one hand, by more likely biased processing of loyal customers (Ahluwalia et al., 2000) and their tendencies to resist or discount disconfirmatory information (Dawar & Pillutla, 2000). On the other hand, potential customers miss the opportunity to increase their personal experience, which is instrumental in maintaining brand equity during a crisis (Aaker & Biel, 1993). Consequently, they are more affected (van Heerde et al., 2007). Therefore, the following hypotheses are derived considering the importance of loyalty to brand equity (Aaker, 1996):

Hypothesis 8: Higher brand equity leads to smaller effects of the critical incident.

Hypothesis 9: The smaller the effect of the critical incident, the greater the loyalty.

Furthermore, supposing that loyal customers possess generally more brand knowledge as well as stronger associations (Romaniuk, 2008) and are hence more familiar and committed compared to potential customers, the following hypotheses result:

Hypothesis 10: Associations are stronger for customers compared to non-customers.

Hypothesis 11: Current customers reduce their attitudes less compared to non-customers.

According to Dawar and Lei (2009), the influence of the nature of crisis depends on whether key benefit associations are affected. This implies different critical incidents influence different brand dimensions. One reason is that risk perceptions differ depending on the nature of crisis (Weißgerber, 2007). Therefore, in the case of a product failure, perceived quality (PQU) is presumed to be directly affected in consequence of perceived functional and/or physical risks. In contrast, in the case of corruption, a significant direct effect is

expected on associations towards the company (ORG), such as trust, credibility and esteem due to psychological and/or social risks (personal identification). With regard to both critical incidents, perceived value is assumed to decrease as a result of its mediating role and the expected direct effects. Consequently, the following hypotheses are proposed:

Hypothesis 12a: In the event of corruption, organizational associations (ORG) are significantly affected.

Hypothesis 12b: Perceived quality (PQU) is significantly affected in the event of a product failure.

Hypothesis 12c: In both cases, perceived value (PVA) is significantly affected.

In addition to the nature of crisis, Laufer, Gillespie, McBride and Gonzalez (2005) show that perceived severity mediates the impact of critical incidents. Dawar and Lei (2009) confirm this mediation on negative perceptions measuring seriousness. Assuming that the perception of seriousness depends on the potential amount of damage, geographic and chronological proximity as well as whether or not the persons are directly affected, the following hypotheses are proposed:

Hypothesis 13: When the persons are not directly affected, the critical incident impacts loyalty (LOY) less than other constructs.

Hypothesis 14: CI which are perceived as less critical affect brand dimensions less.

Finally, considering that people strive to avoid cognitive dissonance, mediums transmitting bad news are key planks. This means the more credible the medium is perceived to be, the more likely and extensive the processing of information. Consequently, the final hypothesis is offered:

Hypothesis 15: Less credible perceived news items affect brand dimensions less.

3.4 Methodology

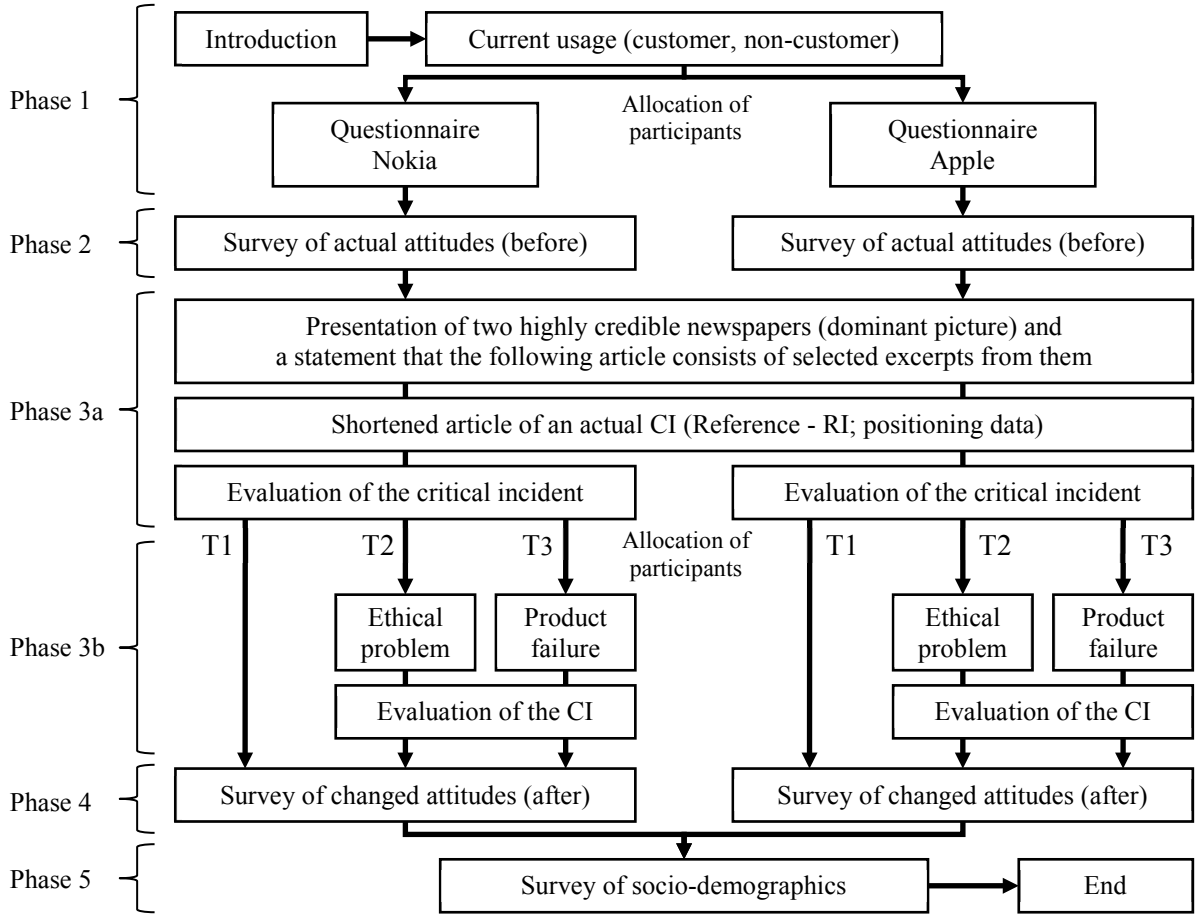
3.4.1 Study design

In order to test these specified hypotheses, attitudinal data are gathered via the internet using an experimental pretest-posttest-control design. The experimental design considers additionally three independent variables – level of brand equity (low vs. high, respectively Nokia vs. Apple), current relationship (customer vs. non-customer) and the nature of the critical incident (product failure vs. ethical problem). Consequently, the design consists of 8 treatment and 4 control groups (2x2x3). All test subjects are assigned randomly to a treatment or control group except current customers of the brands under investigation. Nokia and Apple customers are allocated randomly to a treatment or control group in their respective survey to reach or rather to exceed a minimum threshold of responses in every group. This means, all responses regarding Nokia do not contain the responses of customers who currently use an Apple mobile phone and vice versa (see Figure 3.3).

The treatments are fictitious articles claiming a product failure or corruption happened recently in and limited to East Asia. Consequently, the incidents do not concern participants personally. Focusing on attitudinal changes triggered by the incident, these articles exclude any kind of company response. In order to maximize credibility, the articles are created on the basis of past CI in the mobile phone industry (malfunction of batteries and corruption). Also, all participants are exposed first to a well-known critical incident in the industry. For this purpose, this study takes advantage of the data protection discussion regarding smartphones which collect and save positioning data without the knowledge of its user. To offer or rather recall this information concerning both brands, two existing articles of highly credible German-language newspapers are combined. In addition, respondents are informed about the

source and are exposed to a picture of cited newspapers speculating that memories of this picture increase the credibility of the fictional treatments.

Figure 3.3: Experimental design



Examining the success of manipulation and the influence of these mediators, subsequent to every article presentation respondents evaluate their knowledge, perceived credibility and criticality of the critical incident. The article presentation (one per control group and two per treatment group) follows a second measurement of all brand equity dimensions. Consequently, pretest results reflect actual attitudes to a specific smartphone brand based on past perceptions and/or direct experiences, whereas, the second measurement covers the reaction to critical incidents. Finally, socio-demographics are collected.

3.4.2 Measures

According to Christodoulides and de Chernatony's (2010) distinction between indirect and direct approaches to measure CBBE, this study applies both to measure attitudinal changes with regard to occurring critical incidents. Both indirect approaches and direct approaches are measured using a seven-point Likert scale (strongly disagree to strongly agree). Additionally, avoiding a forced choice, each item offers an alternative no-answer-option. All multi-item measurement scales are adopted from existing measures. In order to ensure that German translations are appropriate, first, a group composed of 20 students translated the original measures. Second, another group translated the most frequent translations of each item back into English. Finally, the translation which corresponds more closely to the original measures is chosen for each item.

The used perceived quality scale (PQU) is adopted from Yoo and Donthu (2001) and consists of two items. The scale reflects the dimensions of perceived functionality, which is usually a key benefit of technical devices, and perceived quality of the corresponding smartphone brand.

With regard to brand personality scale (BPE), this study follows Buil et al. (2008) and applies the scale proposed by Aaker (1996). However, the final scale contains only two of initially three items. The third item, which refers to a clear image of a typical brand user, is eliminated due to a different semantic content and hence factor loadings below 0.15 across all groups in the pre-test (Fornell & Larcker, 1981).

In order to measure the organizational associations (ORG), this study uses, in compliance with Buil et al. (2008), the three-item scale of Aaker (1996) including statements about trust, credibility and esteem.

Concerning the applied perceived value scale (PVA), the effect analysis considers two out of three items developed by Lassar, Mittal and Sharma (1995). The third item is excluded in

the course of reliability and validity analyses due to strong correlations with loyalty items. The remaining two-item scale reflects perceived value for money.

Both the applied loyalty scale and the used direct measurement of CBBE, the overall brand equity scale, are adopted from Yoo et al. (2000). The three-item loyalty scale includes statements about attitudinal loyalty. In contrast, the overall brand equity scale consists of 4 items regarding brand preferences. Table 3.1 gives an overview of all applied measures which are restricted to load only onto one prespecified construct.

Table 3.1: Measures of the constructs used to evaluate attitudinal changes

	Items	
PQU	PQ1	The likelihood that X would be functional is very high
	PQ2	The likely quality of X is extremely high
BPE	BP1	Brand X has a personality
	BP2	Brand X is interesting
ORG	OA1	I trust the company which makes brand X
	OA2	I like the company which makes brand X
	OA3	The company which makes brand X has credibility
PVA	PV1	Brand X is good value for money
	PV2	Within Y (category) I consider brand X a good buy
LOY	LO1	I would not buy other brands of Y (category) if brand X is available at the store
	LO2	Brand X would be my first choice when considering Y (category)
	LO3	I consider myself to be loyal to brand X
EQU	BE1	It makes sense to buy X instead of any other brand, even if they are the same
	BE2	If there is another brand as good as X, I prefer to buy X
	BE3	Even if another brand has the same features as X, I would prefer to buy X
	BE4	If another brand is not different from X in any way, it seems smarter to purchase X

3.4.3 Model evaluation and hypotheses tests

Before evaluating the conceptual model, first, this study examines the assumption of differences both in actual attitudes towards distinct brands and between loyal and potential customers. Second, an analysis verifies the hypotheses that Nokia and Apple have

respectively low or high brand equity. For these purposes, descriptive statistics are compared and an ANOVA examines for each item whether associations depend on group membership. Additionally, ANOVA includes multiple comparisons with Bonferroni correction to test for significance of differences between individual groups to assess hypothesis 10.

Following Hu and Bentler (1998), this study applies structure equation modeling (SEM) to evaluate the fit of the proposed model. More precisely, this study uses LISREL with mean structures in order to consider item means and invariance across samples or time according to Baumgartner and Steenkamp (2006). In other words, this means configural, metric, strong factorial and strict factorial invariance are sequently analyzed using multi-sample-analyses based on covariances and means. The estimated parameters (Maximum Likelihood Estimation) show the effect of variables in an absolute sense and are used to compare similar models in other populations (Bagozzi, 1977). If the proposed model is adequate, the respective exogenous and endogenous measurement models are evaluated seperately. Due to Sörbom's (1974) extension of the classical model of factorial invariance, these separate models are necessary to identify differences in both exogenous and endogenous latent variables. Consequently, the fit and invariance of these measurement models are also examined across groups.

The evaluation starts examining reliability and validity of the measurement model. During the further course, the significance, sign and level of each estimated path coefficient are considered and interpreted with regards to hypotheses 1 to 6.

Model evaluation follows an analysis of potential mediators such as knowledge, credibility and criticality. Between-subject-effects are examined using ANOVA and multiple comparisons with Bonferroni correction. Within-subject-effects of paired samples are analyzed to identify differences in perceptions of distinct incidents (reference incident (RI) to corruption (T2) or product failure (T3)).

Immediate attitudinal changes triggered by various CI and invariance over time (pre-posttest) are examined using LISREL with mean structures. To evaluate the reactions, differences in latent factor means (κ) are simultaneously estimated within groups (pre-posttest). To obtain these group-specific differences, exogenous and endogenous factor models are estimated separately. Furthermore, the latent variable mean (κ) of the pretest, including all respondents within one group, is used as reference point and consequently set (fixed) to be zero. In contrast, κ is set to be free regarding all treatment groups. Additionally, the factor loadings (λ), intercept terms (τ) and measurement errors (δ) are declared to be invariant between pre- and posttest measurement. As a result, latent variables are uniformly scaled within one simultaneously estimated group regardless of treatments. Consequently, absolute differences in latent factor means caused by various CI are directly comparable.

3.5 Sample

3.5.1 Data collection and profile of respondents

The data are collected online using a snowball-sampling. For this purpose, an internet link was spread via student mailing lists asking them to forward it via Facebook to friends. A total of 1,122 usable completed responses were gathered. 657 out of these 1,122 respondents (58.6%) used a smartphone at the date of the survey. Remaining treatments unconsidered, in comparison to 252 responses of current customers and 256 of non-customers regarding the Nokia survey, 227 current customer and 387 non-customer responses are collected regarding the Apple survey.

The demographic results are similar in all four groups with regard to gender ($\chi^2(3) = 4.38$; .224) and age ($\chi^2(18) = 28.36$; .057) using Pearson chi-square tests and comparisons of column proportions with adjusted p-values (Bonferroni method, $p < .05$). In general, the sample is balanced with a proportion of 49.4% female to 50.6% male respondents. However,

the age cohort of 21- to 30-year old respondents is over-represented with 78.5 percent. Due to the addressing of students first, the sample includes an above-average share of 74.2% being students. Therefore, the lowest income group is over-represented with 63.7% including people who have no more than 1,000€ net income per month. Regarding monthly net income, chi-square test results reveal differences across groups ($\chi^2(9) = 33.94$; .000), but comparisons of column proportions show that only the Apple-customer group differs significantly from the remaining three comparable groups (see Table 3.2).

Table 3.2: Crosstab and comparisons of column proportions (net income and group)

Net income (per month)		Nokia		Apple		Total
		NC*	CU**	NC*	CU**	
0 - 1,000€	Count	173_a	171_a	261_a	110_b	715
	% within net income	24.2%	23.9%	36.5%	15.4%	100.0%
1,001 - 2,000€	Count	45_a	44_a	57_a	62_b	208
	% within net income	21.6%	21.2%	27.4%	29.8%	100.0%
2,001 - 3,000€	Count	9_a	16_a	24_a	13_a	62
	% within net income	14.5%	25.8%	38.7%	21.0%	100.0%
>3,000€	Count	3_a	4_a	9_a	11_a	27
	% within net income	11.1%	14.8%	33.3%	40.7%	100.0%
Total	Count	230	235	351	196	1012***
	% within net income	22.7%	23.2%	34.7%	19.4%	100.0%

* Non-customer ** Customer *** Difference to 1,022 responses are missing values [a,b] Each subscript letter denotes a subset of group categories whose column proportions do not differ significantly from each other at the .05 level (adjusted p-values, Bonferroni method).

This means while the proportion of low paid persons earning monthly a maximum of 1,000€ is significant smaller in the Apple customers group, persons with a net income between 1,001€ and 2,000€ are over-represented in comparison to other groups. These higher incomes reflect the significant higher proportion of employed persons in the Apple-customer group. Consequently, compared to the groups of potential customers of Apple or Nokia and loyal customers of Nokia, students are under-represented in the Apple customer group. As a result, the chi-square test leads to a rejection of hypothesized similar proportions regarding occupation in the groups ($\chi^2(18) = 37.34$; .005).

3.5.2 Missing values

The fact that a forced choice should be avoided results in some missing values. The analysis of missing values regarding measurement models reveals that in only 880 out of 1,122 cases are the data complete. The remaining 242 cases have in total 1,072 missing values across all 32 variables (2 x 16 variables, PRE - POST). Overall, 2.98 percent of data are missing. However, Little´s (1988) test indicates on a five percent significance level that data are missing completely at random (MCAR) for both the overall sample ($\chi^2(4643) = 4696.75$; .287) and the subsamples of Nokia-NC ($\chi^2(2318) = 2377.65$; .190), Nokia-CU ($\chi^2(2026) = 2109.17$; .097), Apple-NC ($\chi^2(580) = 554.77$; .768) and Apple-CU ($\chi^2(443) = 476.29$; .133). In other words, lack of data depends neither on observed nor on missing values (Rubin, 1976). Based on these results and to keep the sample size, missing values of the measurement model are imputed using expectation-maximization (EM) algorithm. The imputation procedure is executed separately for the subsamples to avoid a loss of group specific characteristics.

3.6 Results

3.6.1 Brand associations (item level)

Table 3.3 shows descriptive statistics of the first measurement (actual attitudes) for both the whole sample and the subsamples. Furthermore, this table reports for each indicator the results of ANOVA with multiple comparisons. To assess the outcomes of ANOVA, the significance level is adjusted to $p < 0.01$ due to shown deviations from a normal distribution and part absence of homogeneity of variances. Although ANOVA is considered to be robust against such violations, in terms of multiple testing an additional non-parametric test is performed. This Kruskal-Wallis test and ANOVA indicate a significant main effect for group segmentation with regard to each item.

Table 3.3: Descriptive statistics of actual attitudes (first measurement) and test of between-subject effects

PRE means (s.d.)	**Overall** n=1122	Skewness / Kurtosis*	**Nokia** NC** n=256	CU*** n=252	**Apple** NC** n=387	CU*** n=227	**ANOVA**** η^2 Model	Intercept	Segment	Kruskal-Wallis-Test
PQ1	**5.00** (1.59)	- .61 / - .33	**4.23** (1.40)	**4.70**$_a$ (1.64)	**4.98**$_a$ (1.54)	**6.27** (0.94)	.19	.92	.19	.000
PQ2	**5.00** (1.59)	- .62 / - .32	**4.20** (1.39)	**4.76**$_b$ (1.54)	**5.00**$_b$ (1.63)	**6.18** (1.01)	.17	.92	.17	.000
BP1	**4.05** (2.02)	- .11 / -1.25	**2.92** (1.61)	**3.50** (1.81)	**4.28** (2.02)	**5.52** (1.61)	.20	.83	.20	.000
BP2	**4.32** (1.90)	- .26 / -1.04	**3.13** (1.61)	**3.76** (1.76)	**4.55** (1.77)	**5.88** (1.33)	.25	.87	.25	.000
OA2	**3.66** (1.86)	- .03 / -1.12	**3.22**$_c$ (1.72)	**3.96** (1.80)	**3.17**$_c$ (1.75)	**4.65** (1.80)	.10	.81	.10	.000
OA3	**3.84** (1.83)	- .06 / - .96	**3.22**$_d$ (1.62)	**3.94** (1.73)	**3.43**$_d$ (1.73)	**5.10** (1.67)	.14	.84	.14	.000
OA4	**3.96** (1.65)	- .25 / - .69	**3.61**$_e$ (1.61)	**4.10** (1.64)	**3.63**$_e$ (1.59)	**4.78** (1.51)	.08	.86	.08	.000
PV1	**4.00** (1.57)	- .13 / - .51	**3.65**$_f$ (1.19)	**4.14** (1.44)	**3.40**$_f$ (1.58)	**5.26** (1.31)	.19	.89	.19	.000
PV2	**4.37** (1.76)	- .26 / - .82	**3.37** (1.38)	**4.07**$_g$ (1.62)	**4.16**$_g$ (1.68)	**6.19** (0.98)	.30	.90	.30	.000
LO1	**2.63** (2.08)	1.04 / - .32	**1.54**$_h$ (1.00)	**2.46** (1.71)	**1.94**$_h$ (1.59)	**5.20** (2.01)	.41	.74	.41	.000
LO2	**2.97** (2.20)	.73 / - .94	**1.60** (0.99)	**2.89** (1.80)	**2.20** (1.70)	**5.94** (1.51)	.50	.80	.50	.000
LO3	**2.71** (2.11)	.90 / - .65	**1.59**$_i$ (1.13)	**3.34** (2.03)	**1.76**$_i$ (1.46)	**4.87** (2.10)	.37	.74	.37	.000
BE1	**2.84** (1.83)	.62 / - .74	**2.29**$_j$ (1.42)	**2.99** (1.70)	**2.29**$_j$ (1.59)	**4.24** (1.98)	.17	.75	.17	.000
BE2	**3.11** (2.05)	.52 / -1.06	**2.26**$_k$ (1.40)	**3.35** (1.87)	**2.32**$_k$ (1.70)	**5.15** (1.91)	.30	.78	.30	.000
BE3	**3.05** (2.03)	.57 / - .98	**2.22**$_l$ (1.41)	**3.30** (1.84)	**2.29**$_l$ (1.68)	**4.99** (2.01)	.27	.77	.27	.000
BE4	**2.88** (1.95)	.65 / - .85	**2.26**$_m$ (1.49)	**3.08** (1.85)	**2.32**$_m$ (1.70)	**4.34** (2.13)	.17	.73	.17	.000

* Standard Errors: .073 (Skewness), .146 (Kurtosis) ** Non-Customer *** Customer **** All corrected models, intercepts and fixed factors (group) are significant on $p < .01$; Levene-Tests are only not significant for all OA items (.05)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

With regard to the assumed perceptional differences of both brands, the results are not consistent. Differences in all associations are significant comparing loyal customers of Nokia and Apple. But comparisons of potential customers suggest that associations differ significantly only regarding perceived quality (PQU), brand personality (BPE) as well as individual indicators of PV2 and LO2. However, focusing on more relevant associations of

customers and the key benefit dimension of technical devices (functional quality), the conclusion can still be drawn that both brands differ considerably. Furthermore, Apple's higher level of these associations is a first indication of high brand equity. The combination of this indication with the results of direct measures and key associations (loyalty) of brand equity implies that Nokia and Apple represent respectively a weak and a strong smartphone brand. Hence, due to comparable perceptions, organizational associations are less relevant to create brand equity.

In principle, associations differ significantly between loyal and potential customers for both brands. Furthermore, as hypothesized, associations of loyal customers are more positive. Consequently, hypothesis 10 is supported.

3.6.2 Assessing reliability and validity

Table 3.4 and 3.5 report results of confirmatory factor analysis including indicator reliability, composite reliability, average variance extracted (AVE) and correlations between latent variables for each group. According to Bagozzi and Baumgartner (1994) calling for values exceeding .40, all indicators except one are reliable. The only exception concerns a loyalty item (LO3) in the potential customers group of Nokia (Nokia-NC) with an indicator reliability of .37. In order to apply one uniform measurement model across groups, a single item falling slightly below the threshold value is acceptable. Consequently, this item is not eliminated and indicator reliability is considered to be given.

Evaluating internal consistency, this study uses Cronbach's alpha, composite reliability as well as the AVE. Cronbach's alpha exceeds the minimum level of acceptability of .70 (Nunnally, 1978) for all groups and constructs. Furthermore, composite reliability and AVE fully meet the limits of respectively > .60 (Bagozzi & Yi, 1988) and > .50 (Fornell & Larcker,

1981). Finally, following Anderson and Gerbing (1988), significance of all t-tests imply indicators which measure effectively the same constructs.

Table 3.4: Indicator reliability (First measurement - PRE)

Exogenous measurement model					Endogenous measurement model				
	Nokia		Apple			Nokia		Apple	
	NC*	CU**	NC*	CU**		NC*	CU**	NC*	CU**
PQU	.69	.69	.74	.61	PVA	.77	.71	.58	.58
	.72	.72	.76	.66		.62	.92	.74	.72
BPE	.52	.69	.48	.53	LOY	.56	.74	.79	.81
	.90	.88	.83	.81		.71	.77	.83	.83
						.37	.50	.55	.56
ORG	.83	.79	.77	.81	EQU	.69	.74	.77	.53
	.85	.85	.76	.74		.94	.92	.94	.90
	.69	.72	.74	.77		.96	.92	.96	.96
						.85	.79	.72	.55

* Non-customer ** Customer

Table 3.5: Correlations of latent variables & reliability measures (First measurement - PRE)

		NC*						CU**					
		PQU	BPE	ORG	PVA	LOY	EQU	PQU	BPE	ORG	PVA	LOY	EQU
Nokia	PQU	1.00						1.00					
	BPE	.48	1.00					.55	1.00				
	ORG	.64	.71	1.00				.60	.80	1.00			
	PVA	.81	.57	.72	1.00			.83	.57	.60	1.00		
	LOY	.26	.47	.39	.48	1.00		.73	.57	.55	.72	1.00	
	EQU	.43	.61	.65	.52	.63	1.00	.68	.60	.69	.67	.74	1.00
	Cronb. α	.83	.81	.92	.81	.76	.91	.83	.88	.92	.89	.85	.96
	Rel (ξ_j)	.83	.83	.92	.82	.78	.96	.83	.88	.92	.90	.86	.96
	AVE	.71	.71	.79	.70	.55	.86	.71	.79	.79	.81	.67	.84
Apple	PQU	1.00						1.00					
	BPE	.65	1.00					.42	1.00				
	ORG	.66	.76	1.00				.53	.66	1.00			
	PVA	.81	.69	.80	1.00			.75	.54	.68	1.00		
	LOY	.45	.50	.59	.69	1.00		.50	.56	.57	.75	1.00	
	EQU	.43	.47	.65	.68	.82	1.00	.42	.62	.67	.59	.74	1.00
	Cronb. α	.85	.76	.91	.78	.88	.96	.77	.78	.91	.76	.88	.91
	Rel (ξ_j)	.86	.79	.90	.79	.89	.96	.77	.80	.91	.79	.89	.92
	AVE	.75	.65	.76	.66	.72	.85	.63	.67	.77	.65	.73	.74

* Non-customer ** Customer

Assessing construct validity, first, following Fornell and Larcker (1981), the results of construct reliability imply convergence validity. Second, discriminant validity is given using

the Fornell and Larcker (1981) test. AVE of all constructs exceeds the squared correlation between the considered and all other constructs. Third, according to Hildebrandt (1984), overall model fit is indicative of nomological validity (see next section). Fourth, after eliminating one brand personality and one perceived value indicator (see Measures), content validity is considered to be given due to positive judgments and reapplications of scales by experts (Cronbach & Meehl, 1955).

3.6.3 Structural model evaluation (fit indices)

Estimated path coefficients shown in Table 3.6 indicate a plausible and stable structural model across groups. This means, relations between all constructs are positive. However, path coefficients between ORG and PVA for Nokia-CU and between BPE and LOY for Apple-NC are not significant. But the structural model is not changed in order to examine comparable models across groups. Consequently, hypotheses 1, 2, 3a, 4a and 4b as well as 6 are supported across groups. Hypothesis 3b is supported except for the group of Apple-NC. Hypothesis 3c and hence hypothesis 5 are also only supported for 3 out of 4 groups (all except Nokia-CU).

Table 3.6: Estimated standardized path coefficients of structural models (PRE)

Coefficients (t-value)	Nokia-NC*		Nokia-CU**		Apple-NC*		Apple-CU**	
PQU - PVA	.57	(7.20)	.82	(9.72)	.45	(7.37)	.56	(6.22)
BPE - LOY	.40	(4.50)	.28	(4.57)	.06	(0.82)	.25	(3.49)
ORG - PVA	.36	(5.02)	.05	(0.75)	.52	(8.55)	.38	(4.99)
ORG - EQU	.47	(8.25)	.40	(7.20)	.27	(6.44)	.39	(6.05)
PVA - LOY	.19	(2.25)	.60	(9.07)	.62	(7.74)	.59	(7.31)
LOY - EQU	.45	(6.97)	.53	(8.78)	.67	(14.12)	.51	(7.55)

* Non-customer ** Customer

Table 3.7: Fit indices of the full model (overall model fit – PRE)

PRE		X^2	d.f.	p-Value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI	GFI	SRMR
Multi-Group-Analysis		1016.83	380	.000	2.68	.077	.072	.083	.00	.97	.98	.98		
Nokia	NC*	246.08	95	.000	2.59	.079	.067	.092	.00	.97	.97	.98	.89	.054
	CU**	264.91	95	.000	2.79	.084	.072	.097	.00	.97	.98	.98	.88	.050
Apple	NC*	242.59	95	.000	2.55	.063	.054	.073	.01	.98	.99	.99	.93	.043
	CU**	263.25	95	.000	2.77	.089	.076	.100	.00	.96	.97	.97	.87	.055

* Non-Customer ** Customer

Evaluating overall model fit, the fit indices shown in Table 3.7 suggest an acceptable fit for both multi-sample analysis and all analyses for separate groups applying the combination rules of Hu and Bentler (1999). This means, despite severe criticism against global cut-off values (see e.g. Barrett, 2007; Chen, Curran, Bollen, Kirby & Paxton, 2008) this study uses .95 for NNFI and .08 for SRMR (Hu & Bentler, 1999) as well as .95 for CFI (Carlson & Mulaik, 1993). Additional frequently-used fit indices are reported. Also NFI (> .90; Arbuckle, 2008), RMSEA (< .10; MacCallum, Browne & Sugawara, 1996) and chi-square-value divided by degrees of freedom (χ^2/d.f. < 3; Homburg & Giering, 1996) indicate an acceptable fit.

Tables 3.8 and 3.9 show the fit indices for the separate and multi-sample analyses of the respective exogenous and endogenous factor models. Based on the above used combination rules (Hu and &, 1999), fit criteria indicate an acceptable fit for the submodels.

Table 3.8: Fit indices of the exogenous measurement model (overall model fit – PRE)

CFX*		X^2	d.f.	p-Value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI	GFI	SRMR
Multi-Group-Analysis		116.61	44	.000	2.65	.077	.060	.094	.01	.98	.98	.99		
Nokia	NC**	21.79	11	.026	1.98	.062	.021	.100	.27	.99	.99	.99	.98	.019
	CU***	24.82	11	.010	2.26	.071	.033	.110	.16	.99	.99	.99	.97	.020
Apple	NC**	40.45	11	.000	3.68	.083	.057	.110	.02	.98	.98	.99	.97	.021
	CU***	29.55	11	.002	2.69	.086	.049	.120	.05	.98	.97	.98	.96	.034

* Containing perceived quality, brand personality and organizational associations ** Non-Customer *** Customer

Table 3.9: Fit indices of the endogenous measurement model (overall model fit – PRE)

CFY*		X^2	d.f.	p-Value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI	GFI	SRMR
Multi-Group-Analysis		313.13	96	.000	3.26	.090	.079	.100	.00	.98	.98	.99		
Nokia	NC**	83.46	24	.000	3.48	.099	.076	.120	.00	.97	.97	.98	.93	0.056
	CU***	73.32	24	.000	3.06	.090	.067	.110	.00	.98	.98	.99	.94	0.037
Apple	NC**	71.21	24	.000	2.97	.071	.053	.091	.03	.99	.99	.99	.96	0.021
	CU***	85.14	24	.000	3.55	.106	.082	.130	.00	.97	.97	.98	.92	0.040

* Containing perceived value, loyalty and overall brand equity ** Non-Customer *** Customer

After supporting the equality of factor and model structure across groups with multi-sample analyses using same pattern and starting values, Tables 3.10, 3.11 and 3.12 contain results of the additionally required invariance tests. Following Little, Card, Slegers and Ledford (2007), the respective invariance across groups is rejected if the descriptive fit index of NNFI changes more than .01 compared to the prior and weaker invariance level. Based on this criterion, the results suggest an absence of factorial invariance with regard to exogenous and endogenous measurement models. This means, without factorial invariance, changes in latent variable means can only be estimated within groups. As a consequence, immediate reactions triggered by various critical incidents are not directly comparable in an absolute sense across groups.

Table 3.10: Invariance analyses across groups - overall model (PRE)

Overall model fit - PRE	X^2	d.f.	p-Value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI
Metric invariance	1333.92	410	.000	3.25	.090	.084	.095	.00	.97	.97	.98
Strong factorial invariance	1712.18	449	.000	3.81	.100	.095	.110	.00	.95	.96	.96

Table 3.11: Invariance analyses across groups - exogenous model (PRE)

Exogenous - PRE	X^2	d.f.	p-Value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI
Metric invariance	133.83	56	.000	2.39	.071	.055	.086	.02	.98	.98	.99
Strong factorial invariance	265.48	68	.000	3.90	.102	.089	.120	.00	.96	.96	.97

Table 3.12: Invariance analyses across groups - endogenous model (PRE)

endogenous - PRE	X^2	d.f.	p-Value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI
Metric invariance	590.17	114	.000	5.18	.122	.110	.130	.00	.96	.96	.97

3.6.4 Investigation of potential mediators

Differences between knowledge of the reference incident (RI) imply that this incident is widely known with regard to Apple and has been lost in media with regard to Nokia. In contrast to approximately 78% (86%) questioned about Apple, just about 19% (23%) of potential customers (loyal customers) questioned about Nokia know this critical incident. Hence, the Pearson chi-square test indicates that knowledge differs significantly between the groups ($\chi^2(3) = 407.81$; .000).

Reflected by a chi-square test ($\chi^2(3) = 5010$; .171), the hypothetical case of corruption (T2) is similarly unknown across groups (Nokia-NC - 97%, CU - 99%, Apple-NC - 93% and CU - 96%). Due to better known hypothetical product failure (T3) regarding Apple, variations are unexpectedly significant ($\chi^2(3) = 23.71$; .000). Although this critical incident is based on an event which happened to Nokia several years ago, 29% (32%) of Apple respondents claim to know the incident in contrast to 9% (14%) of potential (loyal) customers of Nokia.

Against this background, varying credibility is expected between brands for the reference incident and the product failure. However, analyses of potential mediators do not indicate significant variations between groups (see Table 3.13 to 3.15). Comparing both hypothetical incidents within groups reveals that credibility differs significantly between subjects for loyal Apple and Nokia customers (see Table 3.16).

Table 3.13: Descriptive statistics for evaluations of the actual incident and test of between-subject (group) effects

RI **means** (s.d.)	**Overall** n=1122	Skewness / Kurtosis*	**Nokia** NC** n=256	CU*** n=252	**Apple** NC** n=387	CU*** n=227	**ANOVA**** η^2 Model	Intercept	Segment	Kruskal-Wallis-Test
Credibility	**5.07** (1.53)	- .47 / - .47	**5.08$_a$** (1.48)	**5.00$_a$** (1.47)	**5.06$_a$** (1.63)	**5.16$_a$** (1.48)	x	x	x	.563
Criticality	**5.48** (1.54)	- .93 / .18	**5.82$_b$** (1.37)	**5.64$_b$** (1.41)	**5.72$_b$** (1.41)	**4.53** (1.69)	.10	.93	.10	.000

* Standard Errors: .073 (Skewness), .146 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (groups) are significant on $p < .01$; Levene-Test is only not significant for credibility ($p < .05$)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 3.14: Descriptive statistics for evaluations of corruption and test of between-subject (group) effects

T2 **means** (s.d.)	**Overall** n=427	Skewness / Kurtosis*	**Nokia** NC** n=105	CU*** n=91	**Apple** NC** n=151	CU*** n=80	**ANOVA**** η^2 Model	Intercept	Segment	Kruskal-Wallis-Test
Credibility	**4.77** (1.24)	- .09 / - .35	**5.02$_a$** (1.19)	**4.60$_a$** (1.33)	**4.78$_a$** (1.18)	**4.60$_a$** (1.29)	x	x	x	.114
Criticality	**5.19** (1.41)	- .52 / - .20	**5.29$_b$** (1.39)	**5.19$_b$** (1.46)	**5.47$_b$** (1.27)	**4.51** (1.44)	.06	.93	.06	.000

* Standard Errors: .118 (Skewness), .236 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (segment) are significant on $p < .01$; Levene-Test is not significant for both items ($p < .05$)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 3.15: Descriptive statistics for evaluations of the product failure and test of between-subject effects

T3 **means** (s.d.)	**Overall** n=448	Skewness / Kurtosis*	**Nokia** NC** n=98	CU*** n=106	**Apple** NC** n=140	CU*** n=104	**ANOVA**** η^2 Model	Intercept	Segment	Kruskal-Wallis-Test
Credibility	**5.05** (1.45)	- .47 / - .34	**5.09$_a$** (1.64)	**5.09$_a$** (1.44)	**5.01$_a$** (1.43)	**5.03$_a$** (1.31)	x	x	x	.840
Criticality	**5.02** (1.56)	- .55 / - .26	**5.42$_b$** (1.51)	**4.90$_{b,c}$** (1.48)	**5.25$_b$** (1.46)	**4.48$_c$** (1.66)	.05	.91	.05	.000

* Standard Errors: .115 (Skewness), .230 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (segment) are significant on $p < .01$; Levene-Test is only not significant for criticality (.05)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 3.16: Independent samples test of mean differences (test between subjects within groups - T2 to T3)

T2 to T3			Levene's Test			t-test for Equality of Means					Independent-Samples Mann-Whitney U Test
			F	Sig.	EV***	Mean Difference	Std. Error	t	d.f.	Sig. (2-tailed)	
Credibility	Nokia	NC*	11.729	.001	EV not assumed	-.073	.202	-.360	176	.719	.331
		CU**	.562	.454	EV assumed	-.490	.199	-2.466	195	.015	.011
	Apple	NC*	3.411	.066	EV assumed	-.226	.153	-1.473	289	.142	.084
		CU**	.004	.949	EV assumed	-.429	.193	-2.216	182	.028	.023
Criticality	Nokia	NC*	1.195	.276	EV assumed	-.133	.203	-.652	201	.515	.354
		CU**	.189	.664	EV assumed	.291	.210	1.383	195	.168	.183
	Apple	NC*	3.183	.075	EV assumed	.220	.160	1.373	289	.171	.221
		CU**	2.080	.151	EV assumed	.032	.233	.136	182	.892	.774

* Non-customer ** Customer *** Equal variances

Contrary to expectations that a less known product failure is perceived less credible than the reference incident, the results in Table 3.17 do not reveal significant effects within subjects regarding credibility. In contrast, in the case of corruption (T2), credibility decreases except for Nokia-NC. In short, the experimental design works as intended. Hypothetical incidents are perceived as credible (mean > 4.0).

Considering the evaluations of criticality between groups, the biased information processing of current Apple customers is striking compared to other groups. Apple customers perceive the reference and both hypothetical treatments similar and less critical. However, perceived criticality of hypothetical incidents do not differ significantly for other groups either. Nevertheless, criticality decreases significantly in comparison to the reference for both Nokia groups regarding corruption as well as for Nokia-CU and Apple-NC regarding product failure.

Table 3.17: Descriptive statistics and test of within-subject effects (reference CI to T1 and T2)

Reference CI (RI) to T2 and T3				Paired Differences			t-value	d.f.	Sig. (2-tailed)	Wilcoxon signed rank test
				Mean***	s.d.	Std. Error				
Credibility	Nokia	NC*	RI - T2	.19	1.63	.159	1.198	104	.234	.166
			RI - T3	.03	1.69	.171	.179	97	.858	.686
		CU**	RI - T2	.35	1.45	.152	2.316	90	.023	.029
			RI - T3	.04	1.49	.145	.260	105	.795	.863
	Apple	NC*	RI - T2	.35	1.74	.142	2.478	150	.014	.017
			RI - T3	.00	1.49	.126	.000	139	1.000	.985
		CU**	RI - T2	.66	2.00	.224	2.963	79	.004	.002
			RI - T3	.10	1.49	.146	.658	103	.512	.439
Criticality	Nokia	NC*	RI - T2	.55	1.72	.168	3.289	104	.001	.001
			RI - T3	.31	1.77	.178	1.715	97	.090	.060
		CU**	RI - T2	.73	1.48	.155	4.687	90	.000	.000
			RI - T3	.67	2.09	.203	3.304	105	.001	.000
	Apple	NC*	RI - T2	.08	1.56	.127	.626	150	.532	.430
			RI - T3	.71	1.59	.135	5.250	139	.000	.000
		CU**	RI - T2	-.01	2.07	.232	-.054	79	.957	.851
			RI - T3	.21	2.28	.223	.948	103	.345	.392

* Non-customer ** Customer *** Bigger values represent higher losses (negative differences)

3.6.5 Reactions to critical incidents (changes in latent means)

In order to compare unbiased changes in latent means (Temme & Hildebrandt, 2009), the condition of factorial invariance is examined considering pre-test and the respectively three post-tests within a group. The outcomes indicate strong factorial invariance of all multi-sample confirmatory factor analyses applying the criteria of Little et al. (2007). Values of NNFI range from .95 to .99 across samples and invariance levels. Furthermore, even strict factorial invariance is given for all CFA except for the endogenous factor model of Nokia-NC. Due to only marginal effects of missed strict factorial invariance for the estimation of latent variables, differences are neglected.

To evaluate the impact of critical incidents on latent variables, estimated changes of latent means (κ), shown in Tables 3.18 to 3.21, are considered. As a consequence of the general hypothesized negative impact (H7) and multiple comparisons (three per group), significance is assessed on the basis of 1-tailed t-tests with Bonferroni correction.

First of all, assessing results with regard to hypothesis 7 leads to the result that 9 out of 72 estimated changes are positive. However, the changes are so marginal in eight of these nine cases that a stability of these constructs is assumed. Only the insignificant positive change for the group of Apple-CU indicates possibly a reactance towards the treatment (T3). Hence, hypothesis 7 is just partially supported.

In consequence of missing a common scaling of latent variables across all four groups, hypotheses are assessed judging the significance pattern. Considering corruption (T2) first, hypotheses 8, 9 and 11 are supported. That means, direct comparisons of loyal and potential customers of both brands imply that higher brand equity (H8) as well as higher loyalty (H9) lead to smaller effects. Additionally, results of comparing both customer segments within brands suggest that loyal customers are less affected (H11).

Considering the reaction to the product failure (T3) next, results are ambiguous. Although hypotheses 8 and 9 are supported comparing potential customers, results are indistinguishable comparing current customers. Only on the basis of the general level of changes in latent means could one speculate for a smaller impact regarding Apple. Consequently, hypotheses 8 and 9 are just partially supported with regard to the product failure. Hypothesis 11 is also only partly supported due to obvious differences between potential and loyal customers of Nokia in contrast to Apple.

Table 3.18: Estimated differences in factor means (smaller values indicate a bigger loss in latent factor means)

κ (s.d.) / t-value		PQU	BPE	ORG	PVA	LOY	EQU
Nokia - NC	T1	-0.38 (.37) / -1.02	-0.22 (.31) / -.70	-0.20 (.47) / -.43	-0.27 (.30) / -.90	0.04 (.17) / .22	-0.36 (.21) / -1.70
	T2	**-0.61***** (.21) / -2.91	-0.27 (.23) / -1.14	-0.48 (.29) / -1.70	**-0.48**** (.20) / -2.41	0.04 (.14) / .30	**-0.44**** (.17) / -2.61
	T3	**-0.69***** (.24) / -2.94	**-0.37*** (.20) / -1.87	-0.48 (.30) / -1.62	**-0.48**** (.20) / -2.41	0.06 (.13) / .50	-0.24 (.18) / -1.34

* p < 0.1 ** p < 0.05 *** p < 0.01 (1-tailed t-test considering Bonferroni correction)

Table 3.19: Estimated differences in factor means (smaller values indicate a bigger loss in latent factor means)

κ (s.d.) / t-value		PQU	BPE	ORG	PVA	LOY	EQU
Nokia - CU	T1	-0.42 (.30) / -1.40	-0.06 (.39) / -.16	-0.22 (.40) / -.55	-0.33 (.23) / -1.43	-0.15 (.35) / -.44	-0.35 (.32) / -1.09
	T2	**-0.72***** (.25) / -2.89	-0.38 (.32) / -1.21	**-0.90**** (.34) / -2.66	-0.41 (.23) / -1.75	-0.21 (.30) / -.68	-0.40 (.29) / -1.36
	T3	**-0.61**** (.27) / -2.24	-0.16 (.30) / -.52	-0.34 (.37) / -.92	-0.27 (.26) / -1.05	0.02 (.31) / .07	-0.28 (.30) / -.93

* p < 0.1 ** p < 0.05 *** p < 0.01 (1-tailed t-test considering Bonferroni correction)

Table 3.20: Estimated differences in factor means (smaller values indicate a bigger loss in latent factor means)

κ (s.d.) / t-value		PQU	BPE	ORG	PVA	LOY	EQU
Apple - NC	T1	-0.23 (.25) / -.91	-0.14 (.40) / -.36	-0.20 (.28) / -.71	-0.16 (.26) / -.60	0.08 (.26) / .31	0.01 (.26) / .03
	T2	**-0.42*** (.22) / -1.90	-0.15 (.30) / -.51	-0.42 (.26) / -1.62	**-0.44*** (.23) / -1.92	-0.04 (.23) / -.19	-0.24 (.23) / -1.04
	T3	**-0.63***** (.23) / -2.75	-0.12 (.30) / -.41	-0.31 (.26) / -1.19	-0.38 (.26) / -1.47	-0.02 (.23) / -.10	-0.14 (.24) / -.56

* p < 0.1 ** p < 0.05 *** p < 0.01 (1-tailed t-test considering Bonferroni correction)

Table 3.21: Estimated differences in factor means (smaller values indicate a bigger loss in latent factor means)

κ (s.d.) / t-value		PQU	BPE	ORG	PVA	LOY	EQU
Apple - CU	T1	-0.19 (.12) / -1.55	-0.28 (.41) / -.68	-0.04 (.52) / -.08	-0.23 (.25) / -.93	-0.20 (.64) / -.32	0.04 (.47) / .08
	T2	-0.21 (.12) / -1.84	-0.31 (.32) / -.97	-0.32 (.39) / -.83	-0.32 (.21) / -1.51	-0.53 (.59) / -.90	-0.16 (.45) / -.36
	T3	**-0.39**** (.16) / -2.52	-0.11 (.27) / -.39	-0.03 (.39) / -.07	-0.14 (.23) / -.64	0.04 (.45) / .08	0.22 (.32) / .70

* p < 0.1 ** p < 0.05 *** p < 0.01 (1-tailed t-test considering Bonferroni correction)

Evaluating cross effects (comparing customers with non-customers of the other brand), reactions in fringe groups (Nokia-NC and Apple-CU) correspond to hypotheses, whereas comparisons of Nokia-CU and Apple-NC lead to ambiguous results. However, due to a very challenging isolation of causes, a closer examination of cross effects is neglected.

Assessing weakened dimensions of brand equity depending on the type of critical incident implies that hypotheses 12a (ORG) and 12c (PVA) are only partially supported. In contrast, hypothesis 12b (PQU) is supported without any kind of restrictions. Organizational associations are a bit more affected in the case of corruption than when the product failure occurred, but the effect is only significant for customers of Nokia. Whereas, in the case of a product failure, the negative effect on the perceived quality dimension is significant for all groups. Significant effects regarding the perceived value exist only for potential customers of Apple and Nokia in the case of corruption or respectively in both cases. However, corruption apparently affects the perceived quality dimension significantly for all groups except Apple-CU.

Evaluating results with regard to hypothesis 13 (loyalty is less effected) points out that loyalty is marginally or not affected (see above, positive changes), especially for potential customers. Moreover, marginal changes and the absence of significant effects for customers after the product failure indicate stability of the loyalty construct. Hence, hypothesis 13 is supported.

Hypothesis 14 (less critical incidents affect brand equity less) is not supported. With the exception of Apple-CU, where a similar critical and less credible perceived incident induces equally strong effects (comparing RI to T2, see Table 3.17), all results contradict this hypothesis. This means, reactions are stronger despite comparable or lower criticality.

With regard to hypothesis 15, presuming that less credible incidents have a minor effect on brand equity, results are contradictory. On the one hand, less credible and similarly critical

perceived incidents lead to smaller effects comparing T2 and T3 (Apple-CU). On the other hand, despite the smaller credibility of corruption (T2) the occurring effect is stronger for Nokia's customers.

However, comparing reactions to hypothetical incidents, effects overlap regarding criticality and credibility. But stronger reactions to corruption imply that perceived criticality dominates the effect over credibility taking into account the conditions (comparable critical and less credible) and results of Apple-CU. Overall, it is apparent that the immediate reactions triggered by corruption result in a bigger loss of positive associations compared to product failure for all groups except the customers of Apple. In conclusion, the following table presents all results with regard to reaction hypotheses.

Table 3.22: Overview of results (reaction hypotheses)

Reaction hypotheses		**Product failure**	**Corruption**
7	CI reduces positive attitudes	Support in 20/24	Support in 23/24
8	High EQU leads to smaller effects	Support in 4/8	Supported
9	Effects of CI are less the greater LOY	Support in 4/8	Supported
11	CU reduce their attitudes less than NC	Nokia: supported Apple: not supported	Supported
12a	Corruptions affect ORG significantly	X	Support in 1/4
12b	Product failures affect PQU significantly	Supported	X
12c	PVA is affected in both cases	NC: support in 1/2 CU: not supported	NC: supported CU: not supported
13	LOY is less affected	Supported	Supported
14	CI perceived less critical, affect EQU less	Not supported	
15	Less credible news affects EQU less	Support in 1/12	

3.7 Discussion

Nowadays, consumers are often confronted, deliberately or otherwise, with various critical incidents independent of their current business relation with a company. For this reason, this paper addresses the essential questions. When and to what extent do such critical incidents

damage the customer-brand relationship? More precisely, this study examines which dimensions of customer based brand equity are affected depending on distinct critical incidents and which moderators play a role.

For this purpose, an online experiment was conducted whose design increases external validity and overcomes some criticism of previous experiments (e.g. Cleeren et al., 2008; van Heerde et al., 2007, Grewal, Roggeveen & Tsiros, 2008). Therefore, first, participants receive some information of the critical incidents via internet as negative publicity (Ahluwalia et al., 2000) in their familiar surroundings. Second, incidents are based on actual historical events and are transmitted via real credible media. Third, this study analyzes effects regarding distinct customer segments, various incidents and brands at the same time on the basis of large samples. Finally, effects are examined taking into account real brands and business relations.

The results indicate a differing immediate negative effect depending on various factors. In principle, the results imply that a strong brand equity buffers negative perception of critical incidents as hypothesized earlier (Hess, Ganesan & Klein, 2003; Tax, Brown & Chandrashekaran, 1998). However, not only brand equity works as a moderator, the current usage of a brand reduces the negative impact too. Comparing loyal with potential customers, this analysis shows, as supposed by Dawar and Pillutla (2000), actual customers shift their attitudes less. Even the consequence of a BPE decrease for potential Nokia customers is in line with outcomes of Dawar and Pillutla (2000) after a product failure. This means, on the one hand, potential customers tend to lose interest in a brand faster because they are missing a strong relation and an opportunity to be reassured that the product is safe. On the other hand, when a critical incident occurs and the user is not personally affected, the current usage works as an attitude stabilizing anchor.

This effect confirms indirectly the existence of moderators such as commitment (e.g. Ingram et al., 2005) and familiarity (e.g. Ahluwalia, 2002). Following Morgan and Hunt (1994) and taking commitment as a key factor for successful sales for granted, customers possess a high commitment because they have already bought the brand. However, in the case of necessary post crisis communication, the differentiation between loyal and potential customers seems more appropriate in practice because these groups are easier to separate and to address.

Moreover, outcomes suggest that number and type of affected dimensions of CBBE as well as the effect size depend on both type of incident and the above mentioned moderators. There are indications that key benefit dimensions (PQU – function of technical devices) are almost always affected. Whereas in the case of corruption, organizational associations tend to be additionally more affected. However, the reduction of perceived quality triggered by corruption contradicts the statement of Dawar and Lei (2009) that core associations shift only when directly affected by crisis. In principle, post crisis communication should focus especially on significantly damaged dimensions of CBBE. Indeed, given that attitudinal loyalty is a necessary preliminary stage of loyal behavior, outcomes of robust attitudinal loyalty imply that critical incidents do not induce in general a changed behavior. Consequently, appropriate handling of rare critical incidents and the corresponding bad news can be an opportunity to improve brand equity in the long run.

3.8 Limitations and future research

This analysis may be subject to some limitations. First, this study focuses on smartphone brands and hence on basically utilitarian products with high involvement. Hence, the findings can be limited to mobile phones or these types of goods. Therefore, future research has to

figure out whether and how effects vary in other combinations of utilitarian, hedonistic as well as low and high involvement goods.

Second, data are collected using snowball-sampling and a self-administered online experiment. Consequently, sample composition and representativeness might raise some concerns about the generalizability of results. However, taking the typical target group of smartphones into account, the used sample seems adequate containing mainly young technically inclined people and an above average share of smartphone users (58.6%).

Third, the experimental design and the context of research possibly limit the external validity and generalizability of findings. On the one hand, immediate shifts may differ to reactions in the long run. Moreover, being more often exposed to a critical incident may lead to modified attitudinal changes. On the other hand, people personally affected by a critical incident probably react more emotionally and hence differently.

Fourth, the applied methodology requires multivariate normal distributed variables, but variables of the used sample are not even univariate normal distributed. However, following Boomsma and Hoogland (2001), Yuan, Bentler and Zhang (2005), Ryu (2011) and West, Finch and Curran (1995), violations are less critical for large samples (> 200) and positive or negative skewness and kurtosis below 2.0 and 7.0 respectively.

Finally, these limitations, other types of critical incidents, other cultures, brands and branches as well as other measurement models are possible fruitful lines for further research.

4 THE IMPACT OF CORPORATE REPUTATION: LINKING PUBLICATION OF REPUTATION RANKINGS AND SHARE PRICES

Anne Eckert, Sven Tischer and Lutz Hildebrandt (2012)

Working Paper

ABSTRACT:

In concentrated industries with distinctive competition differentiation becomes more and more important. One of the most valuable assets in this context is the reputation of a company. It is believed to cause a multitude of favorable impacts within different groups of stakeholders like customers, suppliers, employees and investors. According to the last group a frequently analyzed and discussed field of research is the relation between corporate reputation and financial performance. To contribute to this topic the study focuses on analyzing the possible influence of publishing reputation rankings on share prices.

4.1 Introduction

A good corporate reputation is believed to be one of the most valuable assets of a company (Caruana, 1997) by giving a unique competitive advantage. It also serves as a reservoir of goodwill (Jones, Jones, & Little, 2000). As such an important intangible resource the linkages between corporate reputation and financial performance is a highly discussed topic. Our contribution analyses the possible impact that the publication of reputation rankings may have on shareholders.

The paper is structured as following. First, corporate reputation is defined from a stakeholder perspective. Afterwards the impact resulting from a good reputation is considered more intensively and the link to financial performance is examined. Subsequently, the analysis of a published reputation ranking and their influence on share prices follows. The results are discussed and the conclusion highlights the most important findings including the limitations of our research and implication for future research.

4.2 Theoretical basis of the research

4.2.1 Definition of corporate reputation

Intangible assets become more and more important as attributes to differentiate a firm from its competitors. In this context corporate reputation is often discussed as one of the most valuable assets (Hall, 1992). However there is still no generally accepted definition of the term corporate reputation (Fombrun, 1996). The various existing definitions can be classified according to different approaches (Fombrun & van Riel, 1997; Mahon, 2002; Chun, 2005; Dhir & Vinen, 2005; Barnett, Jermier, & Lafferty, 2006; Walsh & Beatty, 2007).

One approach that is becoming more and more attractive is the classification of definitions according to the taken stakeholder perspective of the researcher (Helm, 2007). Thus three streams of research can be distinguished: the overall stakeholder perspective, the stakeholder-

group perspective and the individual perspective. According to the first perspective reputation is a construct that reflects the aggregate views of all internal and external stakeholders (e.g. Fombrun, 1996). Researchers who belong to the second perspective believe reputation is a construct that states within different groups of stakeholders, which means that a company possesses as many reputations as different stakeholder groups (e.g. Bromley, 2002a). Pursuant to the last perspective, reputation is defined as an attitudinal construct that is formed on an individual level (e.g. Wartick, 1992).

In the context of this contribution, the stakeholder group perspective is used as recent research has shown that this approach can be seen as the most fruitful one. Reputation is therefore regarded as a construct that states within certain groups of stakeholders. For quantifying corporate reputation we use a reputation ranking conducted by the German *Manager Magazin* which - consistent with our position taken when defining reputation - focuses their survey on a special group of stakeholders: top management (executive staff, directors and managing boards).

4.2.2 Impact of corporate reputation

A favorable corporate reputation can improve the competitive situation (Barney, 1991) by positively influencing different stakeholder groups. Within the group of customers a high reputation is supposed to lead to an enhanced perception of product quality (Grewal, Krishnan, Baker & Borin, 1998) and an increased loyalty (Nguyen & Leblanc, 2001). Similarly employees behave more loyal towards a company with a favorable reputation (Fombrun, 1996); moreover their morale and productivity increase (Turban & Cable, 2003). Within the group of suppliers a high reputation leads to a reduction in transaction costs (Bromley, 2002b; Williamson, 1985) and a long-term relationship can be anticipated (Groenland, 2002). A growing number of qualitative and quantitative researches indicate that

reputation influences the investment decisions (Little & Little, 2000) because well reputed companies are seen as less risky (Srivastava, McInish, Wood, & Capraro, 1997a).

4.2.3 Corporate reputation and financial performance

Based on the above mentioned positive impacts that companies with a high reputation may have, it seems to be obvious that this should be reflected in superior financial performance. A multitude of studies has focused on this relationship (Dowling 2006; Eberl & Schwaiger, 2005; Roberts & Dowling, 2002; Jones et al., 2000; Vergin & Qoronfleh 1998; Srivastava, et al., 1997a). Our study contributes to this field of research by analyzing the possible effect that the publication of a reputation ranking may have on the behavior of shareholders.

4.3 Empirical Study

4.3.1 Data

To analyze the assumed influence of reputation different databases have been used. For quantifying corporate reputation we take advantage of the reputation data from the German *Manager Magazin* for the year 2008 (published at 24th January 2008). Beginning with all contained German companies it is necessary to adjust the sample. The adjustments lead to a decreasing number of companies because of rejecting not listed companies and stocks with a very small trading volume (illiquid securities). The second adjustment is due to not significant estimators (t-value) or worse regressions with $R^2 > 0.2$. The 45 companies included in the final sample are shown in Figure 1.

The financial data needed for the event study analysis (share prices and index prices) are received from Data Stream. As approximation of the risk free rate $(R_{f,\tau})$ REXP® is used. The return of the market portfolio $(R_{m,\tau})$ of the German stock market is approximated by the CDAX®.

Table 4.1: Companies included in the study

Companies			
Adidas	Deutsche Bank	Hochtief	Salzgitter
Allianz	Deutsche Börse	Kuka	SGL Carbon
AMB Generali	Deutsche Postbank	Lufthansa	Siemens
Arcandor	Deutsche Post	Linde	Sixt
BASF	Deutsche Telekom	Lanxess	ThyssenKrupp
Bayer	Douglas	MTU Aero Engines	Tui
Bilfinger Berger	E.on	Münchener Rück	Volkswagen
BMW	Fielmann	Porsche	Vossloh
Celesio	Gea Group	Pro Sieben Gruppe	Wacker Chemie
Commerzbank	HeidelbergCement	Puma	
Continental	Heidelberger Druck	RWE Konzern	
Daimler	Henkel	K+S	

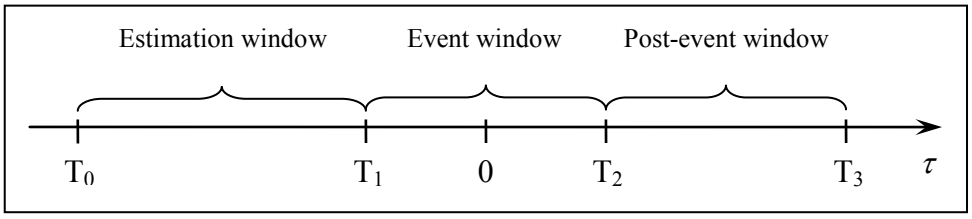
4.3.2 Methodology

The event study methodology is used to examine financial effects of the announcement of a reputation ranking by the German *Manager Magazin*. The main assumptions of this method are efficient capital markets, no confounding events during the event window and unanticipated information (McWilliams & Siegel, 1997). All of them should be considered by defining the estimation and event window.

The event window includes at least the event day with $\tau = 0$ defined as day of announcement. In general the event window is specified larger to enclose all information effects before and after the event day. Following Fama (1970) this is not in contrast to the above mentioned assumption of efficient markets by interpreting the market as medium information efficient, where all public available information is included. According to McWilliams and Siegel (1997) the event window which is used in this analysis fulfills the assumption of medium information efficiency sufficiently with at most three days.

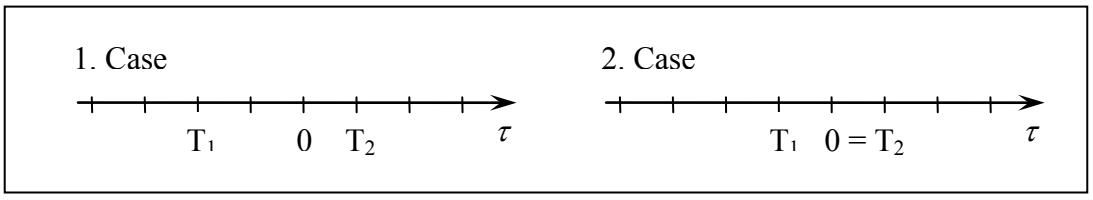
Generally the event window is defined as $\tau = T_1 + 1$ to T_2 (MacKinlay, 1997). To avoid an influence on estimators through returns around the event the windows should not overlap, so that the estimation window is defined as $\tau = T_0 + 1$ to T_1 (MacKinlay, 1997). Figure 4.1 illustrates an overview of the timing sequence including the post-event window.

Figure 4.1: Time line for an event study (MacKinlay, 1997)



In our study we analyze two event windows with different length (see Figure 4.2). In the first case, the event window includes the day before the announcement of the reputation ranking in the Internet $\tau = (-1)$, the event day $\tau = (0)$ and the day thereafter when the printed version of the magazine was published $\tau = (+1)$. The day before the announcement should cover stock trading which could be based on rumors or insider knowledge. The following day should take into account the delayed reactions and the reactions after publishing the magazine. The event window of the second case includes only the day of announcement in the internet. Depending on the lengths of the event window the estimation period ends in $T_1 = (-2)$ or in $T_1 = (-1)$ as shown in Figure 4.2. The length of our estimation window for calculation the estimators for the analysis are set by 250 trading days in both cases.

Figure 4.2: Event windows



To calculate the financial effects of the announcement abnormal returns $AR_{i,\tau}$ are used. Returns are indexed in time τ and in companies i. Our analytical procedure is based on the study of MacKinlay (1997). The abnormal returns are defined as difference between the actual ex-post returns $R_{i,\tau}$ and the normal returns $E(R_{i,\tau}|X_\tau)$ as shown in the following equation:

(1) $$AR_{i,\tau} = R_{i,\tau} - E(R_{i,\tau}|X_\tau) \quad \text{assuming that} \quad E(R_{i,\tau}|X_\tau) \sim N(\mu_i, \sigma_i^2).$$

X_τ symbolizes the condition that the normal return is the ex-ante expected return without anticipating the event at $\tau = 0$. To estimate these returns a regression[5] is conducted. Based on the actual ex-post returns for the whole period beginning at T_0 + 1 and ending at T_1. To calculate the expected returns the Capital Asset Pricing Model (CAPM) from Sharpe (1964), Lintner (1965) and Mossin (1966) is used and shown in the following equation:

(2) $$R_{i,\tau} = R_{f,\tau} + \beta_i(R_{m,\tau} - R_{f,\tau}).$$

$R_{f,\tau}$ corresponds to the risk free rate of return and $R_{m,\tau}$ to the return of the market. The difference between both is the risk premium. The empirical Sharpe-Lintner equilibrium shows that individual risk premium equals risk premium times β:

(3) $$R_{i,\tau} - R_{f,\tau} = \beta_i(R_{m,\tau} - R_{f,\tau}) + \varepsilon_{i,\tau}.$$

For the validity of this equation it is assumed that:

(4) $$E(\varepsilon_{i,\tau}) = 0, \sigma^2(\varepsilon_{i,\tau}) = \sigma_{\varepsilon_i}^2 \quad \text{and} \quad Cov(\varepsilon_j, \varepsilon_k) = 0 \quad \text{for} \quad j \neq k.$$

as well as stationary of parameters β_i (Seyhun, 1986, Seeger, 1998). The return of the market portfolio $R_{m,\tau}$ is approximated by an index which is the CDAX® in our analysis. The next step is to calculate the abnormal returns in combination with estimated β's:

(5) $$\overline{AR_\tau} = \frac{1}{n}\sum_{i=1}^{n} AR_{i,\tau}.$$

[5] Method of least square estimation by Carl Friedrich Gauß (1777-1855)

After adding all the abnormal returns over all companies for one day follows the calculation of the cumulative average abnormal returns $\overline{CAR}(\tau_1, \tau_2)$ with a defined event window of τ_1 to τ_2 and $T_1 < \tau_1 \leq \tau_2 \leq T_2$:

$$\overline{CAR}(\tau_1, \tau_2) = \sum_{\tau_1}^{\tau_2} \overline{AR_\tau}. \tag{6}$$

The examining null hypothesis is:

$$H_0: \ \overline{CAR}(\tau_1, \tau_2) = 0 \tag{7}$$

and the corresponding alternative hypothesis is:

$$H_1: \ \overline{CAR}(\tau_1, \tau_2) \neq 0. \tag{8}$$

Because of assuming that the investigated events have no influence on the expected value and the variance under the null hypothesis a normal distribution will be supposed as following:

$$\mathrm{AR}_{i,\tau} \sim N\left[0, \sigma^2\left(AR_{i,\tau}\right)\right]. \tag{9}$$

The associated test statistic for student's t-test is:

$$\Theta_1 = \frac{\overline{CAR}(\tau_1,\tau_2)}{\sqrt{\hat{\sigma}^2\left(\overline{CAR(\tau_1,\tau_2)}\right)}} \sim N(0,1). \tag{10}$$

And the area where we can deny the null hypothesis is defined as:

$$\Theta_1 < \left(\frac{\alpha}{2}\right) \quad \text{or} \quad \Theta_1 > \left(1 - \frac{\alpha}{2}\right) \quad \text{with } N - 1 \text{ degrees of freedom.} \tag{11}$$

4.3.3 Empirical results

The results for both cases are given in percentage and the p-values are given for a two-tailed t-test (see Table 4.2). According to our sample size of 45 companies the number of degrees of freedom $(df = N - 1)$ is 44. Case 1 reveals a positive average abnormal return $\overline{AR_\tau}$ for the day before and the event day itself while at the day when the paper magazine is

published the average abnormal return is negative. The much better t-value and implicated p-value in case 2 is caused by separating the negative effect of the following day.

Table 4.2 Results for the two cases

Date	**Case 1**	**Case 2**
	$\overline{AR_\tau}$	$\overline{AR_\tau}$
23.01.2008	0.60660	x
24.01.2008	0.60302	0.64068
25.01.2008	-0.55234	x
$\overline{CAR}(\tau_1, \tau_2)$	0.65729	0.64068
t-Value	0.91815	1.47407
p-Value	0.36350	0.14760

4.4 Conclusion

The results indicate that there is a linkage between the publication of reputation rankings and financial performance represented by share prices. A weak significant statistical effect could be proven in case 2 where the event window includes only the day of the publication of the reputation ranking in the internet. Therefore we can assume that publishing reputation data influences the behavior of shareholders positively.

Nevertheless our results are limited in different aspects. First the measuring instrument for corporate reputation is methodologically restricted like the used methodology of event studies and sometimes criticized. Furthermore the analysis contains no differentiation between up or down scaled companies.

Future research could analyze reputation rankings published by different magazines like e.g. *Americas Most Admired Companies* from Fortune, *Britain's Most Admired Companies* from Management Today or *World's the Most Respected Companies* from Financial Times. Moreover the time period could be broadened for at least ten years. Another opportunity is like mentioned before to cluster the companies in up and down scaled groups and to conduct one-sided tests.

5 LINKING CORPORATE REPUTATION AND SHAREHOLDER VALUE USING THE PUBLICATION OF REPUTATION RANKINGS

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Erklärung gemäß §12(4) der Promotionsordnung der Wirtschaftswissenschaftlichen Fakultät der Humboldt-Universität zu Berlin vom 04.05.2010

Hiermit erkläre ich, dass ich in meiner eingereichten Dissertation mit dem Titel

"The impact of critical incidents on marketing intangibles"

außer der angeführten Literatur keine weiteren Hilfsmittel benutzt habe. Hilfe habe ich im Rahmen von §12(4) der Promotionsordnung von Herrn Professor Dr. Lutz Hildebrandt im Rahmen des Betreuungsverhältnisses erhalten. Ich bezeuge durch meine Unterschrift, dass meine Angaben über die bei der Abfassung meiner Dissertation benutzten Hilfsmittel, über die mir zuteil gewordene Hilfe sowie über frühere Begutachtungen meiner Dissertation in jeder Hinsicht der Wahrheit entsprechen.

Berlin, 31. Oktober 2012

Dipl.-Kfm. Sven Tischer