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The MIMIC model of the consumer-based brand
equity

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**The MIMIC model of the consumer-
based brand equity**

Testing the causal specification of
consumer-based brand equity

Ph.D. Dissertation

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1 Introduction

The concept of brand equity has gained in popularity since the 1980s, and since then, the field has undergone significant development, due to which conceptual models (Aaker 1991, Keller 1993) were succeeded by an increasing number of empirical models (Yoo and Donthu 2000, Erdem and Swait 1998, Atilgan et al. 2009). The concept of consumer-based brand equity has become a central marketing concept due to the increasing scientific and business interest in brands, since the approach according to which brands constitute one of the most valuable intangible assets of companies is becoming increasingly widespread (Kapferer 1992, p. 9). Brands stand out of the other marketing mix elements owing to the fact that they are capable of incorporating the positive effects of all marketing activities and by this they become effective signals of quality (Erdem et al. 2006), and they are able to stay on the market in the long term until products transform or disappear (Kapferer 1992), that is why it is worth investing in developing brands.

Research related to brand management is included among the research priorities indicated by the Marketing Science Institute (MSI 2010) for the 2010-2012 period, which shows the great importance the prestigious institute attributes to brands, since brand and brand equity related research was equally determined as research priorities in the past two periods.

In light of the foregoing, brand equity appears as a concept with the help of which we are able to measure the equity of the brands becoming increasingly important to companies. Two great fields of measuring brand equity are constituted by measuring financial value and measuring consumer-based brand equity, from which the present paper focuses on the latter.

Focusing on the issue of measuring consumer-based brand equity, we can summarize the main aims of the research as follows:

1. Building and estimating a second-order consumer-based brand equity model and checking its validity.
2. Testing the causal specification of the consumer-based brand equity.

We include consumer-based brand equity as a second-order latent variable in the model, contrary to the earlier practice where consumer-based brand equity itself was not included in the model or it was present as a dependent variable. As a consequence of all these, we are able to estimate the relationship between consumer-based brand equity and its dimensions within a structural model.

We estimate consumer-based brand equity as a second-order latent variable with a covariance-based estimator (ML), contrary to earlier practice which estimates second-order causal models with the much more comfortable variance-based PLS.

The result of the present research questions the widespread supposition in the literature according to which consumer-based brand equity is a multidimensional construct, since we reached the conclusion that consumer-based brand equity is a two-dimensional construct at best, and we even have to reckon with strong correlation between the two dimensions as well.

The conceptual development of the paper's consumer-based brand equity model goes farther than the empirical models based on Aaker's (1991) model on some important points. It does not define brand-related associations as one concept but includes associations as separate concepts (Uniqueness, Trust, etc.) in the model, thus giving a more detailed and more complex picture of the multidimensional brand equity. Further on, it includes in the model the dimensions of differentiation, which is an essential function of the brand according to every significant definition (AMA 2010, Bauer and Berács 2006) but one that has not been included in scientific models till now.

However, at the end of our analysis, we were not able to fit the detailed multidimensional brand equity as described in the conceptual development.

The consumer-based brand equity model of the paper, besides separately measuring the brand-related associations qualified as essential in the literature, endeavors to take into account the business reality changed as a consequence of the economic crisis and the spread of social networks. As a consequence of this, we included the dimension of trust in our model. Trust has become an essential factor due to the increasing consumer

consciousness, information referring to the more and more easily acquirable quality; on the other hand, in the approach of the signaling theory, the success of brand building significantly depends on the extent to which consumers trust the communication of a brand.

The development of a new consumer-based brand equity model is justified by the fact that the models developed till now are either conceptual (Aaker 1991, Keller 1993, Keller 2003) or they could be applied to a certain product category only (Vázquez et al. 2002), or they did not prove stable enough when repeated (Yoo and Donthu 1997, Yoo and Donthu 2001, Washburn and Plank 2002, Vázquez et al. 2002, Kocak et al. 2007). The models of Erdem and Swait (1998), Erdem et al. (2006) have proved to be repeatable and culturally valid, but they did not operationalize brand equity as a concept.

Several brand equity models were developed for a certain market only (Chau and Ho 2008, Christodoulides et al. 2006, Chernatony et al. 2004, Jensen and Klastrup 2008), thus they are not able to generally explain the opportunities hidden in the brand name in the way the agency-based brand equity models (BAV, BrandZ, EquityEngine) do, about whose scientific fastidiousness and details of methods we know very little.

The consumer-based brand equity of the present paper measures brand-related associations at high abstraction level; therefore it does not depend on any product category or industry.

The intended methodological novelty of the present paper is that it operationalizes consumer-based brand equity as a causal latent variable. Accordingly, it regards consumer-based brand equity as a latent variable that comes into being as a result of marketing activities. The causal nature of brand equity is determined by the theoretical assumptions according to which brand equity measures the value added to a product (Farquhar 1989, Aaker 1991, Achenbaum 1993), and the empirical results support it (Yoo and Donthu 2000, Martensen and Gronholdt 2004, Jensen and Klastrup 2009, Netemeyer et al. 2004).

Consumer-based brand equity was predominantly modeled with structural equations (Yoo and Donthu 2000, Vázquez et al. 2002, Netemeyer et al. 2003, Erdem and

Swait 1998, Boo et al. 2009, Atilgan et al. 2009, Kim and Hyun 2010). Several authors, however, did not operationalize brand equity but only its dimensions (Vázquez et al. 2002, Boo et al. 2009, Netemeyer et al. 2003), others did not define brand equity within the model but they included it as a dependent variable (Yoo and Donthu 2001, Martensen and Gronholdt 2004, Kim and Hyun 2010), or estimated the causal concept developed to measure brand equity in isolation (Martensen and Gronholdt 2004). They did not report on appropriate fit indicators (Martensen and Gronholdt 2004) or they did not give a reason for not having operationalized reflective / causal models (Yoo and Donthu 2000, Vázquez et al. 2002, Netemeyer et al. 2003, Erdem and Swait 1998, Erdem et al. 2006).

In the course of building, testing and assessing the fit of the paper's consumer-based brand equity model, the methodological requirements of structural equation models had to be met in a way to solve earlier problems and answer methodological questions that occurred.

Our empirical results come with several novelties and usefulness.

With the second-order MIMIC model we were able to clearly separate the sources and consequences of consumer-based brand equity.

We included consumer-based brand equity as a latent concept in our model, since the literature continuously refers to it as a multidimensional concept but few (Atilgan et al. 2009) have operationalized it as a latent concept.

We succeeded in estimating consumer-based brand equity consciously measured with causal indicators with covariance-based estimation.

Few articles report on second-order latent variable models fitted with covariance-based estimators, the majority using PLS for this purpose; undertaking the difficulties, we have managed to fit our second-order latent variable model in Amos.

We consider that, due to the causal specification, we have reached a useful result from both theoretical and practical points of view. According to this, consumer-based brand equity is not a multidimensional concept as suggested by Keller (1993) or Lehman et al. (2008), but it is a two-dimensional concept. Our result is acknowledged by other brand equity models as well. In Netemeyer et al.'s (2004) model, the two dimensions of

brand equity cause the willingness to pay price premium. In the Yoo and Donthu (2000) model, if we correctly interpret loyalty as a consequence, we also receive two dimensions.

The two-dimensional solution is an intuitive, easily interpretable and easily measurable model, and it can also be a much more attractive means for the management as well, adding that these two dimensions are able to explain as many variances in consumer-based brand equity as the six dimensions of our conceptual model.

On the basis of the experience acquired in data collection and assessing the fit, it is important to formulate that we have to pay special attention to one of the biasing factors of measuring brand equity in future measurements. When measuring brand equity, we ask brand-related questions, and as a consequence of the *halo* effect and the common method they might also share variances that are due to the brand and the method rather than the specific contents of the questions.

All this might have an important consequence, namely that when we use reflective specification, we will be able to fit several valid concepts on our model, since these will share common variance due to the halo effect and the common method. In a causal model we have to allow the exogenous variables to correlate, thus light is shed onto this problem in assessing fit; in the reflective specification, however, the dimensions are endogenous variables and they do not have to correlate freely; this way, several consumer-based brand equity models can be built without us knowing which of the dimensions are the ones that can cause something together.

2 Literature Review

In the first part of the literature review we present general questions related to brands (Pitcher 1985, Aaker 1991, Aaker 1996, Kapferer 1992, Keller 1993, Chernatony and Riley 1998, Bauer-Berács 2006), then discuss the conceptual differentiation of brand and product (Gardner and Levy 1955, McCarthy and Perreault 1991, Achenbaum 1993, Ambler and Styles 1997, Vázquez et al. 2002, Raggio and Leone 2006).

The second part of the literature review deals with the concept of brand equity in general (Aaker, 1991, Srinivasan et al. 2005, Ailawadi and Lehman 2003, Christodoulides and Chernatony 2010) and with the consumer-based brand equity - the central concept of the paper - in particular (Aaker, 1991, Erdem and Swait 1998, Yoo and Donthu 2001, Vázquez et al. 2002, Netemeyer et al. 2003, Atilgan et al. 2009, Boo et al. 2009, Kim and Hyun 2010, Erdem et al. 2006).

The third part of the literature review discusses the relationship between the results of marketing activities, marketing decisions and consumer-based brand equity (Yoo et al. 2000). We discuss separately the effects of decisions related to **product** (Gamoran 2007, Aaker 1991, Carpenter et al. 1994, Netemeyer et al. 2004, Hooley et al. 2000), **innovation, product development** (Randall et al. 1998, Sriram et al. 2007, Mizik and Jacobson 2008), **price** (Peterson and Wilson 1985, Zeithaml 1988, Aaker 1996, Park and Srinivasan 1994, Sivakumar and Raj 1997, Chaudhuri and Holbrook 2001, Kapferer 2008), **sales promotion** (Jedidi et al. 1999, Blattberg et al. 1995, Niejs et al. 2001, Fransens et al. 2001, Pauwels et al. 2002, Horváth et al. 2005) and **advertising** (Lavidge and Steiner 1961, Nelson 1974, Petty and Cacciopo 1983, Petty et al. 1983, Shum 2004, Mehta et al. 2008, Chioveanu 2008) on brands and brand equity.

2.1 Brand. A conceptual framework

The American Marketing Association (AMA) defines a brand as

"a name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers. The legal term for brand is trademark. A brand may identify one item, a family of items, or all items of that seller. If used for the firm as a whole, the preferred term is trade name." (AMA - marketingpower.com 2011).

The above definition, more exactly its first sentence has become the most common definition of a brand. Koetler's marketing management has significantly contributed to its spread and several marketing researchers have considered it a starting point as a generally accepted definition (Aaker 1991, Dibb et. al 1994, Kotler et. al 1996), as well as several marketing textbooks defined a brand with its help (Zikmund and D'Amico 1989, Evans and Berman 1990, Dalrymple and Parsons 1990, Józsa 2003, Bauer and Berács 2006).

The AMA definition focuses primarily on the input of brand building (Chernatony and Riley 1998), it treats a brand as a simple identifying, differentiating and legal device. On the contrary, however, a brand is given further significance through representing a company, the company products, product lines (besides its numerous other functions), which significantly extends the dimensions of a brand.

The AMA definition supports the deconstructionist approach of a brand, according to which brand development has to be started with decomposing a brand into its elements: brand name, logo, design, related advertising activities, colors, characters, personality etc have to be determined. Kapferer (1992) and Chernatony and Riley (1998) criticised the deconstructionist approach. According to Kapferer (1992), real brand management must start much earlier than breaking a brand up into its elements: brand identity has to be determined first rather than its image.

The AMA definition is tautological in that it alleges that a brand can be a name, object or symbol while a name or object is a particular case of a symbol as any name, object etc. conveying meaning is considered a symbol. In this sense, a brand is a

complex symbol able to convey numerous meanings to the branded product (Gardner and Levy 1955).

It follows from the foregoing that the concept of a brand is more precisely defined by Bauer and Berács (2006):

”A brand is the totality of symbols whose task is to identify goods and services with a particular producer and to differentiate them from other goods at the same time.”

The interpretation of a brand name as a multidimensional construct is widely accepted by analyses and definitions. It appears as a notion able to match the functional and emotional values with the consumers’ expectations concerning performance and their psycho-social demands (de Chernatony and Riley 1998).

The more significant the emotional strength the meanings conveyed by a brand name represent, the more capable they are to generate revenue increase and profit for the company.

According to Martineau (1959), a brand is an image of the functional and psychological characteristics of a product created within the mind of consumers. Pitcher (1985) defines a brand as an image of the product created within the consumers’ mind. Chernatony (1998) interprets the appearance and development of the research field of the brand as an image created within the consumers’ mind as one signaling a definite strengthening of a consumer-oriented brand research.

Kotler (2004) stresses the differentiating, quality-assuring role of brands, but the consequence he draws is that ”brands are complex symbols, though”, similarly to Bauer-Berács (2006) who also emphasize the symbolic nature of a brand when defining it as ”a totality of symbols”.

In order to present the approach applied in the present paper, we will summarize the different approaches of brand definitions as follows:

- A brand is a means to identify and differentiate a product.

- A brand adds value to a product.
- The added value comes into existence in the brand building process (brand building can mean the development, implementation and communication of a certain concept).
- A brand is a symbol.

Brand building, in exceptional cases (e.g. Napster) can materialize as a result of an unplanned marketing activity if the brand represents a value, or consumers discover in it a value due to which a certain community identifies with the value represented by the brand. Owing to community activity, positive meanings can increasingly get attached to a particular brand name (e.g. several underground bands have become popular this way (e.g. Ozric Tentacles)).

2.1.1 Brand and product

In order to define the concept of a brand and introduce that of brand equity it is essential to distinguish between the concepts of brand and product. As also revealed by the above definitions, the definition of a brand entails the definition of the brand name - product relationship in a certain way.

The brand-product relationship can be defined in two extreme approaches. One of these separates brand from product, and treats the former as an independent entity. This approach is based on the view according to which a brand is an addition to the product carrying important meanings (Gardner and Levy 1955, McCarthy and Perreault 1991). On the contrary, Ambler and Styles (1997) regard brand and product inseparable as they are closely related in the consumers' mind.

According to Jones (1986), a brand is a product which, besides its functional benefits, assures some added value that certain consumers are willing to purchase.

According to a different approach, the difference between a branded and an unbranded product lies in the added value to the branded one, which has as its basis the

totality of consumers' perceptions and feelings about the branded product (Achenbaum 1993).

From the company's point of view, the branded product is more valuable as the sum invested in the development of a particular brand has to be treated as an investment. The Borden Company was accused of illegal price discrimination after its decision to sell its own branded milk at a higher price than the unbranded or private label milk, which did not differ from the former at all (Levitt 1966). Companies have a reasonable argument in such cases: they spend large sums on brand building and advertising, which does not represent a value for them only as it makes distribution easy. Products become easily identifiable, the consumers' purchase decision process is shortened, search costs decrease.

In assessing a brand, consumers have two great sources to rely on: abstract information originating in the brand name and the one related to the detailed product attributes (Dillon et al. 2001, Tafani et al. 2004, Betts and Taran 2004, Raggio and Leone 2006, Boatwright et al. 2008).

The difference between the two information sources was illustrated with the example of the Volvo brand by Raggio and Leone (2006). If consumers are asked about the Volvo's side impact protection, they may believe that Volvo offers this protection because the brand is strongly associated in their minds with "safety". When, on the other hand, consumers are asked about the Volvo fog light design and they know this specific characteristic, they rely on the information source directly related to the product.

In the case of consumers who possess high experience and knowledge related to a family-brand or a product, associations related to its attributes influence brand assessment more, whereas in the case of consumers with less experience, general impressions related to the brand name prevail (Dillon et al. 2001).

As a consequence of acquiring experience and knowledge related to product category, consumers show an increased willingness to acquire information about less

well-known brands as well, to try them out, which results in a likelihood of purchasing the less known brand as compared to the situation of having little knowledge and experience (Heilman et al. 2000).

Brand name-related abstract meanings are able to block the learning of concrete attributes in the learning process related to a brand or product category (Van Osselaer and Alba 2000). Blocking means that, if a consumer associates high-quality with a brand name, this blocks learning the associations related to the product's real attributes, or at least the product attribute - product association will be significantly weaker. (Van Osselaer and Alba 2000).

In the course of acquiring experience, accumulating knowledge a general image representing high level abstraction can be formed from the associations with product attributes and brand name (Sujan 1985).

Product category knowledge, product-related experience significantly increases the importance of attribute-related associations in decision-making (Sujan 1985, Alba and Hutchinson 1987, Dillon et al. 2001, Heilman et al. 2000), but the objective assessment of the "expert" consumer may also be influenced by the brand name. The "expert" consumer, when encountering information related to a product he is familiar with, may fail to examine it, relying on the belief he knows its content (Alba and Hutchinson 1987), thus a situation for the "expert" consumer may eventually arise in which abstract associations determine his decisions as well.

It also comes in handy to interpret a brand from the perspective of the halo effect literature. The halo effect means that a general opinion regarding a certain phenomenon is projected on the characteristics of that particular phenomenon as well (Thorndike 1920, in Alchman and Bass 1985). Psychology interpreted the halo effect as a logical error originating from the consumers' inability to distinguish between different attributes (Boatwright et al. 2008).

In contrast to the psychological approach, the halo effect may be interpreted as a useful heuristic that supports consumer decision. Brand equity may be regarded as a cause of a halo effect projecting high abstraction level associations on the specific attributes of a branded product (Leuthesser et al. 1995 Betts and Taran 2004, Tafani et al. 2004).

2.1.2 Benefits of brand provided to consumers

From an economic point of view, the most important benefit of brands is that of the search cost decrease, since a brand, through indicating quality, decreases the time for consumer decision, particularly when a consumer has no knowledge of the product category (Pashigian and Bowen 1994, Tsao et al. 2006, Ramello 2006, Erdem and Swait 1998, Erdem et al. 2006, Barcala and González-Díaz 2006).

Consumers possess an image of product attributes based on previous experiences or marketing communication activities, and they, when recognizing a certain brand, are able to make a quick decision whether to purchase a particular product or not.

The brand – consumer relationship can be interpreted as a non-formal contract as well. Consumers trust a brand, they are loyal to it while presupposing that the brand will consistently assure the expected utility.

Brands are also symbolic instruments that create the possibility for self-expression, and, at the same time, assure social integration (Aaker 1999, Fournier 1998, Escalas and Bettman 2005, Tárkányi 2003).

In brand building, Chernatony (2002) defines two directions: the functional and the emotional ones. That is, a brand name can be associated with attributes indicating the functional benefits of a product (high performance), but, as a consequence of the technological advance, the similar design practice (Chernatony and McDonald 1998) and these associations can lose their differentiating power due to copyable price constructs. In contrast, in the course of communication activities we may attach emotional associations

to a brand name that are interpreted at a much abstracted level and which therefore cannot be copied. In Goodyear's (1997) conclusion, the focus of the branding activity has shifted to assuring emotional values.

A brand can have a significant role in identifying certain product attributes. We can speak about three categories of product attributes (Nelson 1970) depending on the extent to which consumers can form an image of the attributes of a certain product:

- Search attributes
- Experience attributes
- Credence attributes

In the case of search attributes, consumers can form an opinion about the product based on visual signs (color, consistence, etc), while experience attributes require longer usage to be acquainted with. In the case of credence products, such as insurances, product attributes are very difficult to get to know thoroughly.

However, products cannot be simply put into categories; the supposition that a certain product possesses both search and experience attributes seems to be well-grounded. Quality, for example, can be qualified as both a search and experience attribute depending on search cost and price (Wilde 1981).

Brand development in the case of experience and credence products is increasingly important as in their case it is the brand that carries the information related to the attributes (e.g. good quality, safe, etc) that a consumer cannot come to know easily.

The difference between a brand and a trademark lies in the fact that a trademark is a legal category, while a brand is a business one (Bauer and Berács 2006).

"A trademark is an institute that assures legal protection for a product for a determined period of time." (Bauer and Berács 2006). A trademark offers copy protection that may refer to the design, packaging, advertisement, etc of the product (Bauer and Berács 2006).

2.2 Brand equity

The concept of brand equity became widely used at the beginning of the eighties (Nádasi 2005), mainly in agency measures (Interbrand, Coopers & Lybrand, Arthur Young Australia). Since the conference organised by the Marketing Science Institute in 1988, the concept has been more precisely defined. An article by Farquhar, frequently quoted in the brand equity literature that appeared a year later (Farquhar 1989), greatly contributed to the scientific acceptance of the concept.

The Hungarian literature reacted to the appearance of the new marketing term quite early (Bauer 1995, Tasnádi 1995), but extended empirical research was first carried out only in 2003 (Nádasi 2005).

The most important early results related to the concept and measure of brand equity were summarized by Shocker and Weitz (1988), and the latest comprehensive literature review appeared in 2010 (Christodoulides and Chernatony 2010).

The spread of the brand equity concept in the marketing scientific environment was greatly determined by the publications of Aaker (1991, 1994, 1996) and Keller (1993, 2003) on the topic, increasing the popularity of the brand equity concept in the business practice as well.

In order to distinguish between consumer-based brand equity and brand equity expressed in financial terms, the English literature uses consumer-based brand equity (Keller 1993, Vázquez et al. 2002) instead of brand equity, this latter used without a distinctive epithet in the case of brand equity measures expressed in financial terms (Ailawadi et al. 2003, Srinivasan et al. 2005). Brand equity expressed in financial terms is sometimes mentioned as brand value, both having the same translation in Hungarian (Srivastava and Shocker 1991, Salinas and Ambler 2009, Interbrand).

Brand equity was traditionally measured at the level of consumer goods (Netemeyer et al. 2003, Yoo and Doonthu 2001, Vázquez et al. 2002, Lehmann et al. 2008, Martensen and Gronholdt 2004), but lately financial services (Chernatony et al. 2004), online services (Christodoulides et al. 2006, Chau and Ho 2008) and models suitable for measuring B2B brands (Jensen and Klastrup 2008) have also appeared.

2.2.1 Brand equity. Definition of the concept

One of the most-referred-to definitions of brand equity was given by Farquhar (1989). According to it, brand equity is the added value endowed by the brand to the product. This definition stood at the basis of several further instruments measuring brand equity (Kamakura and Russel 1993, Park and Srinivasan 1994, Srinivasan et al. 2005).

Aaker (1991) defines brand equity as a set of brand assets or liabilities that add to or subtract from the value provided by a product or service. The present paper's approach to consumer-based brand equity has been significantly determined by Aaker's approach and the research practice based on it.

In Keller's interpretation (1993), brand equity is "the differential effect of brand knowledge on consumer response to the marketing of the brand" given by the difference between consumer response to the marketing of the branded and unbranded product. Consumers give a more favorable response to marketing mix in the case of brands with high brand equity than in those with low equity. As a consequence, relative marketing costs decrease as the efficiency of marketing activities increase.

Srivastava and Shocker (1991) defined brand equity as consisting of two components, and their definition already entails the attempts of later approaches to associate consumer-level brand measurement and brand equity (Park and Srinivasan 1994, Srinivasan et al. 2005, Kartono and Rao 2006). According to the definition given by Srivastava and Shocker (1991), brand equity consists of two components, brand

strength and brand value, and while the former is based on consumer level measurements, the latter determines the financial benefit provided by the brand strength.

Vázquez et al. (2002) defines brand equity as the utility that the consumer associates to the use and consumption of the brand.

Srinivasan et al. (2005) defines brand equity as the difference between the choice probability for a certain brand and that of the base brand.

In Simon and Sullivan's definition (1993), brand equity means the future cash flows that accrue to branded products over the sum which would result from the sale of unbranded products.

2.2.2 The impact of brand equity on financial performance

Owing to Aaker's publications at the beginning of the nineties (1991, 1996), there has been a great interest in the problem of financial returns generated by valuable brands (Fehle et al. 2008).

Farquhar (1988) defined the value assured by the brand to a company as the incremental cash flow attributed to the brand. The incremental cash flow may result from the increased market share from a brand but also from premium pricing. A strong brand constitutes a platform whose strategic potential makes successful licensing and successful brand extension possible. Strong brands can face crisis situations more easily and are able to survive them (Farquhar 1988).

Individual investors prefer well-known brands as they associate fewer "unknown risks" with them, while institutional investors' preferences are not influenced by brand awareness. (Olsen 2005).

A company's protection against competitive attacks increases as the more differentiated brands result in lower price elasticity (Boulding et al. 1994), the company

is more protected against competitive attacks (Srivastava and Shocker 1991), can apply premium pricing (Farquhar 1998), and can achieve a more successful brand extension (Keller 2003). Simon and Sullivan (1993) confirmed that stock exchange evolution contains information referring to brand equity as well.

There is also a positive relationship between new products and stock return, which is a strong relationship only when a company has introduced a great number of new developed products into the market (Chaney 1991).

Companies of high brand equity can expect significant market share increase if they cut prices, while their share decrease would be insignificant if they increased their prices (Ailawadi et al. 2003). However, this latter result is shaded by the fact that Ailawadi et al. (2003) defines brand equity in revenue premium, and we may rightfully presume that higher equity is achieved by companies with given asymmetrical price elasticity.

Several empirical researches have investigated the relationship between agency-based brand equity measures (BAV, Interbrand and Equitrend) and financial returns as well as stock returns (Barth et al. 1998, Verbeeten and Vijn 2006, Fehle et al. 2008, Mizik and Jacobson 2008), and their result support the approach focusing on shareholder value increase (Doyle 2001).

The names of various agencies, Landor, Young & Rubicam, Milward Brown and Interbrand have become associated with brand equity measurement as they annually publish their brand equity lists in popular magazines (Interbrand-Business Week, Landor-Fortune). These lists significantly increase the popularity of these agencies as their publications are followed with great interest. At the same time, the agencies popularize their brand development services with these lists in a simple and efficient way on the one hand, while they make it possible for their clients to follow the development due to applying for their services on the other.

Investigating the brands valued by the Financial World, Barth et al. (1998) found that the financial brand equity has an explanatory power regarding the net income of stock returns.

Based on the data of Techtel Corporation, Aaker and Jacobson (2001) confirmed that changes in attitude can predict financial performance by one or two quarters and they are positively related to current stock returns.

The data of BAV (Brand Asset Valuator) have revealed similar connections. Investments in brand equity can determine financial performance in the long term (Verbeeten and Vijn 2006), and brands carry information based on which investors update their future cash flow expectations (Mizik and Jacobson 2008).

With the help of Total Research Corporation's EquiTrend database, Aaker and Jacobson (1994) investigated the impact of quality-related information on stock returns. They could not prove that changes in quality perception can generate changes in share prices, but they managed to prove that information influencing significantly long-term returns of investors contains quality-related information as well.

The portfolio consisting of 111 firms on Interbrand's most valuable brands list between 1994 and 2006 had better performance than the overall market (Madden et al. 2006, Fehle et al. 2008). The brands on the Interbrand list generated a definitely higher net income than that of the market on average or the benchmark portfolio used as reference. The most valuable brands on Interbrand's list have not only outperformed the market average net income, but they also assure lower risk (Madden et al. 2006). Despite the fact that Fehle et al. (2008) managed to prove that financial brand value contains additional information, they could not reveal the nature of brand-share price relationship with the Fama-French methodology¹.

Kallapur and Kwan (2004) investigated firms on whose balance sheets brands appeared as intangible assets, when the value of the brand investigated was determined by managers rather than outside parties. The assessment of bought brands is biased because of managers' incentives to overvalue the brand equity recognized in books.

¹ Fama and French (1992) completed the classical CAP (Capital Asset Pricing Model) model with the Three Factor Model (Nagy and Ulbert 2007).

These incentives to overvalue are the result of the fact that capitalized brands increase net asset values; thus managers can avoid having to ask for the London Stock Exchange's permission to realize their transactions. Despite managers' incentives to over value, the research has shown positive association between brand equity appearing on balance sheets and market value after having controlled numerous firm-specific and market factors. Their research has also confirmed the existence of a positive association between positive share price change and brand capitalization announcement.

The investigation of brand strategy–stock returns relationships has led to contradictory results.

Rao et al. (2008) analyzed branding strategies in the following categorization: corporate branding, house of brands, or mixed branding (the combination of the first two) (Laforet and Saunder's 1994). The benefit of corporate branding for the investor community can be cost-effective functioning, as the firm's marketing expenses are shared among its products. The house-of-brands strategy gives a firm the opportunity to enter several business fields, position itself in a different way, develop brand equity for every brand, demand more shelf space; at the same time, risk is shared among several brands, which presupposes high costs.

Investors attribute the highest brand equity to corporate branding and the lowest to the mixed one, so financial market actors under value the market segmentation resulting from the house-of-brands strategy so significant in marketing and the benefits of the risk shared among brands (Rao et al. 2004). In contrast to this, Bahadir et al. (2008) found that acquirer firm managers prefer (establish a higher value for) the brands of firms that possess a rich brand portfolio.

The contradiction can be explained by the different focuses of financial investor and manager; because of the lower perceived risk, investors place a higher value on corporate brands, while managers give higher valuation to the high brand portfolio diversity assuring various positioning opportunities.

The increasing popularity of brand valuation in the eighties is strongly associated with the acquisition wave (Farquhar 1988) starting to gain ground. One of the most

important implementations of brand valuation appeared in the field of mergers and acquisitions (M&A), as the acquirer or merger firm has to assess the value of the intangible assets, including the brands of the target firm.

The estimated financial value of the target brands is influenced in different ways by the abilities and brand portfolio of the firms participating in the transaction. Marketing capability is the ability of a firm to efficiently combine marketing resources to attain its marketing goals (Bahadir et al. 2008).

Firms with stronger marketing capability tend to attribute higher value to the brand portfolio of the acquired or merged firm (than firms with lower marketing capabilities), as, due to their capabilities, they expect high returns. Firms with high brand portfolio diversity can adapt to different market demands more easily, and, at the same time, they tend to keep several brands from the ones of the firms acquired or merged. Firms with a narrow branding strategy will attribute lower value to the acquired brand and abandon some of the acquired brands as managing numerous brands would generate extra high costs to the firm.

In some cases, firms also abandon popular brands to assure efficiency (following the merger between AT&T and SBC Communications, AT&T abandoned the popular Cingular brand) or avoid cannibalism (when acquiring Gillette, Procter and Gamble divested its Right Guard brand (Bahadir et al. 2008).

A comprehensive analysis of the marketing activity - stock returns relationship was carried out by Srinivasan and Hanssens (2009). They discuss in detail the financial and accounting analysis methods that can be employed in investigating the impact marketing activities have on stock returns, especially the method developed by Fama and French (1992). The summary of the scientific debate generated by Srinivasan and Hanssens' article (2009) can be read in Kimbrough et al. (2009).

2.2.3 The theoretical background of brand equity models

There are two outstanding theories in brand equity literature in which brand equity has been defined:

- Resource Based Theory
- Signaling Theory

Besides the above mentioned theories, the cognitive psychological approach is also referred to in the consumer-based brand equity literature (Keller 1993). This approach will not be developed in this paper, as, according to our present knowledge, cognitive psychology has no developed theory applied to marketing.

Resource Based Theory

The Resource Based Theory is one of the most influential theories of strategic management (Bauer and Berács 2006, p. 543), which explains company success / failure in an inside-out approach (Srivastava et al. 2001).

The Resource Based View concept is met in Wernerfelt's classical article first (1984), but the antecedents of the main ideas of this theory can also be found in the work of Penrose (1959) or that of other economists (Stigler 1961, Coase 1937). Due to the economic theoretical antecedents and inside focus, the opportunity arose to interpret the resource based theory as a new firm theory (Conner 1991), but it lacks such key questions of firms as why a certain firm exists (Priem and Butler 2001).

The resource-based theory has as its starting point the simple hypothesis that it is the management's task to achieve such a sustainable competitive advantage that can assure firm performance (Hooley et al. 1999), and for assuring a sustainable competitive advantage, a firm needs resources. The early development of the resource-based theory was significantly determined by the requirements formulated by Barney (1991), which have to be met by resources in order to assure competitive advantages. According to Barney (1991), resources have to be valuable, rare, difficult to imitate and non-substitutable (Meyer 1991).

Based on Barney's influential article (1991), Priem and Butler (2001) defined as the two axioms of the theory that (1) resources are distributed heterogeneously across firms and (2) these resources cannot be transferred from firm to firm without cost.

Apart from some exceptions (Wernerfelt 1984, Bharadwaj et al. 1993, Hunt and Morgan 1995, Hooley et al. 1999, Day 2001), marketing scholars devoted little attention to the resource-based theory (Srivastava et al. 2001). In spite of this, attempts to give the resource-based theory and marketing a standardized frame appeared early, and they built on the complementary nature of the two fields, as while the resource-based theory focuses inside the firm, marketing focuses on the market (Hooley et al. 1998, Hooley et al. 1999). Recently Finney et al. (2008) integrated the advantages of those first entering the market (First Mover Advantage - Lieberman and Montgomery 1998) with the resource-based model, with the help of which they explained the frequent failures of the first movers. Within the framework of institutional markets, marketing and the resource-based theory were integrated with emphasizing the importance of marketing capabilities (Nath et al. 2010) and institutional factors (Homburg et al. 1999, Auh and Menguc 2009).

Brands are assets that meet the requirements of inimitability, rarity and non-substitutability according to the definition of the resource-based theory (Bahadir et al. 2008). Brands and brand equity were often interpreted within the framework of the resource-based theory (Aaker 1989, Day 1994, Day and Nedungadi 1994, Bahadir et al. 2008, Slotegraaf and Pauwels 2008, Bauer and Berács 2006, p. 544). Brands (Aaker 1989) or brand equity (Day 1994, Day and Nedungadi 1994) were defined as intangible assets, or brands were defined as market-based assets (Bharadwaj et al. 1993, Srivastava et al. 1998, Bahadir et al. 2008).

The existence and definition of the brand equity concept already entails the opportunity to approach the resource-based theory. By associating the equity concept to the brand concept and attempt to measure it, we assume that brands represent an intangible asset to firms. Despite all these, there is no separate brand theory within the framework of the resource-based theory.

Signaling Theory

The signaling theory has developed from the information economics and it investigates the market under conditions of information asymmetry (Boulding and Kirmani 1993, Dawar and Sarvary 1997). The birth of the theory is associated with Spence's classical article (1974). Spence investigated the assumptions leading later to the basis of the signaling theory in labor market conditions.

On the consumer goods market, information asymmetry (Akerlof 1970) results from the fact that the seller possesses precise information related to the quality and performance of a brand, while consumers do not possess this information at all or only to a limited extent (Kirmani and Rao 2000). If, for example, certain products have search attributes, consumers are at a disadvantage compared to the seller (Boulding and Kirmani 1993), as they can only assess the product quality and performance after its consumption (Nelson 1970).

The game theory was used in economics (Wernerfelt 1988, Ippolito 1990, Tirole 1992), and the structural equation in marketing (Erdem and Swait 1998, Erdem et al. 2006) to investigate the assumptions of the signaling theory.

According to the signaling theory, we can distinguish between two large groups of firms, the ones that offer high quality brands and the ones that offer low quality. Information asymmetry conditions may induce opportunism, but practice shows that there are many firms on the market which consequently offer the high quality they promised (Ippolito 1990). Under information asymmetry conditions, consumers possess no knowledge of the differences between high and low quality brands, therefore firms providing high quality are urged to solve the information asymmetry with some means (Ippolito 1990, Boulding and Kirmani 1993, Rao et al. 1999). As a consequence of the signals used in the communication with consumers (high price, strong brand name, high advertising expenditure, warranty), consumers constantly modify their behavior (Dawar and Sarvary 1997). The signaling theory assumes that only firms offering high quality are urged to create a high-quality brand image, since if it deceives consumers, in lack of repeat purchase, sums invested in brand building will not return (Rao et al. 1999).

On the consumer market, signals that may be used by firms differ from the ones investigated by Spence (1974). Spence (1974) investigated how a person can send signals about his abilities; in contrast, on the market every firm can "buy" signals (increases quality, invests in advertising, introductory pricing) (Ippolito 1990).

The development of the signaling theory on consumer markets has been strongly determined by the approach according to which a signal has to assure some kind of bond in order to be authentic (Wernerfelt 1988, Ippolito 1990, Montgomery and Wernerfelt 1992, Rao et al. 1999, Kirmani and Rao 2000, Barone et al. 2005). We regard as the antecedents of this approach the economic models investigating the signaling effect of reputation, advertising or brand names (Bhattacharya 1980, Klein and Leffler 1981, Kihlstrom and Riordan 1984, Milgrom and Roberts 1986).

Ippolito (1990) took as a starting point the assumption that if there is a high-quality brand on the market enjoying good reputation, it has to offer some kind of bond for consumers to decrease information asymmetry. For example, money invested in advertising can function as a bond, since if a firm spends a large amount on advertising also perceivable by consumers, it signals that it dares to undertake high expenditure due to the high quality the brand represent, otherwise it risks future profit. Advertising cost signaling high quality can be perceived as a bond that might lose its value with time, one way of preserving value is the consistent assurance of product quality. As firms have to consistently assure warranty for their products, with bonding approaches we also explain the frequent repetition of advertisements (Ippolito 1990).

Advertisements can serve as signals because there is a risk of forfeiture of the money spent on advertising campaigns (Ippolito 1990, Rao et al. 1999). Ippolito (1990) assumed that the bonding mechanism functions only in the case of firms offering high quality; if they do not perform the signaled high quality, they will lose the sum invested in advertising due to the lack of repeat purchase. Rao et al. (1999) extended the model on firms offering low quality, assuming in their case that the bond they undertake is their future profit. If the firm suggests high quality, it may lose its future profit (Rao et al. 1999, Wernerfelt 1988).

Referring to umbrella branding, Wernerfelt (1988) illustrated how the ability of umbrella brands to signal quality manifests when a new product is introduced. In this case, selling the new product is perceived as a bond, that is, consumers assume that the firm will not send a false signal about the quality of the product as it jeopardises future sales of the other brands as well. Umbrella branding is thus qualified as a nondissipative signal (Bhattacharya 1980), since spending on one brand development will also assure reputational² economies of scope (Wernerfelt 1988).

While earlier studies investigated brands as unobservable quality signals (Ippolito 1990), later they also confirmed that umbrella brands play a significant role in reducing consumer risk. (Montgomery and Wernerfelt 1992).

The assumptions of the signaling theory have been confirmed in the case of brand allies as well (Rao et al. 1999). A certain brand, for example, if it has just entered the market, has no reputation to signal; in this case, one solution might be for it to ally with another, reputable brand. The bond in this case is represented by the investments of the reputable brand or the future profit. Rao et al. (1999) investigated the economic vulnerability of brands as a central concept, since vulnerability makes a brand work as a signal offering a bond. Rao et al's (1999) paper is valuable because, among others, it confirmed the early assumptions and theoretical confirmations of the signaling theory (Wernerfelt 1988, Ippolito 1990) with empirical data.

While earlier studies based on the assumption that advertising spending can serve as a bond with reputable brands, Baron et al. (2005) confirmed that high advertising expenditure can work as a quality signal with new brands as well. However, the effect is reversed on markets where differences between brands are perceived by consumers to be small.

The influence of other signals was also investigated within the framework of the signaling theory, but we consider that brands are outstanding signals due to the fact that they are able to incorporate the positive effects of all the marketing-mix elements. (Erdem et al. 2006). High quality firms can signal high quality with low prices when information referring to production cost is known by consumers (Dawar and Sarvary

² In this case, reputation is defined as the sum of past expenditures on brand building.

1997), since then consumer decisions are determined by the "fairness" of prices (Kahneman et al. 1986). Price and Dawar (2002) investigated the joint effects of brands and warranties in signaling quality based on the empirical results of Boulding and Kirmani (1993).

2.2.4 A comprehensive characterization of empirical non-consumer based brand equity models

As consumer-based brand equity is the central concept of this paper, its literature is presented in a separate chapter. The following chapters present the results of market-based and financial brand equity measures.

The most commonly known and frequently referred-to brand equity measure categorization belongs to Keller and Lehman (2001). In their system, we can speak about three large categories:

- Customer mind-set measures
- Product market measures
- Financial measures

Customer mind-set measures mostly assess awareness, associations, loyalty and perceived quality (Aaker 1991, Keller 1993, Yoo and Donthu 1997, Christodoulides et al. 2006, Vázquez et al. 2002). Their advantages are that they assess brand equity sources, can predict brand equity changes and predict a brand's potential (Ailawadi et al. 2003).

Product market measures assess brand equity in the brand's market performance. The most common product- market measure is price premium (Randall et al. 1998, Aaker 1991, Agarwal and Rao 1996, Sethuraman 2000). Further product- market measures use market share (Chaudhuri and Holbrook 2001) or revenue premium (Ailawadi, Lehman and Neslin 2003) to define brand equity. The advantage of these measures is that they can measure the result of the process by which the brand name adds value to the product; that is, they quantify the performance due to the brand name. Their deficiency lies in data

providing and analyzing methods. Revenue premium measures often refer to hypothetical situations, conjoint analyses are costly and they do not make continuous measures possible due to the difficulties of data collection and the complicated statistical methods used in the analyses (Ailawadi et al. 2003).

Financial market measures assess the value of a brand as a financial asset, establishing a financial value of a brand. Measures often use the discounted cash flow model to assess financial value (Interbrand). The advantage of the financial value is that it can quantify future cash flow (Ailawadi et al. 2003).

2.2.4.1 Product market measures

Before a detailed presentation of product market measures we will present the most important product market brand equity models and the complex models combining the advantages of customer mind-set measures with those of the product-market ones.

Table 1: Product-market measure models

	Brand equity measure basis	Data source	Method / Model	Measure level
Ailawadi et al. (2003)	Revenue premium	Retail audit	Revenue premium	Brand
Srinivasan (2005)	Brand choice probability Product-related and non-product-related attributes	Questionnaire	Conjoint/Logit	Individual
Kartono and Rao (2006)	Perceived quality Satisfaction Profit Profit premium Revenue premium	Consumer Report J.D. Power and Associates	Structural	Firm
Srivastava and Shocker (1991)	Brand strength Brand's financial value	-	-	Individual Firm
Jourdan (2002)	The difference between subjectively and objectively assessed preferences	Survey	Conjoint	Individual

Kamakura and Russel (1993)	Brand utility	Retail audit	Logit	Segment
Srinivasan et al. (2005)	Brand choice probability Product-related and non-product-related attributes	Survey	Conjoint Logit	Individual
Sriram et al. (2007)	Brand intercept (β_0)	Scanner	Logit	Segment

The results of product-market measures can often be deceiving. A brand whose brand equity was estimated high based on its market share will have a higher estimated value than in reality if this share has been achieved through severe price cuts. If high brand equity is assessed on the basis of price premium, while measuring, we underestimate brands not applying price premium but representing value to price-sensitive consumers and firms, for example, Southwest Airlines (Ailawadi et al. 2003). Product market measures can indicate cases when a brand faces difficulties or even gets stronger, but they cannot explain these phenomena.

Ailawadi et al. (2003) qualified product market measures as an attractive middle ground and worked out a revenue premium model to measure brand equity. The revenue premium assures a better measurement in comparison to others (price premium, volume premium) since it gives a more comprehensive picture. There might be cases when a brand assures price premium as opposed to a private label, but private label sales may exceed brand sales, which can result in a negative income.

Ailawadi et al. (2003) used the private label as a basis of comparison in measuring brand equity. The widespread use of private label might be problematic since it is difficult to be found in several industries, and we cannot affirm that numerous private labels do not have brand equity.

One of the most complex models of brand equity research was introduced by Park and Srinivasan (1994), and its developed version was published in 2005 (Srinivasan et al. 2005). Their research is based on the brand equity measures of cellular telephone brands.

Srinivasan et al. (2005) defined brand choice probability taking a multiattribute model as a starting point.

Srinivasan et al. (2005) defines brand equity with the help of the incremental choice probability, that is, brand equity is the difference between the choice probability of a certain brand and that of the base product. In their model, the base product is neither a private label, nor a fictive brand. At the individual consumer level, the model compares a certain brand to one in the sample in whose case the difference between product-related or awareness-related associations and objective measures is the smallest.

Finally, brand equity in financial terms is given by the product of brand choice probability and its contribution margin.

Christodoulides and Chernatony (2010) considers it a deficiency that Srinivasan et al. (2005) did not decompose the non-attributes component, but this is not possible in the Srinivasan et al. (2005) model since they calculated this component as the difference between brand preference and multiattribute preference measured on the basis of product-related attributes.

A further deficiency of the Srinivasan et al. (2005) model is that the objective brand measure is based on a survey of experts, and the objectivity of expert opinions should be treated with reservation as a brand name may also have an impact on experts. We might assume that mobile telephone test results might have been a more reliable objective measure. Further on, the heterogeneous conjoint method might have resulted in more accurate assessments in comparison to the self-explicated conjoint method applied in data collection (Sándor and Wedel 2005).

The spread of the Srinivasan et al. (2005) model will assumably be hindered by its complexity, just like other, similarly complex models that will not be popular in application either.

Categorizing the Srinivasan et al. (2005) model is problematic, following to be discussed, after taking into account several factors, within product market measures. We have to remark that, due to the fact that this model combines the advantages of consumer mindset measures with those of the product market measures, it cannot be put in either of these categories. The model has still found its place among product market measures

since it treats the outcome, the brand choice probability as a tool assessing market share, as it can express brand equity in financial terms as well provided data are supplied, and in devising the model, they also use market data such as availability that do not come from consumers.

The econometric model devised by Kartono and Rao (2006) is also linking the demand function measuring consumer mind-set and the supply function measuring firm-level brand equity, similarly to the Srinivasan et al. (2005) model, combines the advantages of consumer mind-set measures with those of the product market measures. The difference lies in the fact that in Kartono and Rao's (2006) model, one element of the firm-level measure is represented by the revenue premium introduced by Ailawadi et al. (2003), which they associated with a profit premium element as well.

In the Srivastava and Shocker (1991) brand equity model, similarly to the previous one, brand equity is made up of two elements: brand strength and the brand's financial value. The Srivastava and Shocker (1991) model also combines consumer mind-set measures with product market measures, brand strength comes into existence based on consumer mind-set measures, while the second component, brand value defines the financial benefit for the firm.

Jourdan (2002), similarly to Srinivasan et al. (2005), used a multiattribute model as a starting point in devising his brand equity model (Christodoulides and Chernatony 2008). Jourdan (2002) developed his own brand equity model from Srinivasan and Park's (1994) model. Jourdan (2002) also measured brand equity as the difference between objective and subjective preferences, but their data collection referring to objective measures was not based on expert survey. Jourdan (2002) used one sample instead of two, and, throughout the data collection built on the conjoint method, the members of the sample first had to assess attributes without knowing the brand name, later they re-assessed the attributes, this time in knowledge of the brand name.

2.2.4.2 Financial brand equity measures

Table 2: Financial market measure models

	Brand equity measure basis	Data source	Method / Model	Measure level
Simon and Sullivan (1993)	Decomposing intangible assets Age of the firm Share of voice	Financial markets Balance sheet, income statement	Tobin's Q	Corporate brand
Interbrand	DCF Net present value	Public financial data	DCF Subjective assessment	Firm Brand

Simon and Sullivan's (1993) model measures brand equity at macro and micro levels, at the levels of company brand and individual product. Owing to macro level measures, brand equity can be defined, while micro level measures help in defining the impact of various marketing activities on a brand. Simon and Sullivan (1993) define brand equity as the incremental cash flow which accrues to branded products over and above the cash flow resulting from the sale of unbranded products. The Simon and Sullivan (1993) model defined the intangible assets of a company with the help of Tobin's Q ratio³ (Tobin 1969), then decomposed the intangible component in a way that makes it possible to assess the share a brand represents among intangible assets. Simon and Sullivan (1993) defined the impact of marketing activities on brand equity according to the logic of experiments, that is, they measured brand equity both before and after the experiment, and investigated the role of the factors causing changes in brand equity.

The assessment of the financial value is mostly necessary in the case of acquisitions and mergers, when the acquired or merged firm's brand equity also has to be evaluated and registered. The FASB (Financial Accounting Standards Board) offers three methods to evaluate the equity of a brand as an intangible asset: market-based, income-based and cost-based approaches. According to the results of the qualitative partial

³ The ratio of the market value of the firm to the replacement cost of its tangible asset. Here, a value of Tobin's ratio greater than 1 indicates that the firm has intangible assets.

research done by Bahadir et al. (2008) that is mostly based on interviews with experts, the most widespread method is the income-based brand equity assessment. This method consists of three stages. First, the acquirer or merger defines the present values of future cash flows, and then this value is multiplied by a royalty rate estimated by setting up a hypothetical situation. In fact, they answer the question what the royalty rate for the brand would be if the brand were subject to a licensing deal. To determine royalty rate, similar brands are used as the benchmark, which have the same market share in the same category, under similar market conditions. In the third stage, based on the valuation made in the first two stages, an independent counseling firm (e.g. Intangible Business) assesses the brand's financial value. It is important to know that it strongly depends on the acquirer or merger firm's marketing capabilities and intentions whether it retains-develops or abandons it.

From among the measures based on methods built exclusively on financial tools presented above, the assessment of net present value received a bigger role in the marketing-focused brand equity measure practice (Interbrand).

Among the business models, the Interbrand's brand equity measuring method has become the most popular one, owing to the fact, among others, that it was the first to appear on the market in this field (Madden et al. 2006, Fehle et al. 2008).

Interbrand uses publicly accessible financial data in evaluating brands, based on which it determines the cash flow that can be attributed to the brand use. The result is weighted according to industry particularities, taking into account the fact that in the case of luxury products, a brand has an essentially greater impact on cash flow than in the heavy industry. As a next step in brand valuation, they determine the discounted cash flow value, then, considering the risk represented, they calculate the net present value of the future cash flow generated by the brand. In order to measure the extent to which a brand can assure future demand and income, they calculate then the so-called brand strength index.

The brand strength index is calculated by considering seven factors:

- Market
- Leadership
- Trend

- Diversification
- Support
- Stability
- Protection

The above factors are considered in every brand valuation. The final value of the brand is also weighted with brand strength.

One great deficiency of the Interbrand's method is the subjective assessment of multipliers (Fernandez 2002, Ailawadi, Lehmann and Neslin 2003). In evaluating the factors, it is difficult to measure the differences existing on different markets. For example, the Pepsi market share can vary from 1%-to 100% on different markets.

2.3 Consumer mind-set measures

The main purpose of this paper is the design of a causal consumer-based brand equity model; consequently we will concentrate mainly on the consumer mind-set measures in reviewing brand equity literature.

Consumer mind-set measures, through a consumer survey, measure concepts such as brand awareness, brand-related associations constituting the dimensions of a multidimensional brand equity in certain models (Yoo and Donthu 2001, Atilgan et al. 2009), and illustrate brand equity effects by investigating the relationships between them (Vázquez et al. 2002).

This chapter will present Aaker (1991) and Keller's (1993) conceptual model first, then it will discuss empirical brand equity models in detail, finally presenting agency-based consumer-based brand equity models.

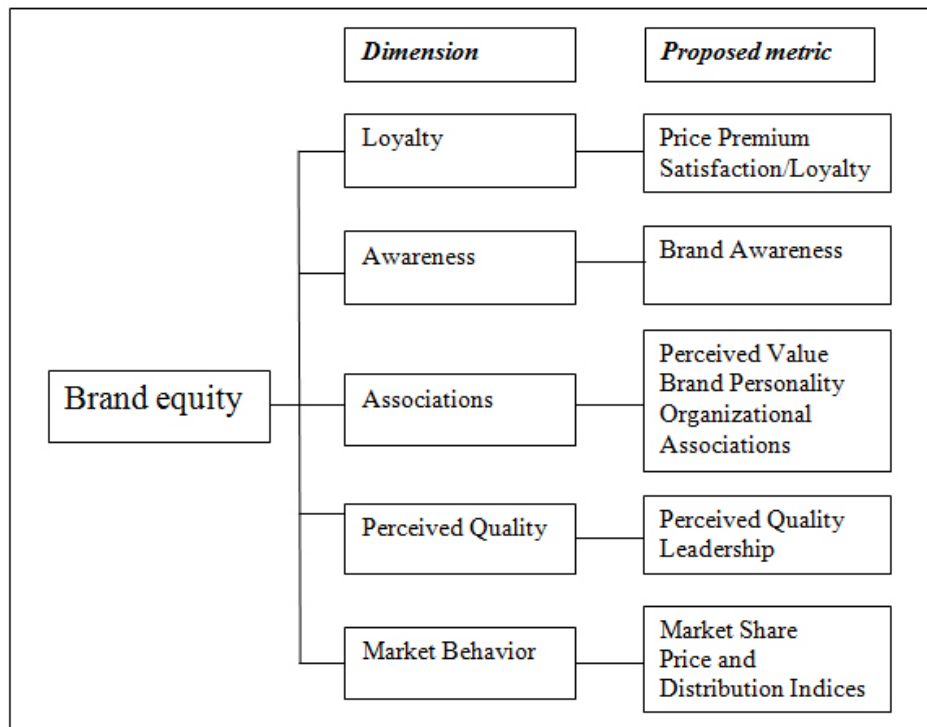
2.3.1 Conceptual brand equity models

David Aaker's brand equity model

Aaker (1991) defined brand equity as a multidimensional construct. The model is set up by the following dimensions: Brand loyalty, Brand name awareness, Perceived brand quality, Brand associations and Other proprietary brand assets. The model defines the basic characteristics of brand equity:

- It is a set of brand assets and liabilities
- Is linked to the brand's name and symbol
- Can subtract from, as well as add to, the value provided by a product or service
- Provides value to customers as well as to a firm

Figure 1. Aaker's (1991, 1996) brand equity model and suggested measures



In the following we will present the components of Aaker's (1996) model in detail and the measures suggested by Aaker (1996) for measuring different concepts.

Brand loyalty

Brand loyalty is an important dimension from the point of view of brand equity measurement as consumer loyalty turns into future profit. A loyal consumer base can assure predictable sales and profit for the company and reduces marketing costs since retaining consumers is much less costly than attracting new ones.

To measure the brand loyalty dimension, Aaker (1996) indicated price premium, consumer satisfaction and loyalty as the most suitable tools.

However attractive a measure price premium is, its commercial application, the frequent price cuts and the spectacularly differing prices among chains of shops create problems in its inclusion in the brand equity model. Further on, price premium as an independent measure of brand equity has several deficiencies as it does not unambiguously measure the company's financial performance (even with a high price premium, a company may suffer losses if sales decrease), and it does not show the brand's impact on reducing marketing costs. Despite its deficiencies, it stood at the basis of several measurement models for brand equity (Randall et al. 1998, Aaker 1991, Agarwal and Rao 1996, Sethuraman 2000).

Awareness

Brand awareness is one of the most frequently measured dimensions of brand equity. The basic measuring tools of brand awareness are recognition, recall, top of mind, brand dominance (only one recalled brand name), brand knowledge and brand opinion. High awareness reduces the brand choice-related perceived risk, consumers feeling safer when choosing a well-known brand (Moisescu 2009).

Brand associations

Brand associations help consumers in processing and retrieving information more easily, they can form the basis of differentiation, motivation and lead to the creation of

positive attitudes. According to Aaker (1991), the brand associations dimension can be created by the measurement of its three components: brand as a product (the functional advantages provided by the product), brand personality (the brand user's profile) and organisation-related associations. The results of the measures of these three components add up in differentiation. In Aaker's (1996) approach, differentiation synthesizes the measure results related to brand associations. Consequently, associations as a result of unconscious and conscious communication activity must finally result in an easily distinguishable product.

Perceived quality

Aaker (1991) discusses perceived quality separately from associations. Perceived quality adds value to the product by creating motivation to buy, makes price premium application possible and differentiates the brand. The importance of perceived quality is indicated by the fact that the research referring to 3,000 strategic business units built on PIMS database found it the most important factor influencing returns (Jacobson and Aaker 1987), or, according to the findings of another research (Aaker 1989), managers indicated perceived quality as the most important source of competitive advantages. Although the generalizability of researches based on PIMS' data base has often been questioned, in measuring brand equity several researches have confirmed the treatment of perceived quality as an independent dimension or its determining role in assessing brand equity (Aaker and Jacobson 1994, Gamoran 2007, Netemeyer et al. 2003).

Other proprietary brand assets

The fifth dimension, the advantages related to brand property was replaced by Aaker (1996) by the market behavior dimension. As a less relevant dimension, this fifth dimension was taken out of the modified Aaker model by Yoo and Donthu (1997).

Measuring market behavior is different from that of the other dimensions in that it does not require strenuous work. It is composed of two elements. One of the components is market share, which can measure the brand's incidence and its strength. As market share in itself can be a deceiving measure (it can increase as a result of price cuts), Aaker

(1996) advises to weight the sales data of certain product groups with the relative market price (relative market price is the ratio of the monthly average price of the brand and the average price of every brand sold by a company). In order to make the market behavior dimension more complete, it is important to take into account the commercial availability of the products.

The deficiency of the Aaker (1991, 1994) model is that it does not give an answer to how the final value of brand equity can be determined and what kind of calculations can be made in order to summarize the measurements carried out. Similarly, it does not indicate the measurement level (consumer, product and business unit), timing (present or predictive effect) or company performance characteristics (ROI, CFROI, stb.) either (Shields and Shields 2005).

Keller Kevin Lane's consumer-based brand equity model

Keller (1993) defines consumer-based brand equity at individual level, taking brand knowledge as a starting point, which is conceptualized as an associative network, where the associations are nodes. In his interpretation, brand equity comes from the response difference owing to the brand, that is, brand equity is given by the difference between consumers' response to the marketing activities of a branded and an unbranded product.

A problem of Keller's (1993) consumer-based brand equity model is that he does not operationalize the concept of brand equity, in this sense we cannot speak about a real brand equity model. In his article published in 1993 he sets up the conceptual model of brand knowledge determining brand equity, but he does not give a clue how to measure the relationship between brand awareness and consumer-based brand equity. Despite the fact that Keller's (1993) model has become the most referred-to conceptual model, the author did not develop it further, and in his later publications he described brand equity with a different model without discussing the relationship between them (Keller 2003).

Keller's (1993) model has brand knowledge in its focus. In the association network model, brand knowledge is the central node of the net, the other nodes, associations connecting to it. Brand knowledge is made up of two components: brand awareness and brand image.

Brand awareness in this model is made up of recognition and recall. Recognition is the consumer's ability to recognize a brand due to the brand as a stimulus and to distinguish a brand from other brands easily. Recall is the consumer's ability to retrieve the brand due to certain stimuli (product category, needs fulfilled by the product).

Brand image is made up of associations connecting to the brand node. Keller (1993) distinguishes among three dimensions of associations: favorability, strength and uniqueness.

The favorability of associations measures the extent to which associations are favorable for a brand, and this is strongly determined by the importance consumers give to the existence of an attribute. It is difficult to create a favorable association if the attribute or benefit is unimportant to the consumer. Associations can also be favorable if consumers do not rely on them in the purchase decision.

The strength of associations depends on the way information entered consumer's memory. We can speak about strong associations if the consumer processed a great amount of quality information at encoding. When consumers think about a brand's attributes actively, stronger associations are created.

The uniqueness of associations means the ability of a brand to differentiate itself from the competing brands. Naturally, brands also have shared associations besides the unique ones. In the case of shared associations, a certain association is connected to other brands as well in the neural network.

2.3.2 A critical analysis of consumer-based brand equity measures

Before the detailed presentation of consumer mind-set measures, we present the most important consumer-based brand equity models ones in the table below.

Table 3: Consumer mind-set measures

	Brand equity dimensions	Model/ Software	Market
Vázquez et al. (2002)	Product functional utility Product symbolic utility Brand name functional utility Brand name symbolic utility	Structural equation (EQS)	Consumer market
Yoo and Donthu (2001)	Awareness/ Associations Perceived quality Brand loyalty	Structural equation (Lisrel)	Consumer market
Netemeyer et al. (2003)	Perceived quality Perceived value for cost Uniqueness Willingness to pay a price premium	Structural equation (Lisrel)	Consumer market
Erdem and Swait (1998)	Brand credibility Clarity Consistency Perceived quality Perceived risk Information cost Expected utility	Structural equation (Proc Calis - SAS)	Consumer market
Erdem et al. (2006)	Brand credibility Perceived quality Lower perceived risk Information costs saved Product consideration and purchase	Structural equation (Amos)	Consumer market
Martensen and Gronholdt (2004)	Rational evaluations Emotional evaluations Customer-brand relations	Structural equation (PLS)	Consumer market
Chernatony et al. (2004)	Brand loyalty Satisfaction Reputation	Factor analysis	Financial services
Christodoulidis et al. (2006)	Affective relationship Online experience Willingness to bilateral communication Trust Satisfaction	Structural equation (Lisrel)	Online services

Chau and Ho (2008)	Trialability Personalisation	Structural equation (Lisrel)	Online services
Lehmann et al. (2008)	Comprehension Comparative advantage Interpersonal relations History Preference Attachment	Factor analysis Structural equation	Consumer market
Atilgan et al. (2009)	Perceived quality Brand associations Brand trust Brand loyalty	Structural equation (Lisrel)	Consumer market
Boo et al. (2009)	Destination brand awareness Destination brand experience Destination brand image Destination brand quality Destination brand value Destination brand loyalty	Structural equation (Amos)	Tourism
Kim and Hyun (2010)	Awareness /Associations Perceived quality Loyalty	Structural equation (Amos)	Organisational market (Software)

Source: Own systematization

Vázquez et al. (2002) identified four dimensions of the consumer-based brand equity:

- Product functional utility
- Product symbolic utility
- Brand name functional utility
- Brand name symbolic utility

Vázquez et al. (2002) defines brand equity as the utility associated to the use and consumption of the brand. In this sense they lay stress on the ex-post (after consumption) utility of the brand, in contrast with other researches that stress the ex-ante (before consumption) utility of it (Erdem and Swait 1998, Erdem et al. 2006). The basis of the dimensions created by Vázquez et al. (2002) is the differentiation between functional and

symbolic utility. The model includes both brand-related abstract associations and concrete product attribute-related associations.

The advantages of the four-dimensional model developed by Vázquez et al. (2002) are that it can be easily applied, sheds light on the sources of brand equity and makes individual-level measures possible (Christodoulides and Chernatony 2010).

The deficiency of the Vázquez et al. (2002) model is that it was developed for a concrete product category (training shoes), thus it can only be used as a basis of comparison with limitations. Christodoulides and Chernatony (2010) considers it a further deficiency that the model lays stress on the ex-post (after consumption) utilities, thus ignoring the ex-ante ones. Mention must be made here of the fact that the researches focusing on ex-ante (before consumption) utilities (Erdem and Swait 1998, Erdem, Swait and Valenzuela 2006) have a significantly different logics and theoretical basis, therefore we cannot expect a consumer-based brand equity model to meet the requirements of both approaches.

Kocak et al. (2007) repeated the research of Vázquez et al. (2002) in Turkey, but they could only retain 16 out of the original 22 questions. They drew the conclusion that the differences between the results of the two researches can be explained by the cultural differences. However, they did not support this conclusion with any empirical result.

Yoo and Donthu (2001) developed their consumer-based brand equity model based on Aaker's (1991) conceptual model, which they called MBE (Multidimensional Brand Equity) and introduced the OBE concept (Overall Brand Equity) developed to measure the validity of multidimensional brand equity.

The MBE is built on the four dimensions introduced by Aaker (1991). Yoo and Donthu (2001) did not find the fifth dimension (Other proprietary brand assets) relevant from the point of view of measuring consumer-based brand equity, since with the fifth dimension Aaker (1991) comprises patents, trade mark and channel relationships. As a consequence, the MBE includes the dimensions of Perceived Quality, Brand Loyalty, Brand Awareness and Brand Associations.

In Christodoulides and Chernatony's (2010) evaluation, Yoo and Donthu's (2001) model have the most strength and the fewest deficiencies. They consider one of the greatest values of the model the fact that it can be generally used, that is, it does not depend on product category, it is culturally valid, it can be measured at individual level and it can be applied easily. Christodoulides and Chernatony (2010) find it a deficiency of Yoo and Donthu's (2001) model that the dimensions of Brand Awareness and Brand Associations fall into the same dimension, although the most influential researchers of the literature (Aaker 1991, 1996, Keller 1993) describe these two dimensions as separate constructs.

Washburn and Plank (2002) also qualified the classification of brand awareness and brand associations into one dimension as a problematic question, although in their research repeating Yoo and Donthu's (1997)⁴ research they had the most acceptable data reduction solution when they classified brand awareness and brand associations into one dimension.

One of the main problems with the Yoo and Donthu (1997) model, namely that brand awareness and brand associations fell into the same dimension, could have been caused by the fact that the questions measuring Brand Awareness and Brand Associations were not properly chosen (Washburn and Plank 2002). From the two dimensions, the items of Brand associations might have caused most of the problems, since they were formulated in a way to measure brand awareness rather than brand associations (e.g. *I can easily recall the logo of X brand; I have difficulty in imagining X (brand) in my mind.*)

Netemeyer et al. (2004) identified four dimensions of the consumer-based brand equity which they held most important:

- Perceived quality - PQ
- Perceived value for cost - PVC
- Uniqueness
- Willingness to pay premium price

⁴ We consider it as the antecedent of Yoo and Donthu (2001).

They could not treat the two constructions (PQ - PVC) as separate dimensions in the analyses due to the high correlation values, the lack of external validity unambiguously signaled that the two constructions measured the same phenomenon. The explanation might lie in the fact that the perceived value for cost may be determined as the antecedent of brand equity rather than part of it.

From among the advantages of the Netemeyer et al. (2004) research we must emphasize the strict investigation of the model's validity, the fact that, unlike other researches, it was not done among students and that they set up a model easy to apply.

According to the simple and intuitive logic of the Netemeyer et al. (2004) model, PQ/PVC and uniqueness positively determine the willingness to pay price premium, which in its turn determines willingness to purchase.

In the signaling theory approach Erdem and Swait (1998) stress the brand's ex-ante (before consumption) advantages and regard the decrease of the perceived risk and information cost saved as the antecedents of brand equity. In fact, they claim that we can only speak about brand equity when risk and information cost have decreased. Further on, they consider brand loyalty an important component of Aaker's (1991) model, as a consequence of brand equity, as opposed to Aaker's (1991) model.

Erdem and Swait (1998) discuss it as another important characteristic of the signaling theory approach that it does not compulsorily connect brand equity with high quality brands. Brand equity is not primarily determined by high quality but by the authentic information referring to high quality, that is, the greatest utility to the consumer is provided by the brand communicating in a reliable way, the one that always offers what it promises.

The structural equation model estimated by Erdem and Swait (1998) describes the following process: due to the investments and consistency, the brand will be authentic and its message unambiguous, which positively influences the perceived quality, reduces risk and information cost which, in their turn, positively contribute to the utility expected by the consumer.

The importance of measuring cultural factors has recently appeared in the branding literature. In the brand extension literature, concerning Hofstede's (1980)

cultural dimensions, there are significant differences at the level of various cultures in what concerns the success of extension (Henseler et al. 2010). In the consumer-based brand equity literature, Erdem et al. (2006) confirmed the cultural validity of brand equity. Erdem et al. (2006) extended their research to seven countries, owing to which they successfully proved the cultural validity of the Erdem and Swait (1998) model, and they found that the uncertainty avoidance index amplified the effect of credibility on brand choice, while in the case of the power distance index this effect could not be detected.

Martensen and Gronholdt (2004) distinguished between two ways of brand equity development, the rational and emotional approaches, and they also investigated the combination of these two. The independent variable, the brand-consumer relationship is determined by two dimensions, the rational and the emotional evaluation of the brand. In the structural model, the brand's rational evaluation is determined by product quality, service quality and price, while the emotional evaluation (feelings associated to the brand) is determined by differentiation, promise and trust. The applicability, reliability and validity of the model were controlled in later researches (Martensen and Gronholdt 2006).

Jensen and Klastrup (2008), leaning on Martensen and Gronholdt's (2004) brand equity model, made an attempt to develop a model suitable for investigating the brand equity of the brands present on business-to-business markets. In applying the model, the authors took as their starting point the widespread assumption that in the case of B2B brands, product associations play an exclusive role (Riel et al. 2005) as compared to brand name associations. By applying the Martensen and Gronholdt (2004) model for measuring business brands, they also wanted to find out the role the emotional dimension plays in B2B branding. They investigated the model on two different samples, industrial original equipment manufacturer customers and consulting engineers. In both cases, the model had a high explanatory force, but in neither case could they prove the external validity of the model. They could not significantly differentiate between the brand's

rational evaluation and customer-brand relationship dimensions either, both constructions measuring the same reality in fact.

Jensen and Klastrup (2008) could not unambiguously answer what role the emotional dimension plays in the case of B2B brands. On the one hand, from the model they considered valid, the two dimensions of rational and emotional evaluations from the Martensen and Gronholdt (2004) model had to be left out. On the other hand, in data collection, the responses to the questions meant to measure the emotional dimensions confirmed the arguments according to which B2B branding is primarily built on rational elements.

While brand equity models were developed for products for a long time, in the past years several brand equity models have appeared that refer to online or business markets.

Chernatony et al. (2004) developed a three-dimensional model for financial services. The model found brand loyalty, satisfaction and reputation as the most suitable measures for measuring the brand equity of financial services, and eventually these came to be the three dimensions of the measure.

Christodoulides et al. (2006) developed a measure suitable for online brand measurement. The authors find the following five dimensions as the most suitable for measuring online brands:

- Affective relationship
- Online experience
- Willingness to bilateral communication
- Trust
- Satisfaction

We can consider it as an important characteristic of the Christodoulides et al. (2006) brand equity model that they planned the dimensions of their model following Vargo and Lusch's (2004) approach considered to be the new determining logic of

marketing. In the interpretation of Vargo and Lusch's (2004) dominant logic, a consumer is not a passive actor any more but an active participant in production. By consuming a product, the consumer can acquire several experiences that can help the producer make spectacular, useful developments. In the case of online services, the active consumer's concept is unambiguously grounded, since the consumer's active participation is much more likely in setting up online services than in the case of products. Measuring active consumer participation might have several exciting results in brand equity research, which will surely be discovered in the future.

Berry's (2000) model seems to be a little random. He identifies two dimensions of the service brand equity, namely brand awareness and brand meaning, but we do not find out the way he would operationalize these dimensions. However, the model presented by him proves to be a salient visual aid and an introduction to the practical examples written in an enjoyable and convincing way.

Chau and Ho (2008) also developed a brand equity measure applicable in services. More specifically, they investigated the opportunities of service brand building via the Internet. They built their model on two independent factors, triability and personalization, and successfully confirmed their influence on brand equity (in the author's formulation, Consumer-based Service Brand Equity). The triability and personalization dimensions, besides their direct influence on the CSBE, have an indirect influence on it as well through the dimensions of information-gathering and information-processing cost savings and the perceived benefits of the brand.

It is important to present here the result of the Lehmann et al. (2008) research despite the fact that the authors do not claim their work to belong to the brand equity literature, and they do not call the result fitted into the structural model a brand equity model, but a brand performance model.

Lehmann et al. (2008) investigated several models developed for measuring brands. They considered the scientific models of Aaker (1996), Fournier (1998), Keller (2002, 2008), Keller and Lehmann (2003) and Ambler (2003) as their starting point and they included in their research the dimensions of the agency models of BAV developed

by Young & Rubicam, BrandZ developed by Millward Brown and the Equity Engine model developed by Research International.

They used a construct measuring 27 brands in total, and in order to control the cultural factor, they did the research in the USA and China.

Despite the fact that in the factor analysis, most of the 27 constructs sat on only one factor, they found the following six-factor solution the best, with the respective dimensions:

1. Comprehension: presence, awareness, knowledge.
2. Comparative advantage: differentiation, esteem, performance, advantage and acceptability.
3. Interpersonal relations: caring, prestige, service, innovation.
4. History: heritage and nostalgia.
5. Preference: bonding, loyalty, willingness to purchase, value for money, attitude and extension potential.
6. Attachment: persistence and attitude.

The components of the brand performance model developed by Lehman et al. (2008) were investigated with a structural equation model. The model fitted in a hierarchy of effects structure similar to the AIDA model, and follows the logic below: Brand Awareness positively determines the three dimensions (advantage, relations and history) describing brand image and associations, which build brand preference that, in its turn, builds brand attachment.

2.3.3 Agency-based brand equity models

Young & Rubicam - Brand Asset Valuator

BAV (Brand Asset Valuator) developed by the Young & Rubicam agency is the consumer-based brand equity measure with the greatest data base on the world. Young & Rubicam has carried out measures on 19,500 brands along 55 parameters since 1993, asking approximately 350,000 consumers. One of the results of these measurements is the BAV consumer-based brand equity model popular with both the business and scientific community.

BAV is a relative brand equity measure, that is, it establishes the equity of brands in relation to each other; the measurement is an output rather than an absolute value as in the case of the Interbrand. The BAV cannot explain the differences between industries (Verbeeten and Vijn 2006), but the measurement was devised to measure brand equity at a global level, independent from industries.

BAV is made up of four dimensions: Differentiation, Relevance, Esteem and Knowledge.

Differentiation: It measures the brand's perceived differentiation that Aaker (1996) declared to be the most important synthesizing measure of associations. Thanks to it, a brand is able to stand out among competitors.

Relevance: measures the extent to which a brand is relevant to a customer. With this level in fact BAV estimates the probability of the consumer's willingness to purchase a certain brand. The Relevance dimension must be regarded as one completing Differentiation, since a brand's uniqueness cannot assure firm success in itself.

Esteem: Esteem measures associations related to perceived quality, reliability and brand leadership.

Knowledge: It measures familiarity with a brand. This dimension is not the same as awareness as it also includes consumers' knowledge of the brand, their routine gained through experience and their familiarity with the brand through its use.

The four dimensions eventually summarize the information related to the brand in two second-rank dimensions. Multiplying Differentiation by Relevance we get Brand

Vitality (or Brand Strength). The importance of this new dimension lies in the fact that Differentiation cannot determine brand equity in itself; a brand which is unique (e.g. Jaguar) but without relevance or willingness to purchase has low brand equity. Multiplying Esteem by Knowledge we get Brand Stature whose development has its starting point in the fact that the two dimensions can only determine brand equity together, since brands with knowledge (Exxon) but less esteem will have low brand equity.

BAV is basically a tool suitable for measuring consumer-based brand equity, but starting with 2004, the Landor agency, the parent company of the Y&R, has prepared the Breakaway Brands research, which, combining the methods of the BAV and that of the Stern Stewart Economic Added Value (EVA), selects the financially most performant brands out of the 2,500 investigated brands from the BAV data base and publishes the list of the top ten. The research, however, does not end with the assessment of a brand's financial value with the help of the EVA, but they also research, involving the students of the Wake Forest University's Babcock School of Business, the most important factors of the selected brands' success.

Milward Brown – BrandZ

BrandZ is the brand of brand equity measures developed by the Milward Brown agency. Milward Brown is a member of the Kantar and WPP groups.

BrandZ illustrates brand equity in a hierarchical structure assuming that brand equity is the result of the consumer's following the stages below:

- Presence
- Relevance
- Performance
- Advantage
- Bonding

The presence dimension measures familiarity, brand knowledge, that is, the extent to which a brand is present in the consumer's mind. Relevance measures the extent to which a brand is relevant to the consumer's needs from the point of view of price and offer, that is, if it is included in the product category considered. Performance measures

whether a brand's performance meets the consumer's expectations, while Advantage investigates the advantages of a brand over other brands. Bonding is on top of the pyramid and it measures the attachment to the brand to the exclusion of other brands. (<http://www.brandz.com>).

Research International –Equity Engine

The Equity Engine brand equity measure developed by Research International is one of the most popular agency-based brand equity models that functions similarly to the logic of the consumer-based brand equity model, i.e. it measures the sources of brand equity.

This model is referred to by numerous scientific articles (Ailawadi et al. 2003, Lehmann et al. 2008, Keller and Lehmann 2003, Christodoulides et al. 2009) or the scales it developed are used by them (Lehmann et al. 2008).

Similarly to the Martensen and Gronholdt (2004) model, Equity Engine defines two large dimensions of brand equity:

- Affinity
- Performance

The affinity dimension represents the emotional advantages (authority, identification, approval) provided by a brand, while performance represents the functional advantages associated with the product and service (Knowles 2008). The model also shows similarities with the Vázquez et al. (2002) model in the sense that the Vázquez et al. (2002) model attempted the separation of functional and symbolic advantages.

At present, this model is not available on the market. Research International developed the model and introduced its brand equity solutions under the Brand Action umbrella brand. The so-called Energy Diagnosis Engine, which developed from the original Equity Engine, was part of this umbrella brand. The difference between the two models lay in the fact that, while preference was the dependent variable in Equity Engine,

the so-called Brand Energy came to be the dependent variable in Energy Diagnosis Engine, which measured present status and future development potential.

Research International, which developed the model, merged into TNS⁵ that does not make available the brand equity measures developed by Research International but offers its own solutions marketed under such brand names as NeedScope, Conversion Model, BPO (<http://www.tnsglobal.com/>).

⁵ Both agencies are members of the Kantar group, which is the information and counselling division of the WPP group in its turn.

2.4 The effect of marketing activities on brand equity

The process of value creation is illustrated with the help of the BVC (Brand Value Chain) by Keller and Lehmann (2003). BVC describes the process in which brand equity sources (awareness, associations) are created as an impact of marketing investments (advertisements, product development) and the way they increase the company's market performance (price premium, market share), which eventually is able to create and increase the shareholder value.

However, real marketing activities cannot have any effects until consumers perceive their existence (Yoo et al. 2000). The effects of perceived marketing activities were measured in several researches (Peterson and Wilson 1985, Yoo et al. 2000, Chattopadhyay et al. 2010, Morgan and Rego 2009). For instance, the measurement of the perceived price is well-grounded since we cannot generally assume that consumers are aware of the real prices. Kenesei (2004) proved that frequent buyers are not characterized by higher price awareness than those who rarely purchase.

The brand-related perceived benefits change slowly despite the fact that a certain brand has introduced developments. For example, Hungarian consumers put the Skoda car brand into the same category as the Lada; although by the time of the research Skoda had undergone a spectacular development while Lada remained the same (Reketye and Liu 2001).

We consider the analysis of the perceived marketing activities important because we assume that consumer decisions are directly influenced by the perceived marketing activity (Hofmeister-Tóth 2003). By using real data we can give an answer to spending efficacy, for example. For instance, Dekimpe and Hanssens (1999) illustrated the way of estimating, planning and sustaining the long-term effects of marketing activities.

The relationship between marketing activities and consumer-based brand equity was first examined in one comprehensive model by Yoo et al. (2000). Yoo et al's (2000) research was repeated in India by Chattopadhyay et al. (2010). They enlarged the circle

of the examined marketing activities, including the place of origin, word-of-mouth popularization and sponsoring in the research. An interesting difference between the two researches is that in Chattopadhyay et al.'s (2010) research, advertisement did not prove to be a significant factor as compared to the WOM (word-of-mouth), which positively influenced brand equity dimensions and brand choice as well.

2.4.1 The effects of product-related decisions on brand equity

In the signaling theory approach, the basis of brand equity is given by the brand's ability to decrease information asymmetries (Erdem and Swait 1999). A brand decreases consumer uncertainty, generates lower search costs as it helps quick decision making through quality-related information. According to this approach, associations are not parts of brand equity but its consequences (Gamoran 2007).

For measuring the role of quality, a special "laboratory" environment is created by such a virtual world as the Second Life⁶. Among the brands present in the Second Life there is no real empirical quality difference, since they are virtual products. In spite of this, there are significant differences in price among brands. The SL markets are not characterized by information asymmetry (Akerlof 1970, Kirmani and Rao 2000), the products' quality characteristics can be observed by everyone, so the brands present in the Second Life can be regarded as pure search goods since their consumption does not determine quality-related valuation in any way. Gamoran (2007) examined four product categories: male trainers and jeans, female trainers and jeans. In the case of male trainers and jeans and female jeans there was no difference (determined in price premium) between branded and unbranded products. This fact supports the information economics approach according to which on a market where there is no information asymmetry, a brand does not have brand equity, since there is no product quality-related uncertainty (Gamoran 2007).

⁶ Virtual world with real economic processes. The one realizing income in the SL can exchange it into real dollars. Numerous brands entered the SL, and several local (virtual) brands were developed at the same time.

In Second Life, clothing brands from the real world (Adidas, Nike, etc.) can be purchased at a significantly lower price than brands developed in the virtual environment. Still, the SL inhabitants prefer the virtual brands (Gamoran 2007). A possible explanation of this phenomenon could be the fact that brands which became popular in the real world do not carry the promise of quality in the virtual space, and in lack of it, the image in itself is not capable to create brand equity.

Based on the above we may as well assume that in brick and mortar business brand equity cannot be created without quality-related promise, or at least the perceived quality (Aaker 1991, Netemeyer et al. 2004) is one of its most important facets. Perceived quality contains information that determines the investors' future cash flow expectations. At the same time, approaching the question from the point of view of the company's strategy, companies characterized by high market orientation do not differentiate their products with the help of price but that of quality. More precisely, they invest in quality development instead of trying to achieve a better financial performance with price cuts (Hooley et al. 2000).

An important basis of brand equity sources (association, awareness) is the product attributes that make a product unique, which are able to differentiate a brand from the concurrence. Differentiation helps consumers in decision making, especially if no other brand has the same characteristics that are able to make difference even when they are not relevant from the point of view of the product's performance and quality (Carpenter et al. 1994).

The consumers' ability to analytically evaluate a product's concrete characteristics is decreased by the great amount of information and it is increased by intentional information search (Hutchinson and Alba 1991). This is very important for companies because advertisement and packaging significantly influence the image formed about characteristics standing at the basis of differentiation (Lans et al. 2008). Further on, advertisement and packaging might distract attention from the essential elements of difference and might draw it to the irrelevant characteristics (Hutchinson and Alba 1991).

Product development, new product-introduction

Innovation (new product introduction, developments) is a factor that was less researched earlier from the point of view of brand equity but which has a significant effect on brand equity increase (Randall et al. 1998, Sriram et al. 2007, Mizik and Jacobson 2008). From a strategic point of view we consider every marketing activity important, but product development stands out among them in the sense that the product constitutes the real, physical form of the offer (Józsa 2003).

New product introduction decreases marketing communication costs aimed at brand equity development, and in short term they increase brand equity more efficiently than advertisements (Sriram et al. 2007). A product of outstanding quality in the product line increases brand equity (Randall et al. 1998), and design might be a significant factor of decision, usage experience and self-expression (Horváth and Sajtos 2002).

Product development, the introduction of new models can create in consumers the image of a company that is continuously trying to create real values for consumers. Continuous development creates the possibility for the company to adjust its offer to consumer expectations, as a consequence of which it will enjoy the benefits of market orientation, and market-oriented companies are known to outdo their competitors characterized by low market orientation (Hooley and Berács 1997). Brands having a significant advantage in the field of developments tend to increase their research and development costs in the following periods to preserve this advantage (Ofek and Sarvary 2003).

Mizik and Jacobson (2008) built a fifth dimension in the BAV (Brand Asset Valuator) brand measure, that of the energy. Energy measures the dynamic and innovative nature of brands. A brand's innovative nature originates from its ability to introduce new products, new models and appears on the market with spectacular technical innovation. The importance of this new dimension lies in the fact that it can build the brand's future development capabilities in itself. Mizik and Jacobson (2008), with the Fama and French (1992) method, found that the energy dimension has a

significant positive effect on stock returns, that is, the energy dimension carries information based on which investors formulate their expectations regarding future cash flow.

In the case of vertically differentiated products, the product line structure also influences brand equity. Vertical differentiation means that a brand (e.g. Canon Powershot) identifies a product line in which different models can be aligned from the point of view of the quality, that is, the product line contains both lower-quality but cheap and high-quality but expensive products, and these products serve the same purpose. According to Randall et al.'s (1998) results, the good-quality model in the product line increases the equity of the whole brand (e.g. Canon Powershot), while the presence of a low-quality model decreases brand equity. Randall et al.'s (1998) results also suggest that certain producers consciously build outstanding-quality product in the product line in order to make the whole product line more attractive and demonstrate their technical capabilities. We have to add, though, that a high-quality product can only increase a brand's equity if it is widely known and the product-related information is easily accessible. The new, high or low-quality product introduced into the product line will take its effect on brand equity after a certain period of time. Therefore, if they introduce, for example, a lower quality product into the product line, the firm can still enjoy the earlier sales level until the new product takes its effect and can achieve significant profit due to to significantly higher sales in the lower segments.

Availability

The wide availability of products may significantly influence the formation of positive brand associations since it makes possible for the consumers to purchase them whenever and wherever they want. (Bronnenberg et al. 2000, Yoo et al. 2000).

Availability decreases search costs, thus consumers can easily manage their time meanwhile purchasing and can spend it more usefully than by searching for a brand (Yoo et al. 2000). Availability increases the probability for the consumer to meet a brand frequently, thus it increases its awareness (Smith 1992).

High availability of a brand in commerce may signal the company's commitment to consumers and its success on the market as well (Ataman et al. 2010). Wide availability may thus also signal that other consumers have accepted the product, many have tried it out, and so it can be trustfully consumed.

2.4.2 The relationship between price and brand equity

It is generally accepted that strong brands representing high quality can apply price premium, due to which they significantly influence the financial results achieved as well (Aaker, 1991, Aaker 1996, Park and Srinivasan 1994, Sivakumar and Raj 1997, Chaudhuri and Holbrook 2001, Kapferer 2008).

The existence of price premium is best illustrated by joint product development. In several industries (electronics, car industry, office equipment), companies developed products together, which they sold under their own brand name. Stronger brands are able to sell the same product with price premium, while the other developer sells it at a lower price under a different name. For instance, in the case of the TV set developed jointly by General Electric and Hitachi and sold under their own names, Hitachi applied a \$75 price premium and it sold twice as many products as GE (Keller 2003).

When the relationship between price and brand equity was examined, researchers usually had as a starting point the ability of high price to signal high quality (Yoo et al. 2000, Chattopadhyay et al. 2010). The ability of high price to signal quality is a widespread view both in public opinion and marketing literature (Lambert 1972). The general nature of the positive relationship between high price and perceived quality was not confirmed by the specialist literature, though (Zeithaml 1988, Peterson and Wilson 1985).

The price-quality relationship depends on product category, for example; it is weak in the case of comfort products and strong in the case of special ones (Rekettie 2004, p. 61). With some concrete products such as automobiles (Rekettie and Liu 2001), or wine (Hofmeister-Tóth and Totth 2003) the positive relationship between price and quality was also found, but the general nature of this relationship must be examined

taking into account situational factors (such as attitude towards store) (Dodds et al. 1991, Zeithaml 1988). Dodds et al. (1991) found that in the case of rarely purchased products, when store and brand name-related information is "at hand", the price – perceived quality relationship does not play an important role or it even ceases to exist.

The price-quality scheme (Peterson and Wilson 1985) depends on other available information such as detailed information referring to store or brand (Dodds et al. 1991), on the operationalization of perceived quality (Brucks et al. 2001), on the life cycle the commercial brands are in within the examined country (Steenkamp et al. 2010), or on the product category (Rekettey 2004, p. 61).

Brucks et al. (2001) defined quality as a multidimensional concept, which can give an explanation to the controversial phenomenon that in certain cases price can signal quality while in others it cannot. For instance, Brucks et al. (2001) proved that consumers rarely relied on price as a signal of quality if they had to estimate a dimension of quality such as performance; on the contrary, price proved to be an important signal in the case of a dimension such as prestige.

Steenkamp et al. (2010) examined the price-quality relationship in the case of national, corporate and private brands and found that in countries where the life cycle of private brands had reached the maturity stage, the price-quality scheme showed a significantly weaker relationship than in countries where private brands were in the early stage of their life cycle.

When measuring consumer-based brand equity we measure brand name in general rather than a specific model, but in such a case we cannot ask about price since there might be several differently priced models within the brand. If we measured specific model or models, our results would reflect the knowledge of a relatively narrow sample referring to a certain model instead of the information contents of a brand name (Dodds et al. 1991).

In the case of several measures, price premium is the most important or one of the most important brand equity measures (Randall et al. 1998, Aaker 1991, Agarwal and Rao 1996, Sethuraman 2000). Despite the popularity of price premium application, several difficulties might emerge in measuring brand equity. One of the greatest problems is finding such a base brand in comparison to which the premium applied by the brand is measured. On the other hand, from the point of view of consumer-mind set measurement, it seems theoretically better-grounded to regard price premium as a consequence rather than an antecedent or component of brand equity. A brand provides value for the consumer by decreasing search costs, and in exchange, the consumer pays a premium.

As opposed to this, the perceived price must be regarded as the antecedent of brand equity, since the price-related perceived knowledge may significantly influence brand image or brand equity dimensions.

Consumer-based brand equity measures primarily focus on the value provided by a brand for customers. They measure brand associations created in the consumers' mind, their strength and uniqueness; therefore the approach of consumer-based brand equity measures is most related to value-based pricing.

Value-based pricing has the value provided for customers as a starting point. In Bauer-Berács's (2006) definition, "in value-based pricing, the targeted price is formed primarily from the estimated value provided by the product/service to the customer rather than from the costs".

Value-based pricing does not mean bringing low-quality products to market. The core of value-based pricing is to create such added value that is sold at the price the consumers are willing to pay. This accounts for the fact that certain products have enjoyed significant market success lately, due to the fact that consumers recognized developments added to products as positively added value. Gillette sold its Mach III brand at a price 50% higher than the earlier models and reached a significant market share at the same time.

2.4.3 Promotion

The effect of promotional tools on brand equity is a debated field. Many argue that the widespread use of promotional tools may damage a brand (Keller 1998, Jedidi et al. 1999, Blattberg et al. 1995, Niejs et al. 2001, Fransens et al. 2001, Pauwels et al. 2002). Most attacks in this sense were directed towards price-related promotional tools, especially price cuts or promotion⁷.

According to the results of other authors, promotional tools are able to assure utility for the brand, in form of long-term sales increase (Slottegraaf and Pauwels 2008) or the formation of positive associations (Palazon-Vidal and Delgado-Ballester 2005).

The disadvantages of promotion might be multilayered. As a result of promotion, consumers switch brands more easily and frequently, perceived quality decreases, the promotional tools absorb significant sources from advertisements, and new purchasers might remember their decision as one determined exclusively by the price cut, therefore they will not repeat purchase (Keller 2003, p. 310).

Due to price cuts or price-related promotional tools, the importance of price as a *consumer buying decision* factor increases (Keller 2003). Frequent price cuts may decrease consumers' reservation price, then consequently the profit margin (Blattberg et al. 1995) as well; in the long term, consumers' price sensitivity increases and their sensitivity to discounting decreases (Jedidi et al. (1996) at the same time. Due to the effects of frequent price cuts it gets more and more difficult to increase prices, and at the same time, increasingly greater discounts have to be applied if we want to achieve our promotional goals. Sriram et al. (2007) found that price cuts have a negative effect on brand equity, but this effect was not statistically significant.

On highly concentrated markets there is a great probability for the promotional tools to be highly known, which increases the risk that the promotional tool will decrease brand preference (DeIVecchio et al. 2006).

⁷ "Promotion" means 'to urge' in fact, but it is identified with price cuts even in the English specialist literature.

However, well-planned promotional tools are able to increase brand equity by providing information or usage experience that link positive associations to a brand.

The researches presenting the negative effects of promotion almost exclusively examined market-leading brands (Niejs et al. 2001, Fransens et al. 2001, Pauwels et al. 2002, Slottegraaf and Pauwels (2008). When examining all the brands on the market, they found that promotional tools (price cut, use of display elements) have a significant long-term effect. In the case of numerous actors, brands examined within certain categories, the long-term effect on sales was perceived not only in the case of 5%, but in the case of 14%. The difference is explained by the fact that the most powerful long-term effect of promotion shows itself in the case of small brands. For instance, in the case of 28% of brands with 1,25%-3% market share, the long-term effect was demonstrable besides the positive short-term effect. By long-term effect we mean that brand sales get stabilized at a higher level in comparison to the baseline sales.

According to the results of Palazon-Vidal and Delgado-Ballester (2005), non-price promotions could more successfully link positive associations to a brand name than price promotions. Palazon and Delgado (2005) examined the effects of promotional tools from the point of view of consumer-based brand equity. More precisely, they measured the effect of promotional tools on the number of associations and their beneficial and unique nature. According to their results, promotional tools are able to link numerous beneficial associations to a brand, although non-price promotions are definitely more efficient from this point of view.

Due to the widespread application of promotional tools and to the programs popularizing them, brand awareness also increases (Chattopadhyay et al. 2010). The more frequently brands apply promotional tools, the more positive their effect on brand awareness is.

The short or long-term effect of price reduction can also depend on the way the management reacts to the performance of their own as well as the concurrent brands. Horváth et al. (2005) demonstrated with the help of a VAR model (Vector Autoregressive Model) that the effect of price reduction is significantly influenced by competitive

reactions in certain product category (tuna fish), while they have no significant effect in the case of others (shampoo).

DelVecchio et al. (2006), in their meta-analysis of the promotion literature, gave a subtle picture of the effects of promotional tools on brands. One important and to some extent expected conclusion is that in some cases promotional tools might cause damage to brand preference while they are able to have a positive effect too. For instance, an unannounced, unexpected price reduction can have a negative effect. On the other hand, certain promotional tools, such as coupons, due to the fact that they urge to interact, leave consumers with the impression that they like the brand if they have been able to make several steps for it.

2.4.4 Advertising

Advertising plays an extremely important and controversial role in creating brand equity (Keller 2003). It is important because it is the most widely applied tool to create awareness and link strong, unique associations to brands. It is controversial because the efficiency of advertising activities can sometimes be measured with great difficulty.

It is widely accepted that advertising can increase brand equity (Aaker and Biel 1993, Cobb-Walgreen et al. 1995, Mela et al. 1997, Smith et al. 2007). Advertising costs measured in SOV (Share of Voice) has positive relationship with brand-related revenue premium (Ailawadi et al. 2003).

The increasing intensity of advertising increases the probability of the brand to get into the circle of products considered (Hauser and Wenerfelt 1990), and with properly planned advertising, associations can be created that are easy to recall in consumer memory (Farquhar 1989), but trying out the product, compared to advertisements, can more efficiently create associations easy to reach.

One of the definitely positive effects of advertising activity is traceable in brand awareness increase. Advertising significantly contributes to awareness increase and

creation of positive associations (Cobb-Walgrin et al. 1995, Farquhar 1989, Yoo et al. 2000, Clark et al. 2007).

Based on perceived advertising costs, consumers tend to form an opinion about brand quality. High perceived advertising costs suggest high quality to them (Kirmani and Wright 1989). In his research, Kirmani (1990) examines the relationship between perceived costs and high quality image in more details. She did not only manage to prove that there is a positive relationship between perceived advertising expenditure and high perceived quality but also showed that advertising expenditure, at a higher level, will negatively influence brand associations such as comfort and quality (Kirmani 1990).

If entrepreneurs spend much on advertising, if consumers are often exposed to advertising messages as a consequence, the company might suggest that its products are of a higher quality than those of the concurrence. Frequent advertising may suggest to consumers that the company disposes of sufficient capital and financial stability to produce the adequate quality product (Ippolito 1990, Rao et al. 1999, Wernerfelt 1988). Furthermore, frequent advertising may create the impression that a brand is continuously in the centre of attention, therefore it cannot afford to make a production mistake.

Advertising activity contributes to brand differentiation. With the advancement of technology, product offers have got closer to each other, whereas with the help of the advertising activity we can link associations to brands with which we can differentiate them, independent from the actual function of the product (Petty et al. 1983, Chioveanu 2008).

The role of advertising in competition may be evaluated from several points of view. With the help of the advertising activity, the competitors' consumers might be enticed away due to the fact that advertising can impede repeat purchase, thus breaking brand loyalty. Advertising can overwrite brand loyalty due to the fact that it decreases switching cost (Shum 2004).

The effects of advertising on consumers, according to Mehta et al. (2008), fall into informative, transformative and persuasive groups. Owing to the informative effect,

advertising provides consumers with product quality information (Lavidge and Steiner 1961, Nelson 1974).

The transformative effect presupposes that the consumer has already tried out the product (Mehta et al. 2008), and the effect of the advertisement gets activated afterwards in a way that it forms consumer opinion about this product. With the transformative effect we cannot convince newer consumers to try out the product, but we can develop a stronger attachment to the brand, especially if it is difficult to form a definite opinion about quality based on usage experience. For example, with the transformative effect we can prevent exposure to high risk during the attacks coming from competitors (Mehta et al. 2008).

A popular model of the persuasive effect of advertisements, the ELM (Elaboration Likelihood Model) was introduced into advertising research by Petty and Cacciopo (1983). According to the assumptions of the model, advertisements persuade in two ways: in a central one linked to the actual benefits of a brand or in a peripheral way (e.g. humor, celebrity endorsement), independent from brand functions. The two ways do not exclude each other, and the likelihood of one way dominating over the other will depend on the consumer's motivation and ability (Petty et al. 1983). A virtue of the ELM is that it is devoid of the problem originating from the assumption of the hierarchical effect models according to which effective advertising presupposes complex cognitive changes in the consumer's mind (Scholten 1996).

Persuasive advertising, in one interpretation, is advertising which does not primarily intend to fulfill an informational role, but links associations to a brand which create a primarily emotional relationship between consumers and the brand (Chioveanu 2008).

Besides the above mentioned effects we also have to mention advertising as a quality signaling approach. For example, Fluett and Garella (2002) proved that advertising is a significant quality signal on markets characterized by price competition and where quality differences are less significant.

3 Preparation of empirical research

The main goal of the empirical research is the creation and testing of a consumer-based brand equity model measured with causal indicators.

From a technical point of view, the goal of the present paper is the estimation of consumer-based brand equity in a Type II second-order MIMIC model, with the help of a covariance-based estimator (ML).

The next chapters will discuss the methodological questions of the structural equation modeling in general (Baumgartner and Homburg 1996, Steenkamp and Baumgartner 2000, Babin et al. 2008, McDonald and Ho 2002, Hayduk et al. 2007), then present causal modeling that counts as a novelty in the marketing literature as opposed to the traditionally widespread reflective modeling, and give a detailed presentation of the methodological requirements of causal structural modeling (Bollen and Ting 2000, Temme and Hildebrandt 2006, Wilson et al. 2007, Coltman et al. 2008, Diamantopoulos et al. 2008).

Before introducing the paper's model, we will give a detailed presentation of the theoretical considerations standing at the basis of the causal specification of consumer-based brand equity (Bollen 1991, Coltman et al. 2008 Borsboom et al. 2003 Farquhar 1989, Aaker 1991, Achenbaum 1993), and, together with the presentation of the causal consumer-based brand equity model, we will present its dimensions as well as the theoretical considerations.

3.1 The causal model of consumer-based brand equity

The central concept of this paper and our empirical research is consumer-based brand equity that became widespread as CBBE in the literature. In our empirical research, we intend to achieve the measurement of consumer-based brand equity, thus the research connects to the consumer-based brand equity literature.

The necessity of developing a new model is supported by the fact that no existing model has gained wide acceptance so far.

The consumer-based brand equity models developed by Keller (1993) and Aaker (1991) have no empirical applications. Yoo and Donthu's (1997) model was not repeatable (Washburn and Plank 2002), further on, they could not measure brand awareness and brand associations in separate dimensions. Vázquez et al.'s (2002) model, on the one hand, was not repeatable (Kocak et al. 2007), and, on the other hand, it is product category-specific as it was developed for measuring trainers' brand equity.

In the case of the models of the information economics approach (Erdem and Swait 1998, Erdem et al. 2006) the research could be repeated and cultural validity was also proved. However, Erdem and Swait's (1998) model does not operationalize the concept of brand equity.

Other brand equity models can only be applied to certain fields, such as business-to-business markets (Chau and Ho 2008), financial services (Chernatony et al. 2004), or online services (Christodoulides et al. 2006, Jensen and Klastrup 2008).

Among agency-based models there are several ones (BAV, BrandZ, EquityEngine) that fulfill the requirements of brand equity measures: they are repeatable, can be widely used and they are industry-independent, and scientific literature often lean on them as well (Lehmann 2008, Aaker and Jacobson 1994). However, we hardly know anything about the scientific fastidiousness or the details of the measurement methodology.

3.1.1 Methodology at the basis of designing and estimating the starting models

As the consumer-based brand equity model of this paper, besides the conceptual innovation, lays great stress on methodological development as well, prior to the presentation of the conceptual model we consider it necessary to present the basic concepts determining the causal operationalization of consumer-based brand equity.

3.1.1.1 Structural Equation Modeling (SEM)

Modeling built on structural equations has increased in popularity in marketing researches (Yoo et al. 2000, Berács et al. 2003, Sajtos 2004, Vázquez et al. 2002 Erdem et al. 2006, Netemeyer et al. 2003).

Nowadays there is no significant marketing magazine issue without researches built on SEM (Baumgartner and Homburg 1996, Steenkamp and Baumgartner 2000, Babin et al. 2008). Despite its growing popularity, it has not become as widespread in marketing as in other sciences. According to the analysis carried out by Steenkamp and Baumgartner (2000), three significant specialist books dealing with marketing models hardly mention SEM, Leeflang and Wittink's (2000) comprehensive analysis of marketing models does not even mention it. Steenkamp and Baumgartner (2000) give the explanation that SEM is primarily a method suitable for testing theoretical models rather than a decision support one. Hayduk et al. (2007) argue further that the researcher building a structural equation must have testing theoretical models as his main purpose rather than finding the goodness of fit.

SEM makes possible the application of numerous analysis techniques together, which are built on the general linear model (GLM) (Ullman 2006). Continuous and discrete independent variables as well as continuous and discrete dependent ones can be built in this model; at the same time, the observed as well as latent variables can also be included; and their cause-effect relationships can also be analyzed within the same model. The most important result reached in developing a structural equation model was

the integration of the confirmative factor analysis and the simultaneous equation model (Bentler 1983 in Lee 2007).

SEM is an outstanding tool in the cases when building the model takes place within a precisely defined theoretical framework and when the model is of medium complexity (Baumgartner and Homburg 1996). SEM is a less suitable tool for analysis in the first, opening stage of model building, that is, it shows its real force when the researcher has properly clear ideas or theoretical presuppositions regarding the relationships between the variables included in the analysis. Baumgartner and Homburg (1996) lay great stress on the prior analysis of data, identification of outstanding values, carrying out normality tests etc. All these have great importance because SEM is only able to analyze extremely complex models due to the fact that it has some strongly simplifying presuppositions (Martin 1987).

Measurement model – Path model

The model has two important parts, the measurement model and the structural model (Tomarken and Waller 2003). Since the structural model in the literature also means the combined unity of the measurement and the structural models, following McDonald and Ho's (2002) suggestion, I will apply the path model expression to denote the second component of the model.

In strict terms, the measurement model is a confirmatory factor analysis model (Garson 2011), in which the relationship between the latent variables and indicators (observed variables) are modeled and the goodness of fit is analyzed. In fact, we do not make a further step in building a model until the validity of our measurement model is fulfilled.

In devising the path model we examine the relationships between the latent variables created in the measurement model, the way the latent variables directly or indirectly modify the values of the other latent variables.

The measurement model evaluates convergent and discriminant validity, while the structural model assures the evaluation of the theoretical validity (Schumacker and Lomax 2010).

In structural equation modeling we also have the possibility to analyze the goodness of fit of the two components, the measurement model and the path model separately. 14 out of the 41 publications built on SEM analyzed by McDonald and Ho (2002) reported separate valuations of the two components (e.g. chi-square and degrees of freedom), but in all the cases the results of the fit indicators estimating the complex model, the structural equation model was accepted.

One of McDonald and Ho's (2002) most important methodological conclusions is that the goodness of fit of the structural equation model is not acceptable if the goodness of fit of the two component models is not fulfilled. More precisely, according to the two-step method suggested by them, a model can be regarded as acceptable if the measurement model is fitted first, the path model is fitted next. Similarly, Kline (1998) stressed the importance of the two-step modeling, while Mulaik and Millsap (2000) advised the application of the four-step modeling (in Garson 2011).

The four steps prescribed by Mulaik and Millsap (2000) are as follows:

- Traditional exploratory factor analysis in order to determine the number of factors.
- Confirmatory factor analysis in order to set up the measurement model.
- Testing the structural model.
- Testing alternative nested models in order to identify the best fitting model.

Schumacker and Lomax (2010) qualified Mulaik and Millsap's (2000) approach as a practice to follow. A modified variation of it can be regarded the practice whose first step would involve an exploratory factor analysis (EFA) of a given data base in order to properly identify the factors, then the result would be tested on another data base with the help of a confirmatory factor analysis. The process of structural equation modeling was also described as the sequential application of the EFA and CFA by Ullman (2006).

3.1.1.2 Causal vs. Reflective models

The present paper uses the terminology proposed by Bollen (2011). According to this, measurement models fall into three categories:

- Reflective models. Their indicators are determined by the latent variable. In their graphic illustration, the arrows are directed from the latent variable towards the indicators.
- Causal models. The latent variable is determined by the indicators. In their graphic illustration, the arrows are directed from the indicators towards the latent variable.
- Composite (Formative) measurement models. The composite variable is determined by the indicators. In their graphic illustration, the arrows are directed from the indicators towards the composite variable.

There are substantive differences between the causal and formative measurement models (Bollen and Lennox 1991, Jarvis et al. 2003, Bollen 2011). In causal measurement, we can estimate a latent variable, while this is impossible in the composite measurement models where we can estimate composite (formative) notions. From a mathematical point of view, the substantive difference lies in the disturbance term estimated at the level of the latent indicator, which is not present in the composite models. As a consequence, in the latter model the researcher has to assure the inclusion of all indicators explaining the notion in the analysis since he estimates the given composite notion without any error term.

To the proposal of Bollen (2011) we will try to avoid the use of the formative¹ notion because it has often been used in the literature to denote (causal) measurement models with real latent variable and (composite) measurement models as well.

To estimate causal models with latent variable, estimators (ML by default) assured by covariance-based softwares (Amos, EQS, Lisrel) are suitable, while a popular way to estimate the composite measurement models is PLS (Smart PLS).

The problem of the causal and reflective measurement models

We are able to operationalize theoretical concepts in causal as well as reflective forms (Jarvis et al. 2003, Temme and Hildebrandt 2006), but almost exclusively the reflective measurement models were prevalent in the literature for a long time. The fact that the covariance-based measurements and the reflective operationalization of latent variables have become widespread is explained with the effect of Churchill's (1979) methodological article (Temme and Hildebrandt 2006, Coltman et al. 2008, Diamantopoulos et al. 2008).

While reflective models dominate the scientific literature of psychology and management, the causal and composite approach plays a greater role in economic sciences and sociology (Borsboom et al. 2003, Coltman et al. 2008).

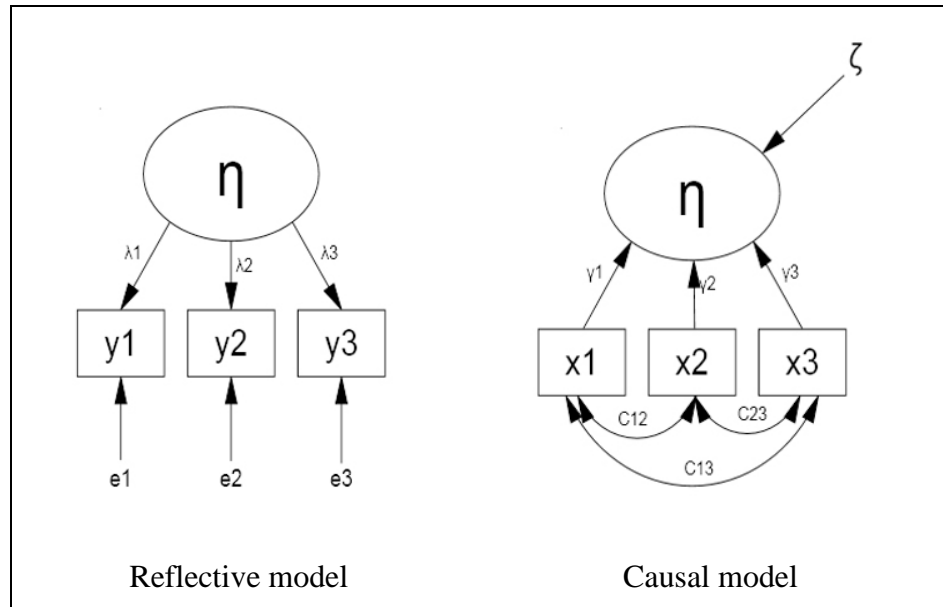
Typical examples of reflective measurement models are attitude or willingness to purchase (Jarvis et al. 2003). Both attitude and willingness to purchase are rightfully presupposed to signal unobservable states that influence measurable phenomena. Typical example of composite measurement models might be 'quality of life' (Bollen and Ting 2000). Quality of life could be measured by factors such as health, happiness, economic situation, but the presupposition that they would be the effects of the quality of life is not theoretically grounded (Bollen and Ting 2000).

In the case of the reflective measurement models we assume that the causal processes are directed from the latent variable to the indicators. That is, we assume that the change in the latent variable will also cause a change in the indicators (Bollen and Lennox 1991, Jarvis et al. 2003, Coltman et al. 2008). In graphical illustration, the arrows are directed from the ellipse staying for the latent variable towards the squares staying for the indicators (measured variables).

In the causal measurement models the direction of the causal process is the exact opposite to that of the reflective one. In this case we assume that the change in the

indicators leads to change in the latent variable (Edwards and Bagozzi 2000, Diamantopoulos and Winklhofer 2001, Jarvis et al. 2003, Wilson et al. 2007, Diamantopoulos et al. 2008, Collier and Bienstock 2009). In graphical illustration, the arrows are directed from the indicators to the ellipse standing for the latent variable. We argue that the causal latent variable is created by the common variance of the indicators.

Figure 2: Schematic illustration of reflective and causal measurement models



Source: Bollen and Lennox (1991)

According to the above model, the equation of the reflective measurement model can be written as follows:

$$y_i = \lambda_i \eta + \varepsilon_i$$

Where y_i is the i th indicator of the reflective η latent variable, ε_i is the measurement error belonging to the i th indicator, and λ_i parameter is the effect of η latent variable on y_i . We assume that measurement errors are independent from each other (that is, $\text{cov}(\varepsilon_i, \varepsilon_j) = 0$, and $i \neq j$), and they are independent from the latent variable (that is, $\text{cov}(\eta, \varepsilon_i) = 0$). Further on, in reflective models there must be a positive intercorrelation between indicators. This assumption was proved by Bollen (1984), starting from the conclusions of Curtis and Jackson's (1962) article.

The causal model can be illustrated with the following equation:

$$\eta = \sum_{i=1}^n \gamma_i x_i + \zeta$$

where x_i is the i th causal indicator, γ_i parameter measures the effect of the i th indicator on η latent variable, while, ζ is the disturbance effect belonging to the latent variable. There is no correlation between the disturbance effect and indicators (that is, $\text{cov}(x_i, \zeta) = 0$). The meaning of the disturbance effect has been explained in several ways. According to Jarvis et al. (2003), the disturbance effect is the joint error of the measured variables, while according to MacKenzie et al. (2005) it may come from three sources: the measurement error of indicators, interaction between indicators and it can also be a part of the construct not explained by indicators.

Diamantopoulos (2006) proved that the disturbance effect cannot be explained with the measurement error, since the causal indicators per definition take part in the estimation without errors. Interaction between indicators as an explanation could be accepted from a statistical point of view, but it raises a serious interpretation problem as the causal latent variable is created exactly as a result of the interaction effect. The solely acceptable explanation is that disturbance consists of the variance unexplained by the latent variable.

While in the case of reflective models positive correlation between the indicators is a requirement (Bollen 1984, Diamantopoulos et al. 2008), in the case of composite indicators we can accept no correlation or negative correlation between them (Nunnally and Bernstein 1994, Collier and Bienstock 2009). We make it possible for causal indicators to correlate freely in the model, but they are also expected to share some content since they influence a latent variable together, consequently we expect the correlation between indicators to be positive (Bollen 2011).

The earliest theoretical substantiation of formative measurement models can be linked to the work of Curtis and Jackson (1962) and Blalock (1964). Curtis and Jackson's

(1962) theorem, interpreted in the case of causal models, reveals an essential characteristic of these models (Bollen 1984). In causal measurement models, indicators do not have to positively correlate, therefore we cannot apply inner consistency test in their case (Bollen 1984). If we drop certain indicators from the model based on inner consistency check in the case of composite indicators, there is a risk of leaving out an important indicator determining the meaning of the concept (Bollen 1984, MacKenzie et al. 2005).

It follows from the foregoing that causal indicators are causes that cannot replace each other, all of them measuring a specific area of the concept. If we leave any of the indicators, we change the meaning of the concept as well (Jarvis et al. 2003, Diamantopoulos et al. 2008, Collier and Bienstock 2009). As opposed to this, if we leave any of the indicators out of the reflective model, we do not risk modifying the meaning of the concept (Jarvis et al. 2003).

Because of the inapplicability of the inner consistency test and the meaning-forming role of formative indicators, the theoretical substantiation of causal models plays an important role.

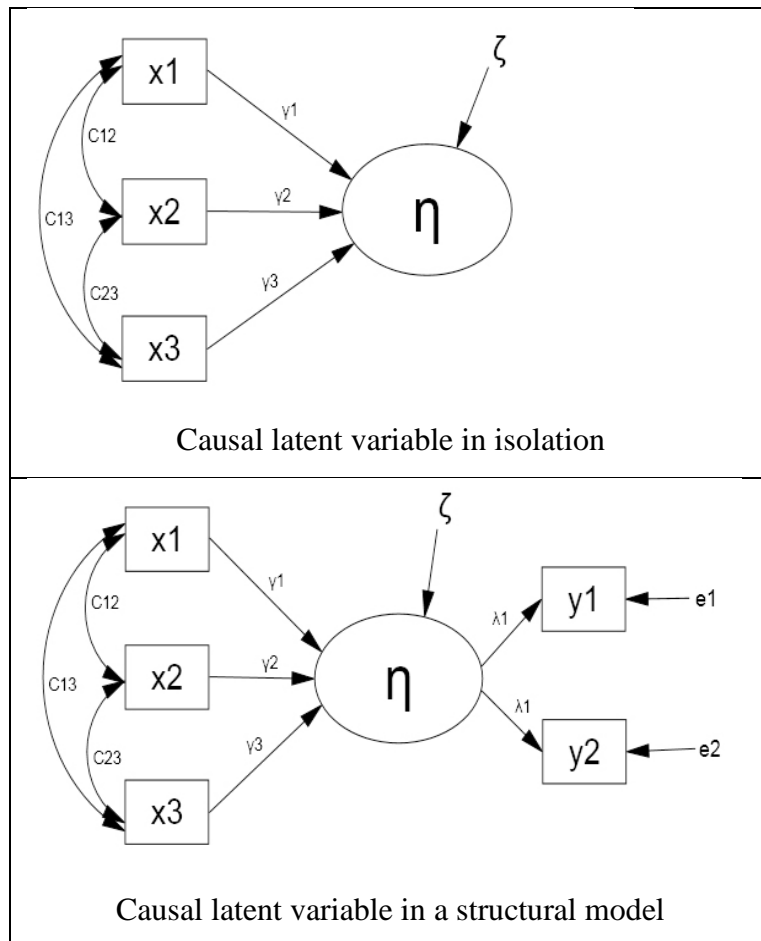
In the measurement of composite (formative) measurement models it is worth including several questions measuring the indicators of the composite (formative) construct in order to avoid the risk of leaving out essential concept-forming indicators, because we assumed that we can estimate them without disturbance and we will not find out if an error has been made.

By contrast, in causal models, the disturbance effect present at the level of the latent variable provides a more realistic opportunity for estimation, due to which we will know the extent to which our latent variable has to be explained. Further on, we do not have to assume the ability to give a full explanation of a social phenomenon whose opportunity is excluded anyway.

Reflective measurement models can be correctly estimated in isolation (Diamantopoulos et al. 2008), while causal measurement models cannot be used in

isolation; therefore they cannot be estimated (Jarvis et al. 2003, Bollen and Lennox 1991, MacKenzie et al. 2005). In order to estimate disturbance at the level of the latent variable, we have to include the causal measurement model in a larger model. More exactly, we need a complete structural model for correct estimation. A widely accepted solution to the problem is to estimate the causal latent variable together with its consequences within a structural model. More precisely, in order to estimate disturbance at the level of the latent concept, it is necessary that two arrows be directed from the causal latent concept to two reflective indicators or latent variables (Jöreskog and Goldberger 1975, MacCallum and Browne 1993, MacKenzie et al. 2005).

Figure 3: Causal latent variable in isolation and in a structural model



Source: Own design (based on Bollen and Lennox 1991, Diamantopoulos et al. 2008).

In the comparison above, the first figure illustrates the causal measurement model in isolation, which means that our model consists of one causal measurement model. In the second figure, a schematic MIMIC model can be seen, where the latent variable is not in isolation, since we built two reflective variables (y_1 , y_2) into the model, thus the error (ζ) belonging to the causal latent variable can be estimated. This problem does not emerge in the case of the reflective models since there the error terms are linked to the measured variables, not the latent one.

Distinguishing between causal, composite and reflective models is of high importance since if we incorrectly operationalize a concept, the estimated parameters and our conclusions referring to the causal relationship will also be incorrect.

The metaanalysis of incorrect operationalization carried out by Jarvis et al. (2003) covers four significant marketing magazines (Journal of Consumer Research, Journal of Marketing, Journal of Marketing Research, Marketing Science). According to their results, 71% out of the examined 1192 latent constructs were correctly modeled. The majority of the remaining 29% incorrectly operationalized latent constructs were formative⁸ concepts modeled as reflective ones by the authors.

⁸ Here the authors do not make clear if they are referring to causal or composite indicators.

Table 4: Comparison of reflective and causal models

	Reflective measurement model	Causal measurement model
Theoretical considerations		
1. Nature of the concept	The latent concept exists independent of its indicators.	The latent concept is caused by its indicators.
2. Direction of the causal relationship	Variation in the concept causes variation in the indicators	Variation in the indicators causes variation in the construct.
3. Characteristics of indicators	Indicators are the reflections, manifestations of indicators.	Indicators determine the concept.
Empirical considerations		
1. Reliability of indicators	There has to be a positive correlation between indicators. <i>Test:</i> Examining inner consistency with Cronbach α , explained variance and factor weights	Any kind of intercorrelation is accepted. <i>Test:</i> Explained variance (Hair et al. 2009). Examining inner consistency is not possible.
2. Validity of indicators	<i>Test:</i> Content validity based on theoretical consideration, convergent validity and discriminant validity empirically.	<i>Test:</i> Testing theoretical validity with MIMIC type model or with the help of building in structural relationships.
3. Measurement error, collinearity	Identification of the measurement error is possible in the measurement model. <i>Test:</i> Factor analysis.	Identifying the measurement model in isolation is not possible. Indicators are modeled without errors, disturbance exists at the level of the latent variable. <i>Test:</i> Applying rules testing identity (Bollen 1984), vanishing tetrad test (Hipp and Bollen 2005). Excluding collinearity with standard tests.

Based on Coltman et al. 2008.

The use of structural equation models in consumer-based brand equity research

In the consumer-based brand equity literature, the use of structural equation is quite widespread. There are numerous papers in which the structural equation model was used to test hypotheses or measure brand equity (Yoo and Donthu 2000, Vázquez et al. 2002, Netemeyer et al. 2003, Erdem and Swait 1998, Erdem et al. 2006, Martensen and Gronholdt 2004, Jensen and Klastrup 2008, Chau and Ho 2008, Boo et al. 2009, Atilgan et al. 2009, Kim and Hyun 2010).

Despite the widespread use of the structural equation and theoretical assumptions (Aaker 1991, Keller 1993), brand equity has rarely been defined as a reflective latent variable (Atilgan et al. 2009), and no authors have ever argued why they used reflective respectively formative or causal models in designing their consumer-based brand equity model.

Atilgan et al. (2009) used reflective measurement models, but they did not argue for specification.

Erdem and Swait (1998), Erdem et al. (2006) defined consumer-based brand equity in the brand's ability to signal authenticity, due to which the perceived risk and search costs decrease and expected utility increases. Martensen and Gronholdt (2004) build the brand-consumer relationship concept in the model and interpret it as brand equity.

Some authors do not operationalize brand equity but only its dimensions in the structural model (Vázquez et al. 2002, Boo et al. 2009, Netemeyer et al. 2003). In the Atilgan et al.'s (2009) model, consumer-based brand equity appears as a reflective measurement model, but they also estimate relationships at measurement level only (but they do provide cultural validation of their model).

On the other hand, Atilgan et al. (2009), as opposed to other authors, operationalized brand equity as a latent variable. Yoo and Donthu (2001), Kim and Hyun (2010) interpreted general brand equity as a dependent variable, Martensen and Gronholdt (2004) and Jensen and Klastrup (2008) also included the "brand – consumer relationship" in their models as an independent variable.

Unfortunately, Martensen and Gronholdt (2004) did not report the estimated parameters or the goodness of fit.

The significant majority of the authors of consumer-based brand equity models build their empirical models on Aaker's (1991) conceptual model or use it as a starting point (Yoo and Donthu 2000, Yoo and Donthu 2001, Netemeyer et al. 2003, Atilgan et al. 2009, Boo et al. 2009, Kim and Hyun 2010). Aaker (1991) defined brand equity as the totality of assets and liabilities added to the value of the product due to the brand name. That is, according to Aaker (1991) we can define brand equity as the totality of measurable elements, which indicates the causal nature of consumer-based brand equity.

3.1.2 The causal specification of consumer-based brand equity

One of the most important characteristics of this paper and its novelty interpreted in the brand equity literature is that it consciously analyzes the possibility of the causal measurement of consumer-based brand equity and justifies its theoretical and empirical importance.

We define the consumer-based brand equity model of the paper as a second-order latent concept caused by Awareness, Uniqueness, Advantage, Perceived quality, Activity, Trust.

Awareness, perceived quality and brand associations constituted important dimensions of Aaker's (1991) model and the models developed later are built on it (Yoo and Donthu 2001, Netemeyer et al. 2003, Atilgan et al. 2009, Boo et al. 2009, Kim and Hyun 2010).

A further novelty of the causal consumer-based brand equity model is that it does not measure the concept of brand associations with a single concept, since the assumption that perceived quality is not an association connected with the brand is not theoretically based.

The brand associations constituting the causal consumer-based brand equity model include Perceived quality, Uniqueness, Advantage, and Trust.

The activity dimension is the only behavioral component measuring the consumers' willingness to regard a brand as an organic part of their lives, to talk about it, to share information about the brand with their acquaintances.

Uniqueness and advantage measure a brand's ability to stand out among others. The difference between the two dimensions lies in the fact that in the case of uniqueness we measure only the extent to which consumers perceive a brand as different from the concurrent ones, independent from whether the meaning attributed to this difference is positive or negative; while advantage measures the extent to which the brand's ability to differentiate represents some usefulness to the consumer and if this distinction has a positive meaning to the consumer.

Uniqueness and advantage together have to measure the ability of a brand to differentiate. Differentiation has not been included in brand equity models despite its being a central element of brand definition (AMA, Bauer and Berács 2006) and among Aaker's (1996) suggestions referring to measuring brand equity dimensions.

The conceptual model of the paper was based on Aaker's (1991), Keller's (1993) conceptual models, the empirical models built on Aaker's (1991) model and the results of Lehman, Keller and Farley's (2008) article.

Four components of the Aaker (1991) model, Perceived quality, Loyalty, Awareness and Associations were included in empirical research (Yoo and Donthu 1997, 2000, Washburn and Planck 2002, Chau and Ho 2008, Atilgan et al. 2009, Kim and Hyun 2010). As opposed to this practice, in the development of the present model we interpreted Loyalty, similarly to Erdem and Swait (1998), as the consequence rather than the antecedent of brand equity. To measure Loyalty, following Aaker's (1996) instructions, we used questions that refer to purchase practice, but thus it is neither theoretically nor technically acceptable that the Loyalty dimension explain a consequence of Brand equity such as Willingness to purchase.

We interpreted the three Aakerian dimensions as follows. We regard Awareness as a concept that concretely refers to the existence of the association node in the consumer's mind, while we qualify every other brand-related concept measured as an

association. Therefore, in our conceptual model, Brand equity dimensions are Awareness and the brand name-related associations Uniqueness, Advantage, Perceived quality, Activity and Trust.

As compared to the Aaker (1991) model and other models built on it (Yoo and Donthu 2000), the inclusion of the Trust dimension in the model is a novelty. We consider that under conditions when the number of accessible brands is growing spectacularly and increasingly more low-quality products appear on the market, trust in a brand becomes one of the most important factors of consumer-based brand equity.

Uniqueness and Advantage together have to be suitable for measuring brand differentiation. According to Aaker's (1996) instructions, the content of the Associations dimension is best summarized by differentiation. The importance of differentiation is signaled by the fact that Aaker (1996) describes the Associations dimension as Associations / Differentiation.

We define consumer-based brand equity as a second-order latent variable. As a consequence, we assume that consumer-based brand equity is a concept caused by various factors. We assume that the dimensions of consumer-based brand equity have to be estimated in a reflective measurement model.

From a technical point of view, this means that is appropriate to estimate consumer-based brand equity in a Type II (Diamantopoulos et al. 2008) second-order MIMIC model.

Modeling causal consumer-based brand equity is also supported by highly popular definitions in the consumer-based brand equity literature (Farquhar 1989, Aaker 1991, Achenbaum 1993).

From the three references mentioned we will highlight the substantive formulations essential from the viewpoint of the causal specification of consumer-based brand equity:

- Brand adds value to the product (Farquhar 1989, Achenbaum 1993).
- Consumer-based brand equity is the concept measuring the brand's ability to add value to a product.
- The totality of intangible brand assets (Aaker 1991).

In the light of the above mentioned, the definition of the causal consumer-based brand equity is the following:

Causal consumer-based brand equity is the value added to a product by a brand, which comes into being due to the effect of the associations linked to the brand.

When searching for the answer to whether to measure consumer-based brand equity with causal or reflective indicators, we do not want to answer the question what consumer-based brand equity is like. Consumer-based brand equity cannot be qualified as either reflective or causal in itself.

If we build a model in which consumer-based brand equity indicators are reflective first-order latent variables, we assume that consumer-based brand equity causes the advantages of the brand, its awareness or the trust in the brand.

However, it is not an assumption that can be logically defended, since the specialist literature refers to consumer-based brand equity as a decision support tool that sets up a useful diagnosis to managers about consumers' ideas related to a brand. If we assume that brand associations are caused by consumer-based brand equity, we also assume that the concept of consumer-based brand equity already exists in the consumers' mind, and brand associations such as uniqueness and trust come into being as its reflections.

Trust in a brand can be the result of the impact of well-built communication campaigns, word of mouth, experience, etc. In this sense, measuring trust with causal indicators may be well-based, as trust is the effect of experience, convincing accounts of acquaintances, etc.

There is one factor, though, which "compromises" the causal measurement of consumer-based brand equity dimensions. In consumer data collection we measure latent concepts in a way that we ask the interviewees about brand associations already created in their minds. This way we cannot grab the moment of their formation. When interviewees answer questions related to advantages or perceived quality, the images already formed in their minds about the advantages provided by the brand or its perceived

quality will manifest. As a consequence, measuring consumer-based brand equity dimensions with reflective indicators is a more appropriate method.

An average person might have specific ideas about the advantages and quality of the brand well-known (and used) by him, but the concept of consumer-based brand equity appeared as a scientific term in the literature. Consumers do not have an already created image of consumer-based brand equity in this sense.

While we consider it a realistic assumption that an advantage provided by a brand or brand quality are meaningful to consumers, we cannot assume that consumer-based brand equity is an already existing concept in consumers' mind. Thus we cannot assume that it has reflections either.

Consumer-based brand equity can be best defined as a concept in which the impact of brand associations gets focused.

Through the result of the reflective measurement we can only find out the extent to which brand-related concepts share common variance. As in the brand-related measurements we have to reckon with the presence of the halo effect as well, it may also happen that we can apply almost any valid and reliable brand-related concepts on a reflective model as they will share common variance due to the halo effect and the common method variance.

However, it is more useful for us to know the nature of the structure in which brand-related concepts have an impact on some hypothetical latent concept (hereby called Brand equity); what are the latent concepts out of the brand-related associations which have a common impact on something.

Other empirical models at the basis of causal specification

In their article, Yoo and Donthu (2000) did not research consumer-based brand equity specifically but they examined the effect of marketing activities on brand equity dimensions; part of their model, though, models the relationship between consumer-based brand equity dimensions (Perceived quality, Loyalty and Associations) and overall

brand equity (OBE). In their model, the causal directions between the dimensions and brand equity are definitely the same as we assumed. However, Yoo and Donthu (2001) included brand equity as a dependent rather than latent variable in their model, that is, they measured the causal structural relationships between dimensions measured by reflective indicators and an overall brand equity measured by reflective indicators as well.

Chau and Ho (2008) also modeled a causal relationship between the dimensions and brand equity, but they also included it as a dependent variable in their model.

Martensen and Gronholdt's (2004) conceptual model consciously defined consumer-based brand equity in causal specification, but we have no knowledge of the estimated coefficients; and because they used PLS we do not know anything about the disturbance of their estimation. Jensen and Klastrup's (2008) explicit purpose was also the building of a causal brand equity model, but they also estimated it in PLS without disturbance, therefore their model contains composite constructs rather than latent ones.

In the Netemeyer et al. (2004) model, the causal direct effects directed from the brand equity dimensions also support the causal specification.

Methodological considerations at the basis of the structural model

Managerial perspective

By measuring brand equity we have to provide management with a useful diagnostic tool as well. The management has to be able to read from the model the dimensions that play the greatest role in brand equity formation, the ones that require development and problem solution. The model has to include dimensions that can be influenced by marketing activities. In other words, while operationalizing brand equity, the managerial perspective has to be considered as well.

The abstraction level of associations

One of the expectations towards the ideal brand equity measure is its widespread applicability (MSI 1999). If brand equity functions as a measure independent from industry and product model, we are also able to compare the efficiency of marketing activities aiming at brand building.

It follows from the foregoing that we have to include in the construction building brand equity associations that do not directly relate to the product, do not depend on one of its characteristic or achievement.

The brand equity measure applied in this paper primarily endeavors to measure brand associations of high abstraction level.

Shall measurement refer to corporate brand, product brand or a specific product model?

On the basis of Nádasi's (2005) results we can affirm that associations measured at different levels may differ, that is, consumers do not associate the same things to the company name as to a specific model.

In measuring consumer-based brand equity we measure the brand equity of the umbrella brand, of the corporate brand (Srinivasan et al. 2005, Yoo and Donthu 2001, Vázquez et al. 2002). If we referred the measurement to a specific product, its factual product characteristics would come into the foreground and we would collect data referring to the experiences of consumers who have had some relation with the product model.

The purpose of this paper is the development of a brand equity measure that can measure brand equity at a high abstraction level, independent from whether the interviewees have used the product or not (Dodds et al. 1991).

Basis of comparison

Brand equity measures most often define brand equity in comparison to an unbranded product. The basis of comparison can be a fictive product, a commercial brand (obvious for measures relying on retail audit data), or the brand with the smallest market share. One of the measurement problems is caused by the definition of this basis of comparison since the fictive product has to be invented then presented to the interviewees, and the answers referring to it might easily distort the results. Commercial brands do not exist in every product category or they are not well-known enough for consumers to answer questions related to their qualities; the brand with the smallest market share does not necessarily have low brand equity.

Srinivasan et al. (2005) used objective measurement rather than a brand as a basis of comparison, similarly to Jourdan (2002). Others, like Ailawadi et al. (2003) used commercial brand as a basis of comparison, while Ferjani et al. (2009) included a fictive new product in the measurements. The use of fictive brands as a basis of comparison is extremely problematic in answering the questions; consumers bluff in fact, thus their answers lack interpretable information content.

From the point of view of the initial model of the paper, we regard the basis of comparison as a problematic presupposition; we consider it impossible to define a base brand valid in every field and use it as a reference point in the long term. In comparison to the use of a base brand, the method applied by Jourdan (2002) is an essentially better solution, but this one cannot be used in every industry either. For example, it may be a relevant solution on the personal computer market since here the respondents might be able to give valid answers based on the mere mention of product parameters and their description. However, in the case when design significantly determines brand equity (e.g. laptop), applying the solution would already cause problems as many would recognize the brand by its shape, thus they would not be able to draw comparisons. Further on, if we follow the practice developed in the field of measuring consumer-based brand equity according to which we regard brand name-related associations as the antecedents of brand equity, these cannot be measured in a conjoint choice model.

The result of brand equity measurement

In the case of numerous brand equity measures stress is laid on developing brand equity dimensions. However, there is no unambiguous answer to the question of how brand equity can be given with the help of a specific value. Many included brand equity as a dependent variable in their models (Yoo et al. 2000, Kim and Hyun 2010, Martensen and Gronholdt 2004, Jensen and Klastrup 2008), despite their approach of brand equity as a multidimensional concept.

In our model brand equity is present as an independent causal latent variable, which can be saved to the datafile as a factor score.

Should we measure only at users' or at non-users' level as well?

In Raggio and Leone's (2006) interpretation, brand equity does not only exist at the user level, since non-users can also have positive associations linked to the brand.

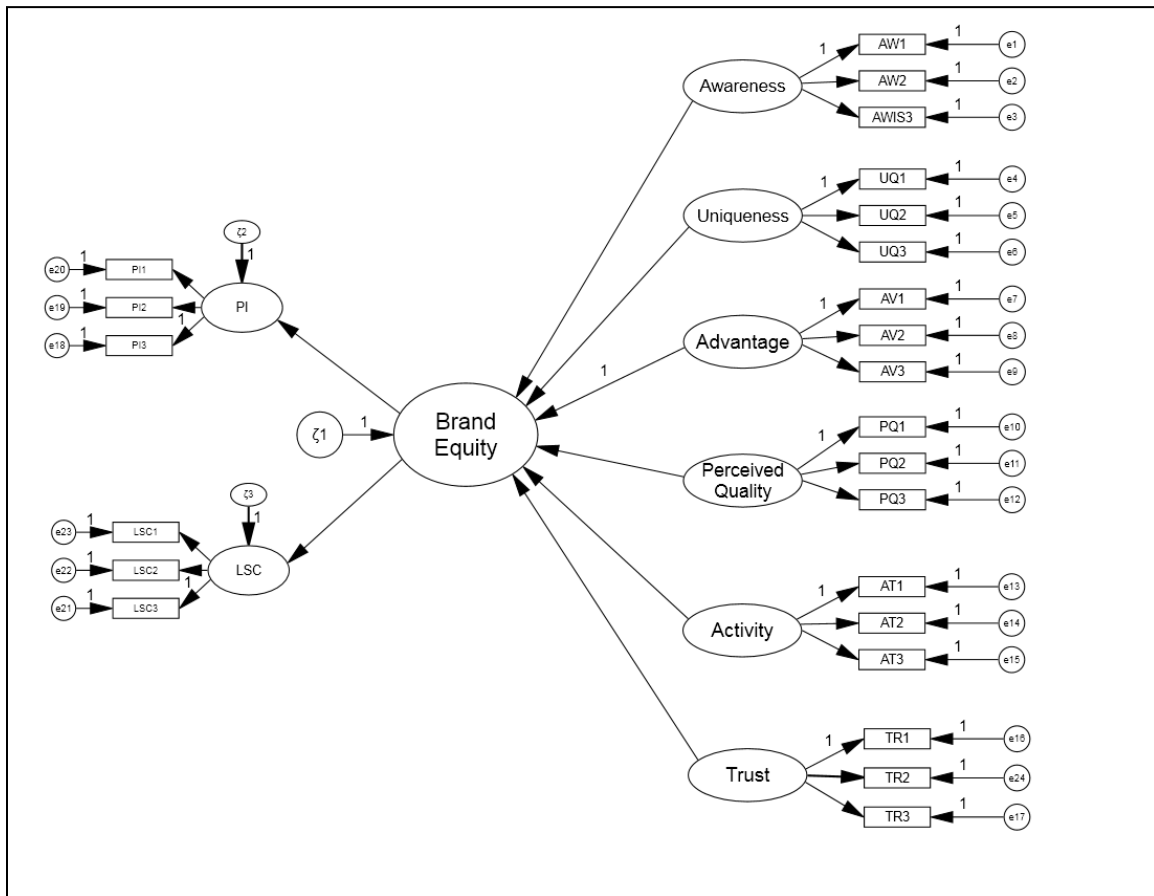
The present paper, accepting the above statement, does not consider it important to measure brand equity merely among users. However, if we do not only measure at consumer level, we can only include in our brand equity measure questions that can be answered by everyone in general.

3.1.3 The structural causal model of consumer-based brand equity - Hypotheses

The basic assumption of the present paper is that the estimation of consumer-based brand equity has to be made in a causal model.

Contrary to the practice until now, we build and estimate the causal model in a covariance based framework, since with the MLE (Maximum Likelihood Estimation) we can make more accurate parameter estimations than with the PLS. Furthermore, disturbance cannot be included in the model in PLS, that is why it is not appropriate for estimating causal models.

Figure 4: The initial causal model of consumer-based brand equity



Source: Own design.

We will define consumer-based brand equity in a Type II causal measurement model as a quasi-exogenous latent variable (Temme and Hildebrandt 2006).

Illustrating brand equity within a structural equation gives us the opportunity to model consumer-based brand equity together with its sources and consequences. In other words, in modeling brand equity, we attribute great importance to its consequences as well. In the model above, first order latent variables are freely correlating, but the covariance arrows are not represented.

In devising and measuring the structural model of consumer-based brand equity we would like to achieve three important goals:

- To test a model meeting the strict and complex methodological requirements of structural equations
- To solve the identification problem of the causal measurement model that has not been dealt with by any consumer-based brand equity model.
- To test whether it is possible to give a valid definition to brand equity based on conceptual models popular in brand equity literature.

One of the most important basic assumptions of this paper is that consumer-based brand equity should be measured with causal indicators.

H1-1: *We are able to correctly estimate the structural equation model containing the latent causal consumer-based brand equity and its two latent reflective consequences.*

When we define consumer-based brand equity as a causal concept we assume that the dimensions included in the model determine brand equity together.

The model assumes that Awareness is an important dimension of brand equity. In the results of the empirical research of Srinivasan et al.'s (2005) model, awareness played the most significant role among the model components through its impact on brand choice, which was followed in order of importance by quality independent associations.

Awareness is also a component of the conceptual (Aaker 1991, Keller 1993), the empirical (Yoo and Donthu 2001, Atilgan et al. 2009, Boo et al. 2009, Kim and Hyun 2010) and the agency-based consumer-based brand equity models (BAV).

In the case of purchasing everyday products, consumers tend to rely on simple heuristics and make their brand choice decision based on awareness (Hoyer 1984). Well-known brands are more likely to be selected from the group of products in a consideration set (Hoyer and Brown 1990, Leong 1993), and the consumers who choose a brand based on awareness, consider fewer alternatives and more rarely choose the best quality brands (Hoyer és Brown 1990). The results of the classical articles of Hoyer (1984) and Hoyer and Brown (1990) were proved on other, greater samples (MacDonald and Sharp 2000, Huang and Sarigöllü 2011) and their cultural validity was also confirmed (Leong 1993).

In the case of homogenous products, more significant acquisition time and technological instability, the positive relationship between awareness and company achievement (Homburg et al. 2010) is demonstrable on business to business markets as well.

Top of mind awareness. When measuring awareness, we pay special attention to the top of mind awareness. This concept was related to the concept of "salience", Heeler et al. (1979) considering them equal. The awareness dimension is included in the model weighted with the "top of mind" mention.

H1-2: *Awareness positively and significantly influences brand equity.*

Awareness played an important role in conceptual models; however, the awareness dimension could not be included either (Atilgan et al. 2009) or it could not be used as an independent dimension (Yoo and Donthu 1997, 2001, Kim and Hyun 2010) in the consumer-based brand equity models until now.

The concepts of uniqueness and advantage are operationalized as the subdimensions of a more comprehensive differentiation. In spite of the theoretical importance attributed to it (AMA, Bauer and Berács 2006, Aaker 1996), apart from a few exceptions (Martensen and Gronholdt 2004, BAV), differentiation is not present in consumer-based brand equity models.

Uniqueness means that a brand is able to provide more in the case of a certain characteristic than a concurrent one in such a way that consumers' sensitivity and expectation towards other characteristics decrease, due to which a brand can reduce costs (Sharp and Dawes 2001). Companies find it attractive to achieve differentiation at the high abstraction level of brand-related associations. On the one hand, due to imitation innovating brands can only sustain the differentiation basis for a short time; on the other hand, the majority of brands avoid deviation from products present on a market (Sharp and Dawes 2001).

Uniqueness measures a brand's ability to stand out among others to some extent. At a more abstract level, the uniqueness dimension includes consumer ideas according to

which a brand differentiates itself due to some factors. Uniqueness measures merely distinctness, since we assume that there are consumers who, to enhance their consumer status, find it important to distinguish themselves from others by possessing a brand. This logic is partly supported by Carpenter et al.'s (1994) research result, according to which attributes irrelevant from the point of view of achievement can also constitute the basis of uniqueness.

H1-3: *Uniqueness positively and significantly influences brand equity.*

The advantage dimension measures the extent to which a brand can differentiate itself in such a way that it also adds a plus compared to the concurrent ones (Sharp and Dawes 2001).

H1-4: *Advantage positively and significantly influences brand equity.*

Perceived quality is the component of several consumer-based brand equity models (Yoo and Donthu 2001, Netemeyer et al. 2003, Atilgan et al. 2009, Boo et al. 2009, Kim and Hyun 2010), and, together with awareness, it constitutes the dimension of Aaker's (1991) classical brand equity model. Operationalizing the concept of perceived quality is simple; with it, we measure the extent to which consumers think a brand represents high quality.

H1-5: *Perceived quality positively and significantly influences brand equity.*

Social communities, through the spectacular spread of community networks (Facebook, Twitter, etc.), user-generated content (blog, forums) has a significant impact on judging brands and spreading brand-related information (Patterson 2011), and increases the instability of the market structure (Sengupta and Greetham 2010). In Peres et al.'s (2010) assessment, the re-definition of innovation diffusion was necessary to stress the central role of this important factor, the social relations, in the innovation diffusion model.

In our case, activity measures the consumers' willingness to share information about a brand, to treat it as part of their everyday life.

H1-6: *Activity positively and significantly influences brand equity.*

Trust is one of the most important concepts related to a brand (Delgado and Munuera 2005, Delgado et al. 2003, Chaudhuri and Holbrook 2001).

Trust is a component of several consumer-based brand equity measures (Martensen and Gronholdt 2004, Christodoulides et al. 2006, Atilgan et al. 2009, Equity Engine). Credibility that plays a central role in Erdem and Swait's (1998) and Erdem et al.'s (2006) consumer-based brand equity built on the signaling theory is synonymous with trust. Trust in their model is a component of credibility next to expertise, where expertise indicates a brand's ability to fulfil what it has undertaken.

Trust measures a brand's perceived ability to fulfil its offers undertaken in communication, thus a reliable brand does not necessarily provide high quality but provides the quality it has promised.

H1-7: *Trust positively and significantly influences brand equity.*

In the case of brands with high brand equity we count on higher willingness to purchase, assuming that high brand equity positively influences the purchase intent (Laroche et al. 1996, Cobb-Walgreen et al. 1995, Yoo and Donthu 2001, Christodoulides et al. 2006). Chen and Chang (2008) found that switching cost has a moderating effect on the positive relationship between brand equity and purchase intent, while in the presence of low switching cost, the impact of brand equity on purchase intent was not positive. In their meta-analysis of brand equity, Agarwal and Rao (1996) marked purchase intention as a brand equity measure of high priority, but did not interpret it as a consequence of brand equity.

H1-8: *Consumer-based brand equity positively and significantly influences purchase intention.*

The economy literature discusses the reduced search costs as one of the most important advantages provided by a brand (Ramello 2006). It was proved, for instance, that the rise of the relative cost of time increases the demand for the well-known national brands (Pashigian and Bowen 1994). From the viewpoint of the theory of transaction

costs, the importance of the impact of brand equity on consumer decisions increases in the case of product categories that are normally characterized by high transaction costs (Barcala and González 2006).

Under the conditions of information asymmetry, when consumers are uncertain about quality (Akerlof 1970), the importance of a brand grows, since by its ability to signal quality, it reduces information asymmetry, thus reducing search costs and the perceived risk (Tsao et al. 2006).

In the marketing literature, the reduction of search costs is also considered one of the essential benefits a brand provides (Erdem and Swait 1998, Erdem et al. 2006, Christodoulides et al. 2006).

H1-9: *Consumer-based brand equity positively and significantly influences low search costs.*

3.1.4 Other brand-related concepts measured to test validity – Hypotheses

In the above model, the two consequences of brand equity are Low search cost and Purchase intention. In order to check the stability of the model from the point of view of the consequences as well, we also measure concepts that we similarly define as consequences of brand equity, such as overall brand equity (OBE) and brand loyalty (Yoo and Donthu 2001).

The OBE offers a simple solution to one of the central problems of brand equity measurement that of the comparison of the measured brand and a base brand. OBE consists of four questions that give us the possibility to compare a brand to a base brand. In the present case, though, the base brand is not a concrete brand whose choice may present a serious problem such as a commercial brand, the weakest brand or a fictive brand, but it is a different brand in every interviewee's case. A similar logic applies to Srinivasan et al.'s (2005) research, where the base brand also changed with every person

asked. OBE entrusts comparison to the interviewees by asking them to decide whether they still choose a certain brand if another one provides the same.

Brand loyalty is one of the central concepts of the Aaker (1991) model, and it was also included in several empirical models (Yoo and Donthu 2001, Atilgan et al. 2009). We also consider loyalty as one that can be included in our consumer-based brand equity model, but we interpret it not as an antecedent of brand equity but as its consequence. In order to measure the brand loyalty dimension, in accordance with Aaker's (1996) instructions, we included the overall presence of loyalty, the willingness to pay price premium in the scale developed by Keller (Lehman et al. 2008).

We assume that inasmuch our model is stable, it shows appropriate fit with other theoretically based consequences as well.

H2-1a: *Consumer-based brand equity positively and significantly influences overall brand equity.*

H2-1b: *Consumer-based brand equity positively and significantly influences loyalty.*

To measure the external validity of consumer-based brand equity dimensions we use four concepts, two from the BAV dimensions (Esteem and Relevance) and two own concepts (Market leadership and Variety).

Esteem is an abstract concept measuring the esteem generally connected to brand name. It is somewhat controversial as it endeavours to measure brand esteem itself; one of the questions is included with inverse logic (*This brand appreciates me*).

With Relevance, BAV measures the extent of what a brand can personally provide consumers with something, the extent to which they can match its use with their self-image.

H2-2a: *Esteem positively and significantly correlates with the dimensions of consumer-based brand equity.*

H2-2b: *Relevance positively and significantly correlates with the dimensions of consumer-based brand equity.*

The meaning of market leadership is extended, it is often used to characterize companies and brands playing a significant role on the market, as a consequence of which companies tend to abuse the market leader or leader tags. The phenomenon may have important consequences. Consumers may adopt a more positive attitude towards the brand perceived as the market leader and their willingness to purchase may be higher than in the case of a brand perceived as a follower (Kamins et al. 2003, Kamins et al. 2007).

The high positive value of attitude and high purchase intention are primarily linked to brands that are perceived as market leaders, as opposed to the real market leader. More precisely, in order to associate high positive attitude and high willingness to buy with a real market leader brand, consumers have to perceive the brand as a leader as well (Kamins et al. 2003).

H2-2c: Market leadership positively and significantly correlates with the dimensions of consumer-based brand equity.

The effects of the product line width are controversially discussed by the literature. Several authors support with empirical research the assumption that under appropriate circumstances, wide choice has a positive impact on the judgement of a brand and on long-term sales (Kekre and Srinivasan, 1990, Lancaster, 1990, Sriram et al. 2007, Berger et al. 2007, Mela et al. 2010).

Other authors stress the negative consequences of wide choice, proving that it confuses consumers, causes frustration, reduces the probability of choice (Greenleaf and Lehman 1995, Iyengar and Lepper 2000), and, under certain circumstances, it may result in not making the decision to buy (Dhar 1997, Greenleaf and Lehman 1990).

If a consumer already made a decision to buy before choosing, for example, he would like to buy a present and knows that he has to make a certain decision in the shop anyway, a wider variety has a positive impact on his choice, that is, consumers choose from the brand that offers a wider range, which, at the same time, has a positive influence on the perceived quality as well (Berger et al. 2007). However, a wide variety of choices influences decision making and perceived quality only if information about all the

product variants is accessible at the same time and if the brand has developed new models focused on consumers' needs (Berger et al. 2007).

Since there is a wide variety on the mobile telephone market, it also carries the possibility for consumers to find a model easily at a price convenient to them, we assume that the perceived wide variety positively correlates with brand equity dimensions.

H2-2d: Variety positively and significantly correlates with the dimensions of consumer-based brand equity.

3.2 Preparing, testing and fitting the structural equations based on empirical research

We estimate our model in Amos applying a covariance-based estimation procedure, since in spite of difficulties, we find the covariance-based structural equation more reliable; further on, it does not have the deficiencies of a PLS-PM. It is important to remark that an analyzing method similar to the structural equation models is the neural network whose possibilities are not dealt with by the present paper. Comparison of SEM and neural networks was carried out by Davies et al. (1999).

As second-level factor models are often estimated in PLS in practice, we will briefly delineate the method below.

PLS path modeling (PLS-PM)

The advantage of the PLS-based models is that they give a stable estimation even when the requirements of covariance-based models (Amos, Lisrel), such as the required size of the sample or normal distribution are not met (Henseler et al. 2009, Ringle et al. 2009, Gudergan et al. 2008, Goffin 2007, Reinartz et al. 2009, Wilson et al. 2007, Bruhn et al. 2008).

Further on, the PLS-PM is equally suitable for estimating both the reflective and causal models (Wilson et al. 2007, Reinartz et al. 2009), moreover, according to some authors, the estimation of causal (composite) measurement models are only possible

under PLS conditions (Alpert et al. 2001). But since we do not estimate disturbance in PLS, we practically measure composite variables rather than latent ones with the indicators.

Covariance-based estimations (Amos, Lisrel, Mplus), as opposed to PLS, estimate parameters more accurately (Reinartz et al. 2009), so if assumptions of normality and large samples are met, the formers are proposed to be chosen. A deficiency of the PLS estimation is that it does not minimize any criterion (Goffin 2007). The solution to the problem would be provided by the GSCA (Generalized Structured Component Analysis), which consequently minimizes the residual variance of endogenous variables (Hwang and Takane 2004, Hwang and Takane 2009). The GSCA procedure is accessible due to a software running on the GeSCA site (Hwang 2010).

As the PLS does not impose any strict requirement toward data, it does not make any general test referring to the goodness of fit and it can exclusively be applied to recursive models, that is, reflexive and reciprocal effects cannot be estimated. (Temme and Hildebrandt 2006).

Covariance Based modeling (CBSEM - Covariance Based SEM)

The consumer-based brand equity model constituting the starting point of the present paper will be estimated in AMOS following the steps below. The procedure description will detail the steps that are important from the point of view of the accurate design, fit, identification and testing of the model.

1. Theoretical considerations determining the model design

In the marketing literature, the scale development and testing method proposed by Churchill (1979) had a significant effect for a long time. Besides the positive effects of this method there was a negative one as well, that is, the authors of several publications primarily aimed at "blindly" achieving the indicators of reliability and validity (Finn and Kayande 2005).

In the marketing theoretical literature, Rossiter's (2002) article introducing the C-OAR-SE procedure counts as a significant achievement, and in comparison to the practice determined by Churchill (1979), a new, fresh approach appeared, urging researchers to use other methods for testing theories than the ones that would have resulted from the rigid application of Churchill's (1979) method (Diamantopoulos 2005).

The C-OAR-SE procedure, besides its significance, has some deficiencies, though. As opposed to emphasizing the appropriate and well-based conceptual definition, argues against empirical testing (Finn and Kayande 2005, Diamantopoulos 2005).

As a conclusion, the author of the present paper considers the middle way acceptable, that is, considers both conceptual planning (Rossiter 2002) and empirical testing (Finn and Kayande 2005, Diamantopoulos et al. 2008) important.

2. Generating questions

In developing and cleaning the scale standing at the basis of the measurement models we follow the traditional test theory practice of Churchill (1979). However, since the Cronbach alpha has some deficiencies (it presupposes tau-equivalence) and its value cannot be counted in Amos, we will follow the practice proposed by Hair et al. (2009) in measuring scale reliability.

3. Latent variable measured with causal indicators as an exogenous variable

In the case of defining causal measurement models as exogenous variables an important point of view has to be considered, which was drawn attention to by Temme and Hildebrandt (2006).

Temme and Hildebrandt (2006) introduced the concept of quasi-exogenous causal latent variable that refers to a causal latent variable exclusively determined by its indicators. However, if there is another cause (e.g. another exogenous latent variable) affecting the causal latent variable besides the indicators, then this causal latent variable has to be treated as an endogenous variable, and in this case, the interpretation of the

causal relationships will raise serious issues as Temme and Hildebrandt (2006), with the help of two models, definitely proves it.

The problem can result from the fact that if we assume that an external cause can affect the causal latent variable, then the assumption that this cause also has an impact on the exogenous indicators of the causal variable is also well-based. In this case the question arises whether in the structural model we have to interpret only the direct effect between the external cause and the causal latent variable or the direct effect between the external cause and the exogenous indicators of the causal latent variable as well. In the former case we will underestimate the effect of the external cause while in the latter we will overestimate it.

4. Model identification

Reflective measurement models can also be estimated in isolation (Diamantopoulos et al. 2008), while one of the problems of identifying causal models is that they cannot be estimated in isolation (Bollen 1989).

A widespread solution was given to the problem. In order to make causal measurement models correctly estimable, the measurement model has to be fitted into a larger structural model (Bollen 1989). The solution accepted in the literature is also called MIMIC⁹ model after Jöreskog and Goldberger (1975) (MacCallum and Brownie 1993), despite the fact that it does not hold true for every model containing both reflective and causal measurement models.

In order to estimate the causal measurement models correctly and identify the disturbance effect at the level of the causal latent variable we have to build a model in which two arrows are directed from the causal latent variable towards the two reflective variables or reflective latent variables (Jarvis et al. 2003, Diamantopoulos et al. 2008, Edwards 2010, MacKenzie et al. 2005, Jöreskog and Goldberger 1975, Cantaluppi 2002).

⁹ Multiple Indicator Multiple Cause

5. Model fitting

There are several tests to check the goodness-of-fit of structural models: χ^2 , NFI, TLI, CFI, RMSEA and SRMR. The literature deals extensively with the interpretation and use of fit tests (MacCallum et al. 1996, Baumgartner and Homburg 1996, Wilcox et al. 2008, Franke et al. 2008, Goffin 2007, Steiger 2000, Steiger 2007, McQuitty 2004, Hayduk et al. 2007).

The chi-square (χ^2) is an absolute fit indicator measuring the difference between the original covariance matrix and the covariance matrix estimated by the model; if it is significant, we have to reject the model. However, the chi-square is very sensitive to sample size and to the complexity of the model, therefore in the case of larger samples (over 200) will almost always be significant (Schumacker, R. E. and Lomax, R. G. (2010). In the case of a sample over 250 and more than 12 variables we can almost always count on a significant chi-square (Hair et al. 2009), thus we do not regard the significance level of the chi-square as normative. In the case of large samples and complex models we can use the absolute value of the chi-square for comparing two models (searching for the smaller value).

Relative chi-square

The relative chi-square is the ratio of chi-square to degree of freedom, which is abbreviated as CMIN/DF by the Amos. The relative chi-square value is considered to be good below 3; however, there are authors who consider values below 5 as acceptable (Schumaker and Lomax 2004).

GFI (Godness of Fit Index)

GFI varies from 0 and 1, and should be greater than 0.90 to accept the model (Garson 2011). One of the deficiencies of the GFI is that it may suggest good fit even in the case of misspecified, misfitting models. Due to its deficiencies, the GFI is not a recommended fit index anymore. We report the GFI values because the consumer-based

brand equity models presented here also reported GFI, thus our model can be compared with earlier results.

IFI (Incremental Fit Index)

The IFI is relatively independent from the sample size; therefore it is a preferred indicator (Garson 2011). If its value exceeds 0.9, it indicates a good fit.

TLI (Tucker Lewis Index)

The TLI takes into account the complexity of the model and it is also independent from sample size. TLI values are not normalized, thus it is not guaranteed to vary between 0 and 1 (Garson 2011). A TLI value over 0.9 indicates a good fit, although Schumacker and Lomax (2004) indicated 0.95 as the cutoff value.

CFI (Comparative Fit Index)

CFI compares our model to the null model which contains many restrictions; it regards every correlation between variables as 0 and it examines the fit of our model between the null model and a perfect-fit model. If the CFI value exceeds 0.9, the model can be accepted.

RMSEA (Root Mean Square Error of Approximation)

Besides the CFI, RMSEA is one of the most popular goodness-of-fit indicators. It counterbalances the deficiency of the chi-square as a result of which the chi-square rejects the model estimated on larger samples (Hair et al. 2009). RMSEA below 0.5 indicates a very good fit and 0.8 indicates a good fit.

SRMR (Standardized Root Mean Residual)

The SRMR measures the average difference between the covariance matrix predicted by the model and the observed covariance matrix; under 0.5 it indicates a good fit. The Amos does not always print it separately in the output, so we will not always mention it.

6. Reliability – Validity

Traditionally, the Cronbach alpha value is applied to test reliability and internal consistency (Diamantopoulos et al. 2008), and the alpha coefficient is often used to test unidimensional nature as well (Schmitt 1996).

However, Cronbach alpha is not suitable for testing unidimensional nature since one of the preconditions of calculating alpha is the unidimensional nature itself. More precisely, the calculation of the alpha assumes the tau-equivalence, as a result of which the alpha often under- or overestimates reliability (Graham 2006). The tau-equivalence of the measurement model assumes that the effect of the latent variable on the indicators is fixed at 1 but the measurement error is estimated freely. Therefore, when measuring the alpha coefficient, we assume that the latent variable has the same effect (1) on every indicator.

Because of the great number of fixed effects, Graham (2006) proposes that we use the congeneric measurement model instead of the model assuming tau-equivalence for testing reliability if it has better fit, since if the indicators do not meet the assumption of tau-equivalence, alpha will underestimate reliability. The congeneric model is estimated by setting the path estimate of the latent on one of the indicators to 1. Graham's (2006) proposal is problematic, though, since if the measurement model has only three indicators, the model cannot be estimated as it does not have degree of freedom (just identified).

Based on the above mentioned, the unidimensional nature of the measurement models is analyzed with the help of the CFA¹⁰ estimated in Amos, reliability and validity will be tested following literature instructions (Gerbing and Anderson 1988, Hair et al. 2009, Diamantopoulos et al. 2008, Bollen 2011).

Despite the difficulties of measuring the validity of causal indicators, the validity of causal indicators “must still be established” (Edwards and Bagozzi 2000, Diamantopoulos et al. 2008).

¹⁰ Confirmatory Factor Analyses

One way of assuring validity is the strict observance of the significance level of the parameter measuring the effect of causal indicators on the latent concept (Bollen 1989, 2011). According to this approach, the indicators in whose case the parameter is not significant cannot be valid.

Another plausible way to measure validity is to include in our analysis a general measure that is able to measure the essence of the latent concept (Diamantopoulos and Winklhofer 2001), and the relationship between the causal indicator and the general measure will be the measure of validity (MacKenzie et al. 2005).

Among the measurement possibilities of the validity of the latent variable measured with causal indicators, Diamantopoulos et al. (2008) emphasizes the disturbance estimated at the level of the latent variable, since this value can give information about the extent to which we were able to explain the concept with causal indicators.

Construct validity

In the case of reflective models, we follow the steps below in order to assure construct validity (Hair et al. 2009):

- Analyzing the direct standardized weights directed to the reflective indicators (expected value is over 0.7) and the value of the explained variance (expected value is over 0.5).
- Analyzing the reliability of the latent concept (Composite Reliability); (expected value is over 0.7)
- Analyzing the Average Variance Extracted, (expected value is over 0.5).
- Analyzing the discriminant validity.

3.3 Preparing data collection

The present chapter presents the scales used and their source, sampling and industry.

3.3.1 The scales used in the research

The scale questions for measuring constructs were partly compiled from scales validated in earlier research and partly developed on our own.

In developing the scales we considered it important to avoid the mistake of formulating questions with almost the same content, merely because of the internal consistency. Sharing common contents (variance) therefore was an essential question, which we would like to achieve by grabbing the different aspects of the latent concept.

The questions were structured in tables according to topic, and we mentioned the source with the ones compiled. If the question was formulated by us, we marked it as 'Own'. In developing the questions we used the following sources:

1. MB: Millward Brown (in Lehman et al. 2008).
2. Aaker: David Aaker (1996).
3. BAV – Brand Asset Valuator: Young & Rubicam (in Lehman et al. 2008).
4. Ambler: Tym Ambler (2003).
5. Yoo and Donthu (2001).
6. Erdem and Swait (2006).
7. Keller (2003).

The difference between brand equity and other associations lies in the fact that the constructions within the brand equity topic constitute the elements of the conceptual brand equity model, while brand-related other associations will serve for measuring external validity.

Table 5: Scales developed for measuring consumer-based brand equity dimensions

	Question	Source
Awareness	Most people are aware of this brand.	Aaker
	<i>I frequently encounter this brand.</i>	Own
	I feel, some characteristics of this brand come to my mind quickly.	Yoo and Donthu
Uniqueness	In my opinion, this brand has unique attributes.	BAV (modified)
	I feel, this brand is in a class by itself.	BAV
	<i>I could easily explain to my acquaintances why this brand is different from others.</i>	Own
Advantage	I feel this brand is better than any other on the mobile telephone market.	Millward Brown (modified)
	I feel this brand is definitely better in what concerns the essential attributes of mobile phones.	Millward Brown (modified)
	<i>I have the impression that this brand possesses such advantages that make trying out others worthless.</i>	Own
	<i>This brand has advantages over others that I need.</i>	Own
Perceived quality	I think this brand is made to high standards.	Ambler
	I think this brand consistently provides the same quality.	Ambler (modified)
	<i>I feel that all products sold under this brand name are of excellent quality.</i>	Own
	<i>I think this brand is operational under all circumstances.</i>	Own
	<i>It happened to me that was disappointed at this brand.</i>	Own

Activity	I talk about this brand with my friends.	Keller
	I look for more information about this brand.	Keller
	I like to read about this brand.	Keller
	<i>I share brand-related information with my acquaintances.</i>	Own
	I would recommend this brand to anyone	BAV
Trust	<i>I feel confidence if I meet this brand.</i>	Own
	<i>This brand always provides what it promises.</i>	Own
	<i>If you want to buy a mobile telephone, this brand is the most trusted choice.</i>	Own
	<i>No one got disappointed by this brand.</i>	Own

Table 6: Questions related to other brand-related associations. Measuring validity

Concept	<i>Questions</i>	Source
Esteem	I hold the brand in high regard.	BAV
	The brand has earned a strong reputation.	BAV
	This brand respects me.	BAV
Relevance	The brand is relevant to me.	BAV
	This brand is a good one for me.	BAV
	This brand fits my lifestyle.	BAV
Market leadership	<i>I think this brand is a market leader.</i>	Own
	<i>My acquaintances think this brand is a market leader.</i>	Own
	<i>I think this brand could sell the most products on the mobile telephone market.</i>	Own

	<i>I believe this brand entered the market first.</i>	Own
Variety	<i>I think this mobile mobilephone brand gives access to a great variety of models.</i>	Own
	<i>In the case of this mobile phone brand I could easily choose a specific model.</i>	Own
	<i>I think that this mobile telephone brand assures the opportunity for anyone to choose a model suitable for them.</i>	Own

Table 7: Questions of brand equity consequences

Concept	Questions	Source
Purchase intention	I am planning to buy this brand in the future	Keller
	<i>If I buy a mobile telephone next, I will choose this brand</i>	Own
	<i>I buy this brand even if the concurrent one has the same qualities.</i>	Own
Loyalty	I feel loyal to this brand.	Keller
	I would pay extra for this brand.	Keller
	If a store didn't carry this brand I would go to another store.	Keller
Low search cost	Knowing what I'm going to get from this brand saves me time shopping around.	Erdem and Swait
	<i>Thanks to this brand, I do not have to spend much time choosing in case I want to buy a mobile phone.</i>	Own
	If I couldn't decide which mobile telephone to choose, I would find the choice of this brand plausible.	Own
Overall brand equity questions	Even if another brand had the same attributes as this brand, I would choose it.	Yoo and Donthu

Even if another brand is as good as this brand, I **Yoo and Donthu**
would choose it.

If another brand does not differ from this at all, **Yoo and Donthu**
it is worth buying it.

3.3.2 Sample

We plan to collect data from 500 people focusing on the following six Transylvanian cities and their surroundings:

1. Miercurea Ciuc
2. Târgu Mureș
3. Cluj Napoca
4. Oradea
5. Târgu Secuiesc
6. Cristuru Secuiesc

We regard the Romanian inhabitants between 20-59 as statistical population on whom we do not make any special requirement.

3.3.3 Industry

In the research, we measure scale questions referred to three mobile telephone brands:

1. Nokia
2. Samsung
3. iPhone

Mobile telephone brands are a good choice thanks to the fact that they are widespread, people deal with them and the majority of consumers might have knowledge of more than one particular brand. As a consequence, we can rightly assume that the majority is able to give worthwhile answers to the scale questions and they are not compelled to bluff.

Both brands with high and low market shares were selected. From among the selected brands, Nokia is the market leader, while Samsung is the second largest manufacturer; the iPhone owns a low market share but it is a remarkable market participant due to its innovative characteristics and the highest profit share in industry.

4 Empirical research

The presentation of the empirical research consists of three parts. In *Preparing the analysis* we delineate the circumstances of data collection, data purification, normality issues, missing data imputation, data weighting and the generation of the correlation matrix necessary to the Amos.

In the next part we search for the appropriate causal specification of the hypothetical model, and in the last chapter, we present the accepted model, test its reliability and validity, then we test it on the data of the Samsung and iPhone brands in order to justify its stability.

4.1 *Preparing the analysis*

The questionnaire (see Appendix I) compiled on the basis of the scales presented earlier was carried out with the help of two online survey providers. In the first wave, we sent out the questionnaires using SurveyMethods¹¹, while in the second wave, the questionnaires arrived at the interviewees through the Zoomerang¹² survey provider.

Data collection started on June 1, 2011 and ended on August 7, 2011. We sent questionnaires to 395 people's email box; but actually more people received them. The questionnaires were passed to the respondents in three forms. The preferred one was a link sent in a personalized electronic letter following which the addressee could fill in the questionnaire. For security reasons we did not make it possible to fill in the questionnaire twice from a link sent out to an email.

The second form of polling was sending a direct link to people who had agreed to fill in the questionnaire before. In this case, filling in the questionnaire was also limited to one computer, more precisely, only one questionnaire could be filled in from one IP address.

The third form of polling was made personally. It was used mostly in the case of those people over forty or fifty who had agreed to fill in the questionnaire but balked at

¹¹ www.surveymethods.com

¹² www.zoomerang.com

the electronic fill-in or the use of the Internet. The data of the questionnaires filled in personally were digitalized later with the help of the electronic questionnaire.

The response rate in the case of the questionnaires sent to email addresses can be estimated to 60%. Since we cannot follow the number of those who received the questionnaire via the Internet and because the Zoomerang does not report the two ways of polling separately, the actual response rate is unknown. On closing data collection, data preparation started with the purification of a database resulting from 421 fully or partially filled-in questionnaires.

4.1.1 The characteristics of the sample

The characterization of the sample was carried out according to the awareness, possession, media use, income and residence variables. Gender and age distribution will be reported on when weighting the sample (chapter 4.1.5).

In the case of Top of Mind Awareness we asked the respondents to enumerate the first three mobile telephone brands they knew. On the basis of the three mentions we created a Top of mind awareness new variable for all the three brands, into which the mentions were included in a weighted form: the first mention multiplied by 0.6, the second multiplied by 0.25 and the third multiplied by 0.15.

On the scale between 0 and 6, the Nokia brand has a spectacular first position, while the iPhone received a hardly estimable number of points.

Table 8: Top of Mind Awareness

Brand	Top of Mind (%)
Nokia	5.11
Samsung	1.61
iPhone	0.27

The majority of the respondents (56.4%) had only one mobile telephone, 36.5% had two, while the remaining 7% had more than two mobile telephones. The sample did not include anyone without at least one mobile telephone.

Most of our respondents have a Nokia mobile telephone, and the Samsung brand also represents a significant proportion. The penultimate column contains data referring to brand names the respondents mentioned as their second telephone; Nokia and Samsung stand out among them as well.

Table 9: Mobile telephone possession

<i>Brand</i>	<i>In possession (%)</i>	<i>Second in possession (%)</i>	<i>Last purchased (%)</i>
Nokia	59.2	16.7	56.4
Samsung	16.9	5.9	19.8
SonyEricsson	6.1	2.2	5.5
Motorola	3.9	0.3	3.4
LG	3.5	2.2	4.9
HTC	3.3	0.5	2.5
iPhone	1.7	0.3	1.3
Blackberry	1.6	1	1.9
Orange	1	0.3	.7
Alcatel	1	0.7	1.0
Sagem	0.3	1.6	.5
Sharp	0.3	-	-
Huawei	0.3	2	.7
Siemens	0.3	0.2	
Nexus	0.3	-	.6
DigiMobil	0.2	0.2	.2
Vodafone	0.7	-	.7
Total	100	34.8	-
<i>Missing</i>	-	65.2	-
Total	100	100	-

These data are important to us because they indicate that we must have received relevant answers in the case of two brands. In the last column we have the data of the last purchased or received brand. The data mostly coincide with the data in the second column, with a minimal difference in favour of the Samsung.

The majority of the respondents bought their mobile telephones with a contract, and 23% received them as gifts.

Table 10: Mobile telephone acquisition

<i>Way of acquiring the telephone</i>	<i>(%)</i>
I bought it with network	55.2
Phone whitout network lock	17.3
I received it as a gift and use it on a specific network	13.3
I received it as a gift and use it without network lock	10.5
None of them	3.7

The table below shows the distribution of money spent on the latest acquired mobile phone. 0 means that the individual purchased the telephone with a contract that did not require payment for the telephone or he received it as a gift. We find it surprising that there is a relative great proportion (13%) in the sample that paid a large sum for their telephones.

Table 11: Mobile telephone price

Price (RON)	(%)
0	14.7
1-50	20.7
51-300	38.1
301-500	13.4
501-2400	13.1

Media consumption habits were measured with the help of internet use and TV watching habits. The following data can illustrate that our respondents often came in contact with the communication messages of the mobile telephone brands (since mobile brands rarely appear on outdoor advertisement carriers).

Table 12: Media consumption habits

<i>Internet use</i>	<i>(%)</i>	<i>TV watching habits</i>	<i>(%)</i>
Daily	84.8	About 4-5 hours daily	3.1
Many times a week	8.6	2-3 hours daily	12.6
Sometimes a month	2.0	2 hours daily	22.6
Very rarely	2.5	Not every day	47.8
Never	2.1	I do not watch TV	13.9

Almost half of the respondents in our sample said they had average incomes. There are a few more with higher-than-average incomes (27.7%) than lower-than-average incomes (24.4%).

Table 13: Income division

<i>Income</i>	<i>(%)</i>
Much lower than average	4.6
Lower than average	19.8
Average	47.9
Higher than average	24.0
Much higher than average	3.7

The data come from people living in 61 different settlements. 70% of these settlements are in Harghita, 8.5% in Mureş, 8.4% in Covasna and 4.2% in Cluj counties. The remaining 8.9% come from other counties.

4.1.2 Data preparation – Analyzing missing data (MVA)

Data preparation was done in Microsoft Excel 2007 then in IBM SPSS 19, the structural equation model was built and tested in Amos.

Estimating structural equations can exclusively be done with complete data; therefore, one of the essential problems in preparing data to be solved is that of the missing data. There are two types of missing data, one that originates from the option Don't know/Not applicable (user missing) and the effectively missing ones (system missing).

Statistical softwares provide several solutions to the problem of missing data. Widespread solutions are listwise deletion and pairwise deletion. In both cases we solve the problem of the missing data by deleting or ignoring the observations containing incomplete data altogether or pairwise (for example, in the case of calculating a correlation matrix) from the analysis (Kline 2011). The advantage of listwise deletion over pairwise deletion is that in the former, the same data are used in the analysis, while in the latter, for example, in the case of calculating covariances, we use different data depending on which observation the data are missing from in the case of the given variable. (Carter 2006).

The condition of the previous two methods is that the data should be missing completely at random, that is, they can be characterized as MCAR¹³. Data can be qualified as MCAR if the missing data are independent from the other data as well as the other missing data. If the MCAR condition is not fulfilled, and more than 5% of the data are deleted with a certain method, then the validity of the analysis is at risk, since we exclude from our analysis groups with certain characteristics that did not give an answer for a particular reason.

¹³ MCAR – Missing Completely at Random.

Another solution to the problem of missing data is data imputation. Fulfilling the MCAR condition we can complete the data with the mean value, regression mean imputation or identifying similar answer schemes (Kline 2011).

The advantage of imputation is that we do not have to give up the observations containing missing data, thus we can work on a larger sample, increasing the chance of finding significant results.

Modern procedures of imputation assure more satisfying solutions than mean imputation, for example. Multiple imputation is an increasingly popular method as it can assure a better-quality imputation than other methods (Rubin 1996, Schafer and Olsen 1998, Horton and Lipsitz 2001). The essence of multiple imputations is that, preserving the original data, it creates several data files (five by default), in which the data are separately completed. During the analysis we can accept the result that we find best from among the results of the analysis separately made on the imputed data files, or we can combine (pool) the results within a single table and interpret them.

SPSS did not assure a procedure for multiple imputations for a long time, but starting with version 17 it has been accessible as an independent module (Multiple Imputation). In our case, multiple imputations are not applicable because of several obstacles; therefore, because of the application of the structural equation and data characteristics, we will apply the direct ML method (Direct Maximum Likelihood).

Multiple imputation is impeded by the fact that weighted data are not supported by Amos. We could only apply multiple imputation if we were able in SPSS to combine the data tables resulted from imputation into one final data file. According to the sources we have at our disposal (Azur et al. 2008), there is a Python module (rubin.py), which makes it possible to combine imputed data tables into one, but the link given on the indicated site (www.spss.com/devcentral) does not work (even the site itself runs now under IBM domain), whose explanation might lie in the fact that once the IBM purchased the SPSS, this development was made inaccessible.

Another popular and probably the most widespread modern method of imputation is EM (Garson 2011). The EM algorithm makes possible a single imputation. EM is built

on Maximum likelihood estimation, and it estimates parameters based on the available data of the given variables, with the help of which it estimates the missing data after re-estimating the parameters using the already estimated data as well until the appropriate solution is found (Schafer 1997). EM, among others, does not underestimate the standard disturbance, which is one of the deficiencies of mean imputation.

The most developed and theoretically well-grounded imputation method is the FIML¹⁴ or Direct ML (Allison 1987, Allison 2003, Wothke and Arbuckle 1996, Brown 2006). Some authors do not consider the FIML label fortunate as the ML uses all the information under every circumstance, therefore Allison (2003) proposes the use of Direct ML or Raw ML.

In the course of Direct ML imputation we also take into account the hypothetical relationships between the variables included in the model, therefore, according to Wothke and Arbuckle (1996), only this method can be accepted as a well-grounded one, all the others can be qualified as ad-hoc methods.

In the present case, we are going to use the Direct ML method in Amos, but before that, we have to examine the datafile from the point of view of the missing data. The purpose of analyzing the missing data is to identify observations with a large proportion of missing data and to obtain a data file in which the proportion of the missing data is under 5%.

4.1.3. Analyzing the missing data

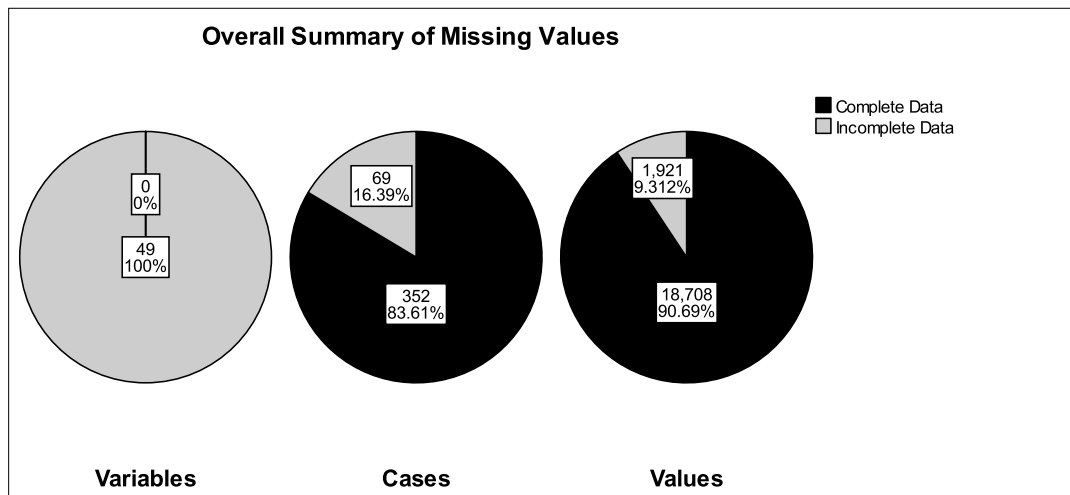
In analyzing the missing data we will focus exclusively on the variables measured in order to build the initial model. The 49 variables included in the analysis will be used partly for building the model, partly for measuring validity. With the analysis of the missing data we prepare their single imputation (Direct ML single imputation). The 49 variables were measured on an uniform, nine-point scale.

¹⁴ Full Information Maximum Likelihood.

In the following, we briefly describe the data from the point of view of the missing data with the help of the diagnostic tools of the Multiple Imputation and MVA (Missing Value Analysis) SPSS modules. In analyzing the missing data we could expect two types of missing data: effectively missing data (system missing), and the one resulting from the option Don't know/Not applicable (user missing).

In the case of 19 out of the 49 variables included in the analysis, the proportion of missing data exceeded 10%. There are missing data in the case of all variables, 16% of the datasets have missing information and in total, 9% of the data can be qualified as missing data.

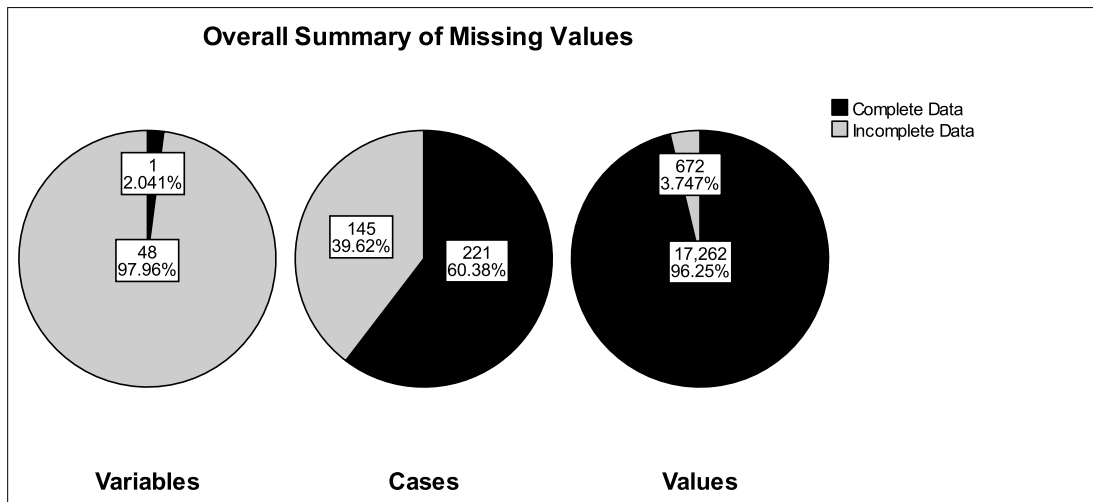
Figure 5: Missing data characteristics in the complete data base



Datasets with 30% missing data referring to the 48 variables included in the analysis were deleted (Hair et. al 2009). As a result, 366 observations were retained.

After deleting the observations with a great number of missing data, only 15 variables remained with over 5% missing data. Every variable contains missing data (mostly system missing) except for one; 40% of the observations do not have missing data and 4% of all data can be qualified as missing data.

Figure 6: Missing data characteristics in the reduced data table



The paired t-statistics and the differences between the sub-sample reinforce the result of the Little MCAR ($p=0.00$) test, according to which data are not missing completely at random. Listwise deletion would result in losing many data (213 observations would remain), thus we would risk revealing significant results. All these support imputation; as a consequence, we could work on a larger sample.

In the present case, we used the Direct ML method assured by the Amos for imputation, and we obtained an imputed data table with 366 observations.

4.1.4. Analyzing the multivariate normal distribution

In a covariance-based setting the default estimation procedure is the Maximum Likelihood, which requires the multivariate normality assumption of data (Bollen 1989, Ullman 2006). Starting from the nature of the questions and earlier experience (Lehmann et al. 2008, Boo et al. 2009) we expect that our data will not meet this multivariate requirement.

There are 30 variables in the initial model in whose case the Mardia's (1970) coefficient measuring multivariate normality took the value of 267 with a critical ratio of

57.93. If we delete the observations with the Mahalanobis distance over the critical value, the Mardia's coefficient decreases to 214, which still shows a large deviation from multivariate normality.

There are no definite rules referring to the deletion of outliers. Researchers have to take into account the information value of the observations to be deleted and the extent of sample reduction (Bollen 2011, Hair et al. 2009). Taking into consideration the complexity of the model as well as the ignorable reduction of the Mardia's coefficient, we decided to delete only the values with the greatest (over 60) Mahalanobis distance. Deletion of extremely great values is important because their presence might lead to abnormal results (Heywood cases, negative measurement error variance) (Brown 2006). After deleting such values, 332 observations remained.

In analyzing univariate normality, two variables measuring awareness stand out with extreme values (Q7N1I, Q8N2I). We do not intend to give them up merely for lack of multivariate normality, but we note for the sake of illustration that if the analysis had been carried out without the Awareness dimension, the Mardia's coefficient would be reduced to 169. This indicates that we will have problems with the Awareness indicators later on. If we examine the variables measuring Awareness, we can formulate a simple solution to the problem. As the measured brand names are widely known, the significant majority of the respondents indicated 8 and 9 on the nine-point scale as an answer; as a consequence, the indicators of Awareness are extremely skewed and kurtotic.

Except for the two previous ones, the variables of the initial model are characterized by acceptable univariate normality. The skewness of 15 variables and the kurtosis of 16 fell in the (-1, 1) interval, and neither the skewness nor the kurtosis of any one variable exceeded the absolute value of 1.5 (Lei and Lomax 2005).

Besides the presence of univariate normality, in most of the cases we may expect that our data will not meet the multivariate normality requirement (Gao et al. 2008), as it actually happened in our case.

Lei and Lomax (2005) carried out calculations with more extreme values than ours (the cutoff value of skewness was 1.74, that of kurtosis was 3.8), and they proved that on fulfilling the condition of univariate normality, we would obtain precise parameter estimates.

In the case of multivariate normality violation, the chi-square value increases and the ML might give a distorted estimation of standard errors. However, the chi-square is very sensitive to sample size, and in a sample over 200 it shows significant deviation even when the data indicate a good fit. Therefore, in accepting the final model, we take into account the relative chi-square rather than significance of chi-square (Garson 2011).

If violation of normality is given to some extent in the case of the data, we also have to carry out bootstrap analysis to estimate standard errors (Byrne 2010). Bootstrap does not require the assumption of normality and it is able to calculate the standard error for every parameter, while ML only calculates standard errors for regression weights and error terms. The bootstrap procedure was developed by Efron (1979), and in structural equation modeling it is used, among others, to treat normality-related problems (Arbuckle 2010, Byrne 2010, Schumacker and Lomax 2010). We do not regard bootstrap as a magic tool to solve lack of normality altogether (Kline 2011), but we test the acceptability of the maximum likelihood estimates.

4.1.5. Weighting data

We used quota sampling based on gender and age. We regarded Transylvanian Hungarians between 15 and 59 as the statistical population (N). Data referring to the statistical population were downloaded from the data service provider (Tempo) of the National Institute of Statistics of Romania (www.insse.ro).

We started the analysis of the statistical population according to gender and age with 16 counties of Transylvania, then we also examined the counties inhabited by a Hungarian majority and we only found a deviation of a few decimal points. Thus, the basis of creating the weights below are constituted by the distribution data related to four counties: Harghita, Covasna, Mureş and Cluj. Asking only Hungarians was exclusively

done for the sake of comfort, as we thought it a great task to prepare, check and test a Romanian translation.

After deleting outliers and observations with a large proportion of missing data, 332 observations were included into the sample (n) serving as a starting point for the analyses. But since we deleted the outliers and the observations with missing data earlier, the proportion of the 15-19 age category significantly decreased to such an extent that we should have used a quadruple factor in applying the weights. The decrease of this age group in the sample is explained by the fact that in comparison to the other respondents, understanding and answering the questions caused difficulties to its members. After deleting the 15-19-year-olds, our sample decreased to 315.

The table below illustrates the calculation of weights with the help of which we adjusted the sample distribution to the distribution of the statistical population. The values of the Weight column resulted from the division of the given group's proportion within the statistical population (N %) by the group's proportion within the sample (n %).

Table 14: Weighting data according to gender and age

Age	Gender	n	N %	N	N %	Weight (N%/n %)
20-29	Man	42	13.33	144482	13.50	1.01
20-29	Woman	79	25.08	142510	13.32	0.53
30-39	Man	42	13.29	152094	14.21	1.07
30-39	Woman	75	23.73	145276	13.57	0.57
40-49	Man	16	5.06	122011	11.40	2.25
40-49	Woman	23	7.28	120311	11.24	1.54
50-59	Man	22	6.96	117278	10.96	1.57
50-59	Woman	16	5.06	126243	11.80	2.33
Total		315		1070205		

As a next step we created a new variable, and instructed SPSS to use this variable as a weight. Because weighted data files are not supported by Amos, we generated a correlation matrix of the measured variables of the model and used this matrix as an input for our structural model.

4.2. Building the causal structural model of consumer-based brand equity, identifying the right specification

In the following subchapter, our goal is to identify the causal specification of consumer-based brand equity. The final, accepted model will be characterized and tested in the subsequent subchapter.

From a technical point of view, we are going to test a Type II causal model (Diamantopoulos et al. 2008). In the Type II model, first-order latent variables are measured with reflective indicators, while the central concept of this paper, the second-order latent Brand equity is measured with causal indicators.

As a first step, we assess the fit of measurement model, then its reliability and conceptual validity.

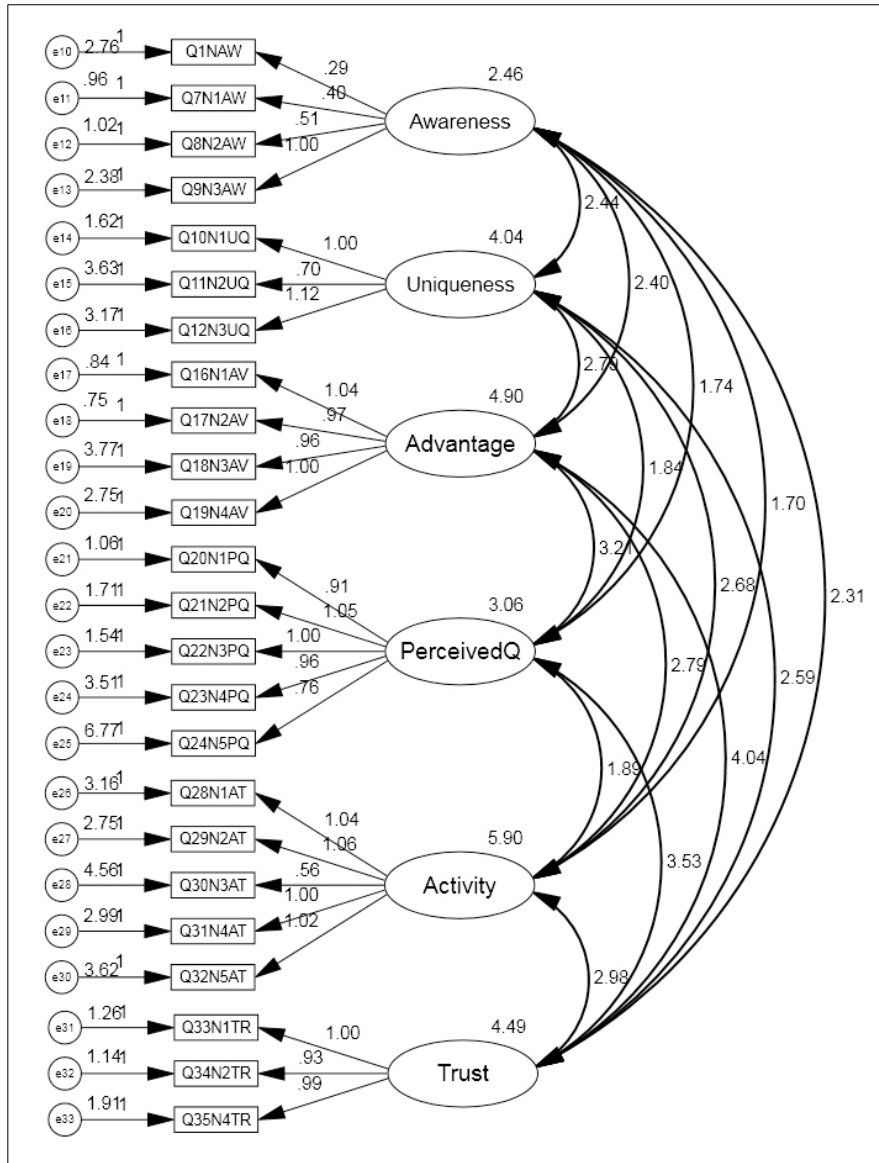
In the case of the fit indicators, taking into account Kline's (2011) proposals, we report the chi-square, degree of freedom, the relative chi square (CMIN), GFI, IFI, CFI, TLI and RMSEA indicators, and, with the final model, the SRMR.

4.2.1. The confirmatory factor analysis of consumer-based brand equity dimensions

In the case of the Type II initial model we assess model fit first, then in the case of the fitting, modified model we examine reliability and validity.

In assessing the model fit we take into account the extent of the effect of latent variables on the indicators, their sign, the variance explained by the latent variables, the modification index and the size of the standardized covariance residuals. In the case of the entire initial model we found the following estimated unstandardised parameters:

Figure 7: Brand equity dimensions, 6-factor CFA



In reviewing the estimated parameters we notice disturbingly low regression weights in the case of two indicators (Q8, Q9) of Awareness. These findings and the severe violation of the univariate normality assumption and experience of previous research (Yoo and Donthu 1997, Atilgan et al. 2009, Washburn and Planck 2002) signaled that we might have problems with this dimension.

In the case of Activity, the low regression weight of Q30 is of little concern.

Table 15: Fit indicators. Dimensions, 6-factor CFA (F. 7)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
989	237	4.17	0.8	0.858	0.834	0.857	0.101

The fit indices of the 6-factor CFA represent a poor fit. In order to reveal the deficiencies we examine the factor structure of the indicators.

The Factor score weight calculated by Amos can be used to save the latent variable as a new variable in our data file, as the weighted sum of indicators.

Table 16: Factor score weights of the initial CFA

	Trust	Activity	Perceived Q	Advantage	Uniqueness	Awareness
Q36N4TR	0.129					
Q34N2TR	0.202					
Q33N1TR	0.197					
Q32N5AT		0.164				
Q31N4AT		0.196				
Q30N3AT		<u>0.072</u>				
Q29N2AT		0.225				
Q28N1AT		0.192				
Q24N5PQ			<u>0.025</u>			
Q23N4PQ			<u>0.061</u>			
Q22N3PQ			0.144			
Q21N2PQ			0.136			
Q20N1PQ			0.191			
Q19N4AV				<u>0.093</u>		
Q18N3AV				<u>0.065</u>		
Q17N2AV				0.332		
Q16N1AV				0.317		
Q12N3UQ					0.208	
Q11N2UQ					0.113	
Q10N1UQ					0.363	
Q9N3AW						0.213
Q8N2AW						0.256
Q7N1AW						0.213
Q1NAW						<u>0.053</u>

We deleted every weight lower than 0.05 from the table below, and the estimates in this table justify the unidimensional character of dimensions, since there are no significant cross-loadings. The underlined low factor scores indicate that the related indicators would have low impact on determining the meaning of their factors.

Besides the general problems of the Awareness dimension, problems were expected to occur in the case of Q1, since this variable is an artificially created one on the basis of the Top of mind awareness, which we measured on a substantially different scale from that of the other variables.

The Q30 variable (*I would recommend this brand to anyone*) differs from the others regarding its meaning, which refers to acquiring or sharing brand-related information.

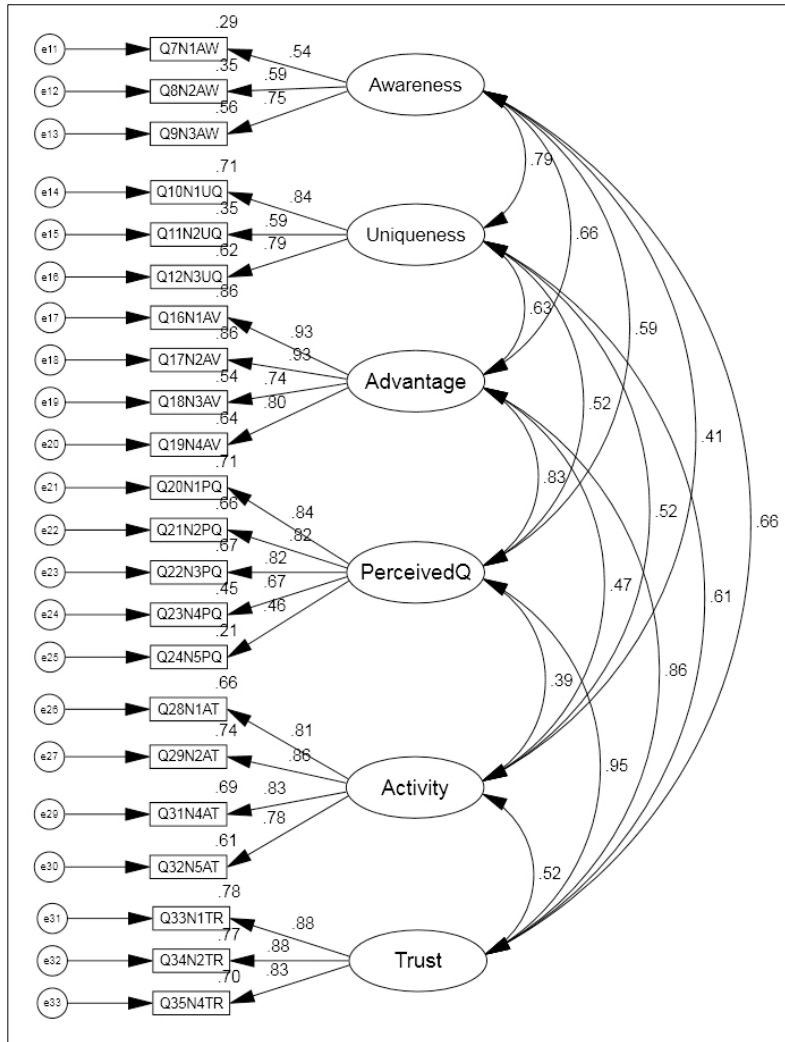
By deleting the two variables (Q1, Q30), our indicators significantly improved. Three indicators, the CFI, IFI and RMSEA reached the acceptable value, and the relative chi-square also approximated 3.

Table 17: Fit indicators (F. 8)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
602	194	3.106	0.847	0.916	0.834	0.915	0.082

In the diagram below we examine the explained variance and the correlation between the factors as well.

Figure 8: Brand equity dimensions. 6-factor CFA. Standardized version.



Above the rectangle representing measured variables we can see the value of the variance explained by the latent variable. In the case of the Awareness dimension, the standardized weights do not exceed the 0.7 value except for the Q9 variable, and the explained variance exceeds 0.5 only in this case. We can expect that the reliability and validity requirements of the measurement model will not be fulfilled with these values.

If we calculate the Composite Reliability and Average Variance Extracted of the concept, we find that neither the value of CR (0.67) nor the AVE (0.41) reach the 0.7 as well as 0.5 cutoff values (Hair et al. 2011), and the situation does not improve either if we preserve only two indicators. In the case of Awareness, the indicators are most probably

so extremely biased that ML will not fit the measurement model, and it is highly probable that this explains the fact that neither Yoo and Donthu (1997, 2001), nor Wasburn and Planck (2002) could estimate awareness as an independent dimension. Atilgan et al. (2009) faced a similar problem, and he had to delete the awareness variables during scale purification.

We expect that Awareness has to be dropped by us as well, but we leave it for the sake of testing and in order to observe the way it behaves in the structural model.

In the case of one of the indicators of Uniqueness, the explained variance of an indicator (Q11) is low (0.35), yet the concept itself shows stability. We keep this indicator in this case as well.

The Q24 indicator of Perceived quality is the only one that has to be deleted because of the very low value (0.21) of the explained variance. If we examine its meaning (*It happened to me that I was disappointed by this brand*), we realize that answering it presupposes several specific experiences. This experience is certainly given to those who possessed the brand, but one of the endeavors of this paper is to achieve an abstract-level measurement in which experience is not a condition. If, for example, the respondent had Samsung mobile telephones, they can give a relevant answer, but if they had no experience with Samsung, they cannot answer this question.

After deleting Q24, the indicators improved further, and now all of them indicate a good fit.

Table 18: Fit indicators, after Q24 deleted

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
557	174	3.2	0.851	0.919	0.902	0.919	0.084

Reliability and validity

In developing the scales we tried to formulate the questions in such a way that they logically share some common content on the one hand, and to avoid the mechanically generated versions of one and the same question on the other. It can be a

consequence of applying the traditional test theory without criticism that researchers formulate their questions in such a way that reliability, usually measured with the Cronbach alpha, or high internal consistency should be assured. A simple method of this is to put questions measuring a certain concept that ask the same thing with minimal modifications. Since we would have liked to avoid this mistake, in developing the scales we paid attention to make every question measure relevant contents different from the others, and in order to achieve this, we used own questions next to the validated ones as well as we modified the questions developed by others.

As a consequence, we have to examine the reliability and validity of the concepts of the initial model.

Table 19: Reliability and validity of brand equity dimensions. 6-factor CFA.

	Awareness	Uniqueness	Advantage	Perceived quality	Activity	Trust
CR	0.67	0.79	0.91	0.86	0.89	0.89
AVE	0.41	0.56	0.72	0.62	0.67	0.74

Except for Awareness and Uniqueness, the reliability and convergent validity significantly exceed cutoff values of 0.7 and 0.5 (Hair et al. 2009).

We can read another piece of important information from the CFA model. If we ask the Amos to show the standardized coefficients on the diagram, it uses the correlation values instead of covariances to characterize the relationships between the latent variables. The correlation is so high (0.95) between two dimensions, Trust and Perceived quality that it is not well-grounded to regard them as independent factors; for this reason, their indicators have to be combined in one single dimension.

Before doing so, however, we have to reformulate the meaning of the new dimension and we have to examine the variables measuring Perceived quality whose contents show resemblance to the questions of Trust.

The questions for Perceived quality are the following:

- Q20. I think this brand is made by taking into account the requirements of high quality.
- Q21. I feel that all products sold under this brand name are of excellent quality.
- Q22. I think this brand always provides the same quality
- Q23. I think this brand is operational under all circumstances.

If we examine Perceived quality in the light of CFA results, it becomes obvious that except for question Q20, the problem formulated in the other three questions is also a matter of Trust. If we formulated, for example, that *all products sold under this brand name are of excellent quality*, the respondents might have answered relying on the trust in the brand. If we imagine a situation in which a consumer considers buying another product of a brand, it will be trust in the brand, in lack of specific experience that might help in making the decision to purchase.

Further on, the consistency measured by the Q22 variable stands at the basis of trust. We trust a brand because it always provides the same value, and we may not trust a brand because we are afraid of not getting the quality we expect at some time, any time. If we reformulate the question from the consumer's point of view (*it functions reliably*), we can also discover the shared content that relate the Perceived quality questions to the other Trust variables. Regarding its meaning, Q20 does not closely follow this logic, but even this question can be interpreted as a reflection of a consumer attitude that is related to the trust in the manufacturer producing the brand. If we agree with the statement formulated in Q20, we also show trust in the manufacturers, as we believe they do their best to meet quality requirements.

Answering quality-related questions can be a tricky task. Therefore we assume that when consumers evaluate perceived quality, they use trust in the brand as a proxy in answering the questions.

So if we would like to give meaning to a new latent variable created by combining Perceived quality and Trust, we can mostly seize it in the formulation Trust in quality.

The estimation of the five-factor CFA yielded no significant change in overall goodness of fit, neither in the presence of the problematic Awareness nor in that of Uniqueness with lower reliability and validity.

Table 20: Fit indicators. Five factor CFA

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
586	179	3.2	0.842	0.914	0.90	0.914	0.085

The validity of the model is also dependent on the significance level of the weights. In the table below we see that every parameter estimate representing the paths from dimensions to their indicators is significant.

Table 21: Significance of parameters. 6-factor CFA

	Estimate	S.E.	C.R.	P	Label
Q7N1AW <--- Awareness	.390	.047	8.326	***	par_1
Q8N2AW <--- Awareness	.476	.052	9.087	***	par_2
Q9N3AW <--- Awareness	1.000				
Q10N1UQ <--- Uniqueness	1.000				
Q11N2UQ <--- Uniqueness	.698	.067	10.440	***	par_3
Q12N3UQ <--- Uniqueness	1.116	.079	14.075	***	par_4
Q16N1AV <--- Advantage	1.043	.052	20.031	***	par_5
Q17N2AV <--- Advantage	.969	.049	19.967	***	par_6
Q18N3AV <--- Advantage	.957	.066	14.505	***	par_7
Q19N4AV <--- Advantage	1.000				
Q28N1AT <--- Activity	1.011	.062	16.375	***	par_8
Q29N2AT <--- Activity	1.065	.060	17.686	***	par_9
Q31N4AT <--- Activity	1.000				
Q32N5AT <--- Activity	.984	.063	15.560	***	par_10
Q33N1TR <--- Trust	1.000				
Q34N2TR <--- Trust	.924	.042	22.062	***	par_11
Q35N4TR <--- Trust	.972	.050	19.395	***	par_12
Q23N4PQ <--- Trust	.800	.057	13.950	***	par_23
Q22N3PQ <--- Trust	.803	.044	18.194	***	par_24
Q21N2PQ <--- Trust	.839	.047	17.882	***	par_25
Q20N1PQ <--- Trust	.742	.038	19.734	***	par_26

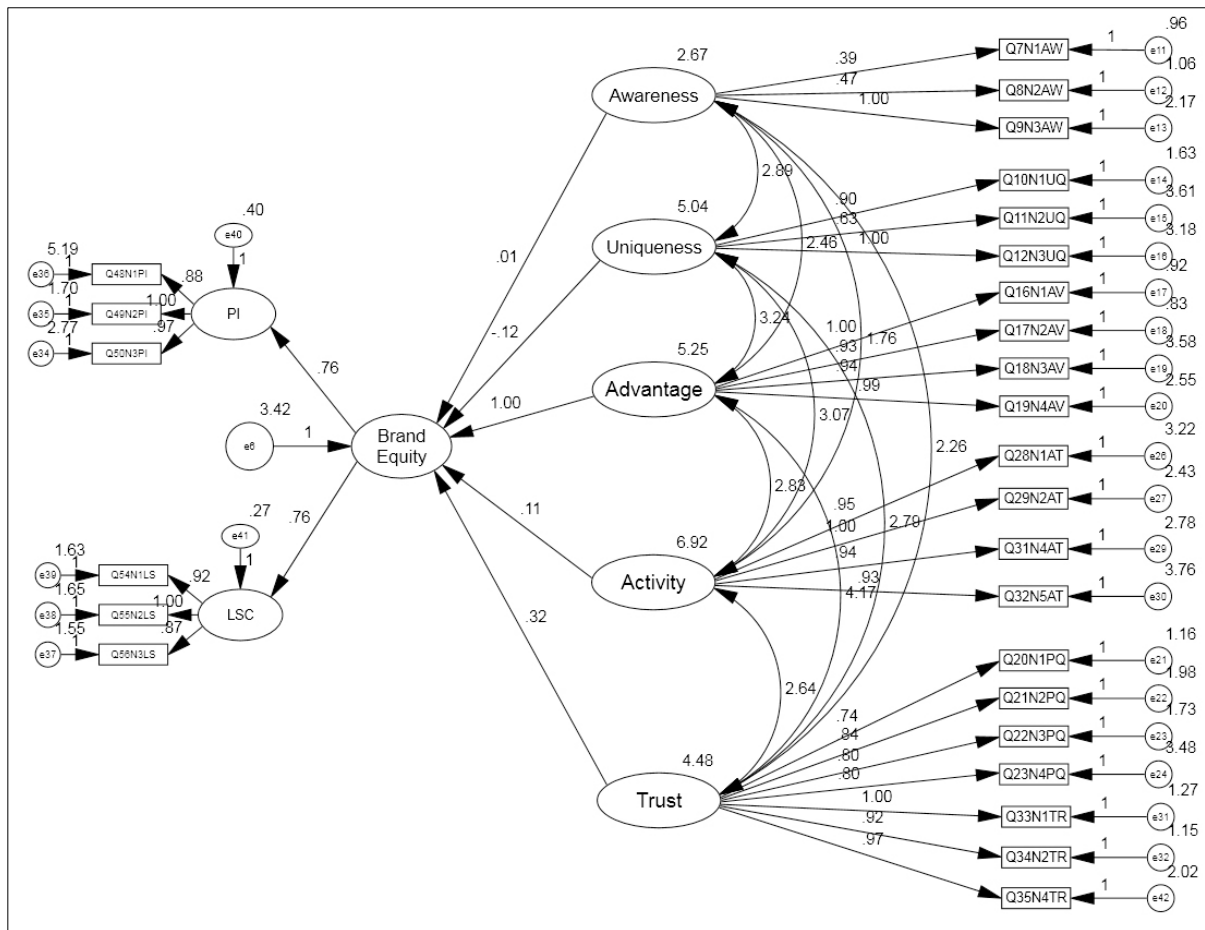
Taking into account the fit indicators, the size and significance of weights we accept the fit of the measurement models and step further to assess the fit of the structural model.

4.1.3 Searching for the appropriate causal specification

In the structural model below, the central concept is Brand equity measured with causal, first-order latent variables. The PI and LSC variables appear in the model as the consequences of Brand equity.

Pay attention to the fact that based on the CFA analysis the indicators of Perceived Quality are merged with Trust's indicators due to high correlation.

Figure 9: The initial structural MIMIC model of consumer-based brand equity



Every measurement model is scaled, that is, we fixed the weight of an indicator to 1 (scaling rule); as a consequence, Amos estimates the value of the unstandardized weights between 0 and 1, otherwise the result cannot be interpreted. We always scale the item with the largest weight to 1, thus we can examine the extent to which other items loaded onto their factor.

There is a measurement error linked to every measured variable in the model, its effect being fixed to 1 by default. We do not allow measurement errors, by default, to covary freely. If correlation between measurement errors is high (indicated by high modification indices), it might mean that indicators associated with the respective measurement errors share a common variance that the latent variable cannot explain.

Brand equity dimensions have to be regarded as exogenous variables, thus no error is attached to these dimensions. The values printed above the dimensions are variances¹⁵ (e.g. Awareness: 2.67). The dimensions are the causal indicators of Brand equity; therefore we have to allow them to covary freely. In composite models, we assume that causal indicators may have any kind of relationship, even negative one between them. However, we expect causal indicators to share some common contents, from a technical point of view, a positive correlation of an acceptable size should exist between them (Bollen 2011).

The residual error estimated at the level of the consequences of Brand equity corresponds to the variance not explained by the direct effect directed to the latent variable. For instance, the residual error is very low in the case of Purchase intention (0.4).

The error estimated at Brand equity level is one of the most important parameters of the model since it distinguishes the present causal model from the composite models in whose case we assume that composite indicators explain the variance of the latent variable without error. From this point of view, the first estimation of the structural model

¹⁵ If we also estimate disturbance term at the level of first-order latent variables in a Type II model, then its variance corresponds to the variance of the latent variable, and thus it cannot be interpreted as a disturbance term.

is already promising, since if we examine the standardized coefficients (Squared Multiple Correlation), we find that 71% of Brand equity can be explained.

As we had to allow Amos to estimate the covariances between first-order latent variables freely, a significant part of the coefficients cannot be read from the diagram. In the present case, however, we are not interested in the path estimates of representing the paths from the first-order latent variables to their indicators as these are significant, while some of the path estimates from the causal first latent variables to Brand equity are not significant.

Table 22: Significance of brand equity dimensions

			Estimate	S.E.	C.R.	P
Brand equity	<---	Trust	0.315	0.182	1.735	0.083
Brand equity	<---	Uniqueness	-0.116	0.144	-0.807	0.419
Brand equity	<---	Awareness	0.007	0.219	0.031	0.975
Brand equity	<---	Advantage	1			
Brand equity	<---	Activity	0.109	0.066	1.658	0.097

The effect of Awareness and Uniqueness on Brand equity in this model cannot be interpreted because of the unacceptable significance levels. In the case of Awareness, there have already been signs indicating that we cannot keep it in the model; now with this significance level (0.97) we definitely eliminate it from the model. Most probably we cannot preserve Uniqueness either, but we re-estimate the model with four dimensions and we receive the following fit indicators:

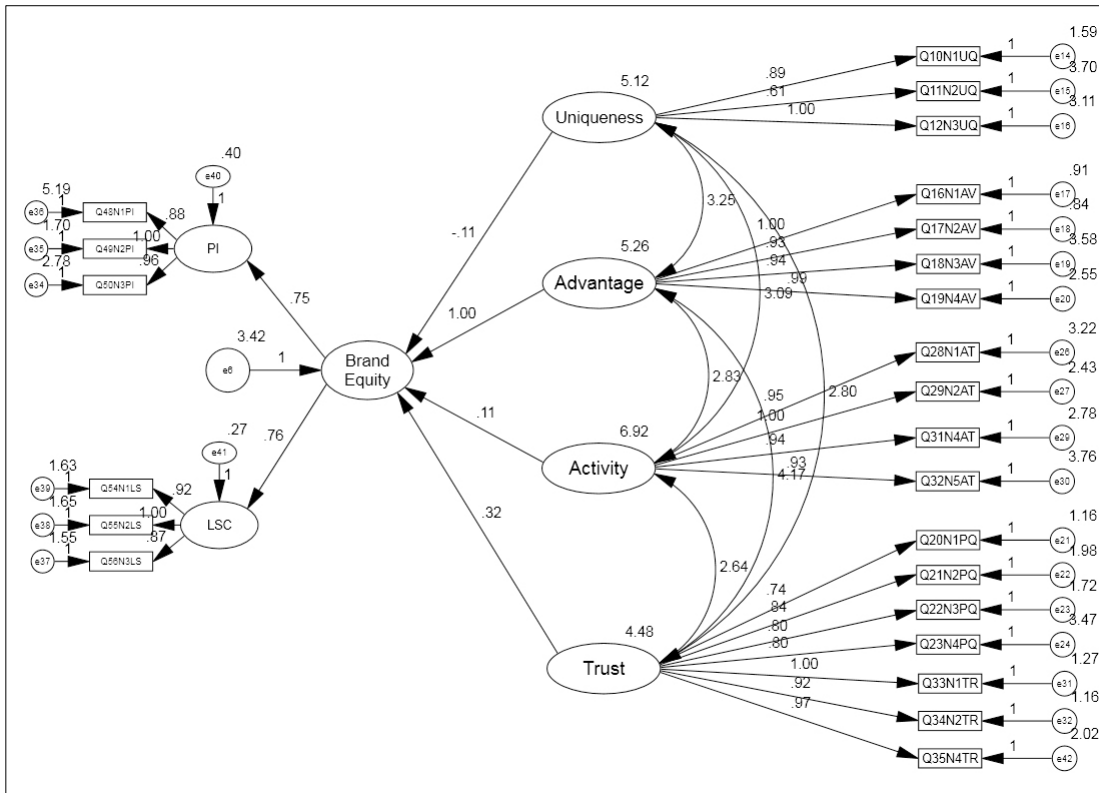
Table 23: Fit indicators (F. 10)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
634	240	2.64	0.847	0.937	0.928	0.937	0.072

The four-dimension solution now indicates a good fit, but the presence of Uniqueness cannot be interpreted in itself in the model, the negative and low sign indicates validity problems as in the case of Acitivity (Bollen 2011).

The significance level of the two dimensions, Uniqueness (0.192) and Activity (0.092) also supports the problem signaled by the low weights. Since we know that our data are not characterized by multivariate normality, it is important that we analyze the model with the bootstrap method as well, as normality problem may cause significance problems. The bootstrap procedure, however, gave a worse result, since the significance level dropped in the case of Uniqueness to 0.251 and Activity to 0.115.

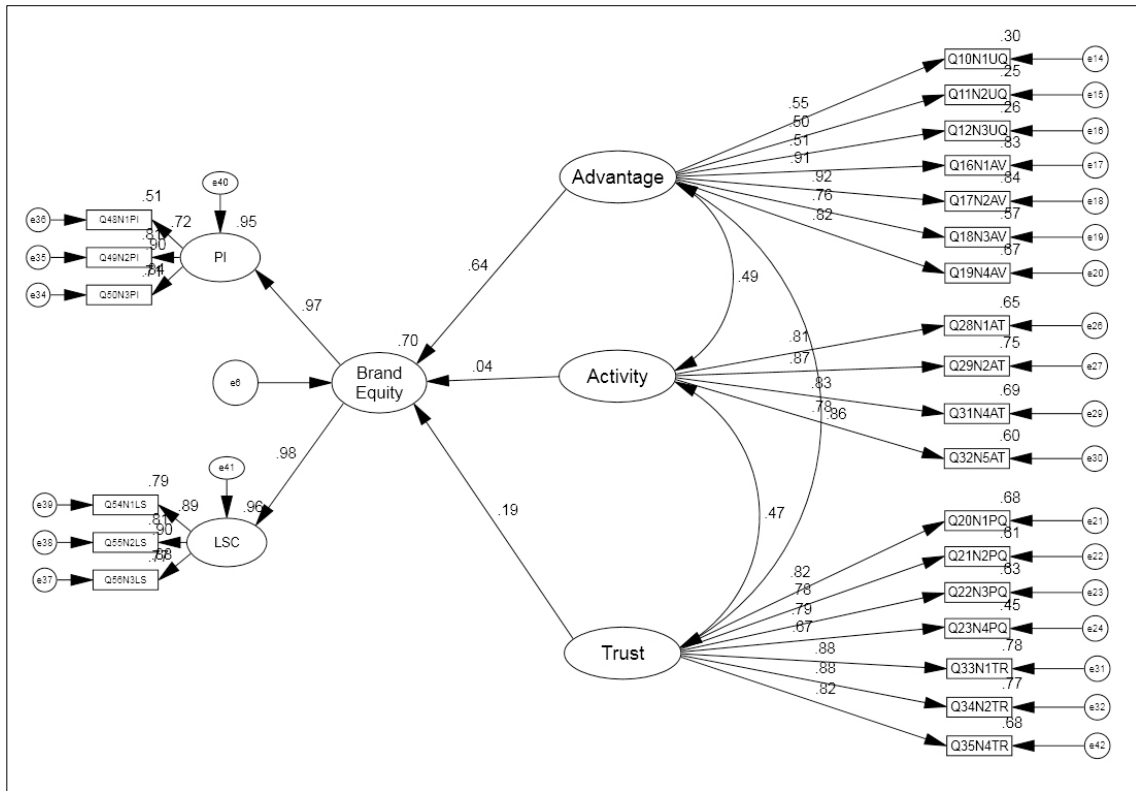
Figure 10: The structural MIMIC model of consumer-based brand equity. 4-factor solution



Since in the stage phase of the conceptual planning of the model we defined Uniqueness and Advantage as more generally interpretable differentiation, it is worth examining the extent to which the contraction of the two dimensions improves the fit of our model.

At this point it is also important to note that combining the two dimensions is also supported by the fact that consumer-based brand equity is generally affected by the halo effect and the common method bias. The most eloquent example is probably the Lehman et al. (2008) research, where a huge number of brand equity scales were used, and 64% of the variance of the variables included in the analysis was explained by a single factor (it was 44% in our case). The presence of the halo effect is most probably due to the thing we would like to measure, that is, the strong effect of brands on consumers. It can have the consequence that consumer-based brand equity is not well represented by the hypothesized multidimensional model.

Figure 11: The structural MIMIC model of consumer-based brand equity. 3-factor solution



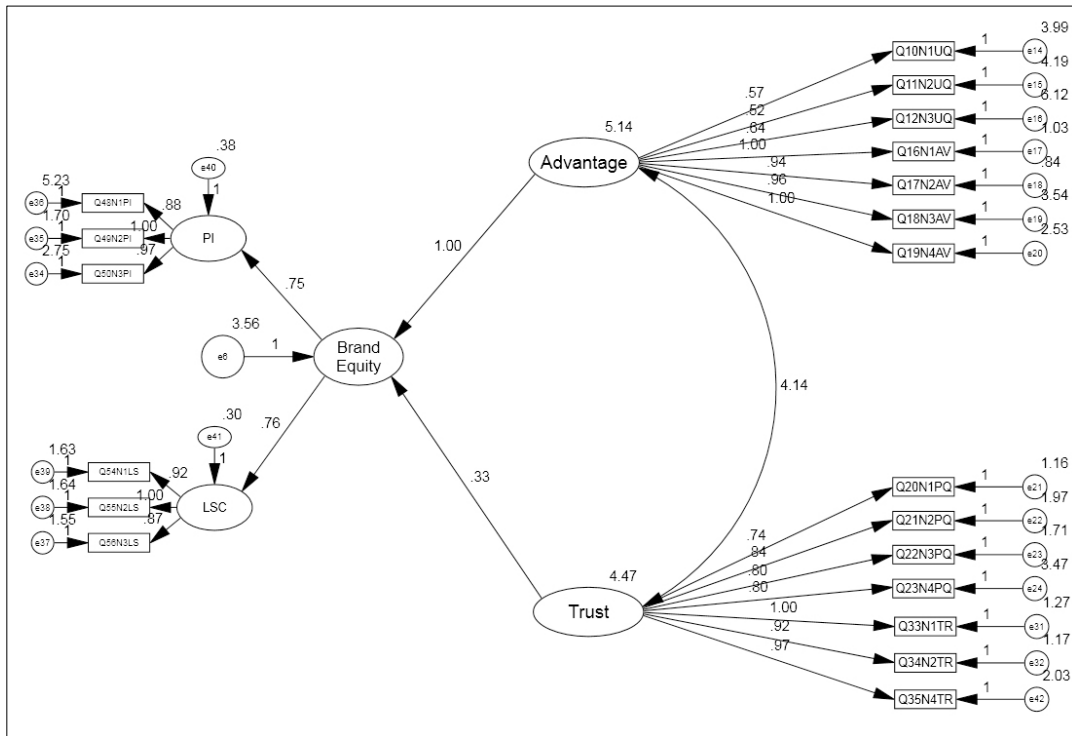
The diagram above shows the standardized estimates of the three factor model. Our analysis so far is supported by the fact that the explained variance of Brand equity is still 70%, and Brand equity well explains Brand equity consequences. However, the

Activity dimension does not fit in the model, it has almost no explanatory power, and its effect on Brand equity is implicitly not significant.

At this point, most probably we have to eliminate Activity from the model as well, since even if we get excellent fit indicators, the model cannot be accepted and interpreted in this form.

If we rethink the arguments supporting the inclusion of the Activity dimension in the conceptual model, we find that perhaps the most important factor was the appearance of the social communities with increasingly great social effect. In the present case we may consider the inclusion of Activity as a mistake, mostly because it stood out of the conceptual frame, since we interpreted behavior-like concepts as consequences of brand equity rather than parts of it.

Figure 12: The MIMIC model of consumer-based brand equity. 2-factor solution



The two-dimensional solution above represents the best fit to the data so far. Every path estimate is significant, and the fit indicators are good at the same time.

Table 24: Fit indicators (F. 12)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
606	165	3.6	0.826	0.918	0.905	0.918	0.092

In a review of the standardized estimates (not published here) we can see that indicators of Uniqueness do not load as expected onto the Advantage factor. Indicators of Uniqueness did not add any information to the central concept, and cannot fit into a general Differentiation construct either; the low values explained variance between 0.25 and 0.3 of the uniqueness indicators signal that these indicators do not contribute to the assurance of the convergent validity of the latent variable.

We decided to eliminate the Q10, Q11 and Q12 variables from the model as well, but before that we try to find an explanation why they do not fit into the model. Question Q10 declares that *this brand has unique characteristics*. The problem in this case may be caused by the misuse of a high abstraction level question.

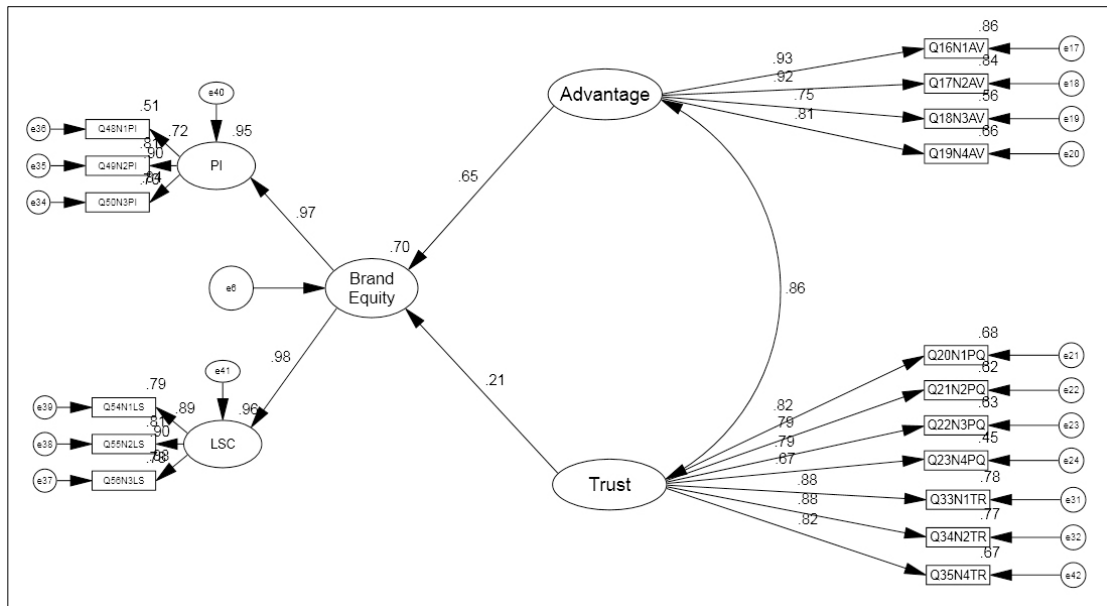
In the conceptual planning stage of consumer-based brand equity we formulated it as an important requirement that the dimensions should be interpretable at a high abstraction level. We might as well regard searching for the causal specification of consumer-based brand equity as a process in which we test the dimensions that meet the requirements of the high abstraction level. Meeting the requirements here means that the respondents can answer confidently the questions that measure concepts that can refer to any brand.

If we think over the meaning of Q10, we can formulate it to ourselves that it is difficult to assume about a brand such as Nokia that it has unique characteristics in comparison to other mobile brands. Q10 might have been a relevant question ten or twenty years ago, but under the circumstances of the oligopolistic markets it is not any longer, that is, brands are difficult to differentiate on the basis of unique characteristics. More appropriate for this is the benefit provided, the value that consumers get for their money. In a different approach, a brand such as Nokia can hardly be characterized generally from the point of view of unique characteristics as compared to the other mobile telephone brands. In the case of certain Nokia mobile telephone models, consumers might feel the presence of unique characteristics, but at the level of the Nokia

brand this is rather problematic. Further on, manufacturers who appeared on the market with really unique, novel models (Apple - iPad) can only preserve their position for a very short time, and it is supposedly not known to many that the unique characteristics of the mp3 player were also developed by Apple, since several successful concurrent are also present on the market.

The Q11 question (*this brand represents a product category in itself*) can acceptably characterize the outstanding uniqueness of a brand, however, respondents were confused by the question. The truth is that there can only be a few brands nowadays that this statement holds true for, and a significant proportion of the respondents interpreted the question word for word. If earlier we assumed that respondents could hardly give relevant answers to Q10, then it also follows from this that answering question Q12 (*I could easily explain to my acquaintances why this brand differs from others*) is also problematic, since if the interviewees can formulate the answer with difficulty, they can hardly explain it to others either.

Figure 13: The MIMIC model of consumer-based brand equity. Standardized version.



The improvement in the model fit of the 2 factor model above is spectacular in comparison to the previous model, for instance, the chi-square has decreased to half its earlier value.

Table 25. Fit indicators (F. 14)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
348	114	3.05	0.875	0.952	0.943	0.952	0.081

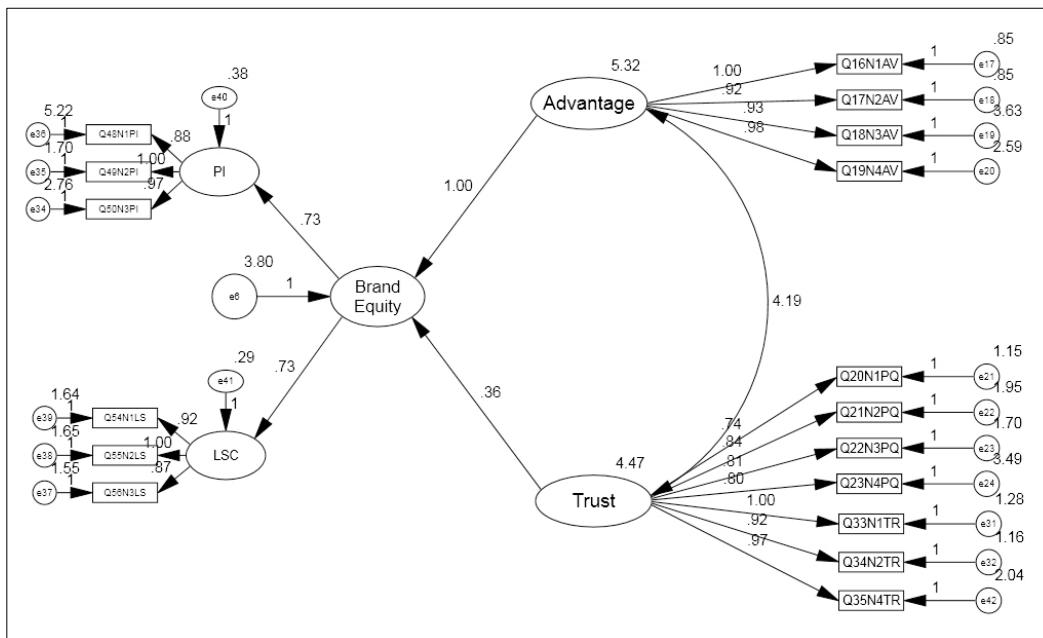
The significance levels, the weights and model fit support the above two-dimensional solution; at the same time, the interpretability of this model seems to be the most relevant to us.

We close the search for the appropriate causal specification with the acceptance of an unexpected, exciting result. The presentation of the final model, the analysis of its reliability and validity will be carried out in the following chapter.

4.3. Assessing the final model

Although we accepted the two-dimensional model as the best solution, it is important to analyze the model in details in order to reach appropriate model fit and validity.

Figure 14: The MIMIC model of consumer-based brand equity.



The explained variance of Brand equity on the earlier diagram (0.70) indicates that we preserved the variables which originally also contributed to the explanation of this variance, that is, we qualify our causal specification as successful, since we were able to reach a good fit with a low disturbance term (3.8).

Earlier we also paid attention to make our questions meet the conceptual requirements, so we examine the questions in our final model once again to assure content validity. We found a single variable (Q35 – *If you want to buy a mobile telephone, this choice is the safest solution*) that contained a definite hint at buying, which cannot remain on the attitude- nature trust scale even if the statement is a kind of manifestation of trust.

In reviewing modification indices, we found the most striking values in the case of the e42 measurement error associated with Q35. The 30.57 modification index signals that if e42 disturbance term and the Trust dimension are allowed to correlate freely, the chi-square decreases with 30.57. However, there is no theoretical support to let this correlation be freely estimated.

Further on, if the correlation between Q35 and Q49 were freely estimated, the value of the chi-square would decrease with 11.96. All these support our worry that the explicit reference to buying might connect Q35 with the consequences.

Table 26: Fitting the accepted model with the help of modification indices

			M.I.
e42	<-->	Trust	30.574
e42	<-->	Advantage	41.673
Q35N4TR	<--->	Q49N2PI	11.962

A measurement error (e21) associated with Q20 stood out with an even higher value in the modification index table. At the same time, the significance level of the Trust dimension – to which Q20 belongs – is somewhat below the acceptable value (p=0.81). The Q20 statement (*This brand is produced by taking into account high quality requirements*) might confuse the respondents as it could allude to some knowledge they do not possess.

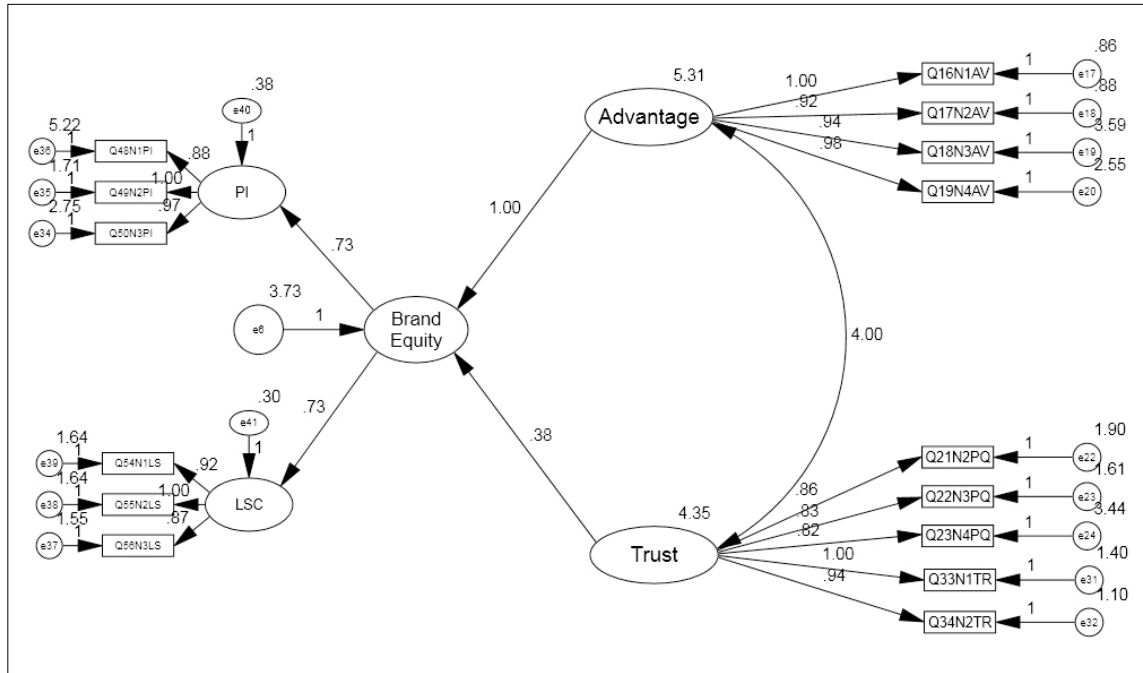
Table 27: Fitting the accepted model with the help of modification indices

			M.I.
e21	<-->	e6	13.445
e21	<-->	e42	11.404
e21	<-->	e22	10.188

After eliminating Q20 from the model, the significance problem is solved as well, the parameter representing the path from Trust to Brand equity significantly differs from

0 ($p=0.031$), the parametric bootstrap not supposing multivariate normality showed an even better result ($p=0.01$).

Figure 15: The final MIMIC model of consumer-based brand equity



The finally accepted model estimated with purified scales is presented by the diagram above. Further on, we present the fit indicators of the model, the significance level of the direct effects, and then we examine the composite reliability and the conceptual validity again in order to establish the final acceptability of the scales. After the methodological characterization of the model, we describe it from a theoretical point of view and we make an attempt to interpret this result within the framework of the consumer-based brand equity literature as well.

The fit indicators of our consumer-based brand equity model are really quite excellent.

Table 28: Fit indicators (F. 21)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
216	85	2.54	0.909	0.969	0.961	0.968	0.07

The relative chi-square value dropped below 3, GFI increased above 0.90, but probably the most important fact is that the values of IFI, TLI and CFI are above 0.95, which already meets more conservative requirements as well.

There is another important and proposed fit indicator (Hu and Bentler 1999), the SRMR, which we present here. The SRMR¹⁶ measures the mean difference between the predicted and observed covariances in the model. Its 0.05 value indicates a good fit. It is not printed in the output by the Amos, so it has to be calculated separately. In the present case, the value of the SMRM is 0.0348, which, in accordance with the comparative indicators, indicates an excellent fit.

The estimates representing the paths from the measured variables to latent variables are all significant.

Table 29: The significance of the parameters of the accepted model

			Estimate	S.E.	C.R.	P (ML)	P(BS)	Est. (BS)
Brand equity	<---	Advantage	1				...	1.000
Brand equity	<---	Trust	0.379	0.176	2.155	0.031	.010	.379
PI	<---	Brand equity	0.726	0.091	7.937	***	.002	.726
LSC	<---	Brand equity	0.732	0.092	7.981	***	.002	.732
Q16N1AV	<---	Advantage	1				...	1.000
Q17N2AV	<---	Advantage	0.918	0.033	27.509	***	.002	.918
Q18N3AV	<---	Advantage	0.938	0.053	17.652	***	.002	.938
Q19N4AV	<---	Advantage	0.98	0.047	20.804	***	.002	.980
Q33N1TR	<---	Trust	1				...	1.000
Q50N3PI	<---	VSZ	0.967	0.047	20.462	***	.002	.967
Q49N2PI	<---	VSZ	1				...	1.000
Q48N1PI	<---	VSZ	0.879	0.057	15.39	***	.002	.879
Q56N3LSC	<---	AKK	0.87	0.037	23.321	***	.002	.870
Q55N2LSC	<---	AKK	1				...	1.000
Q54N1LSC	<---	AKK	0.92	0.039	23.655	***	.002	.920
Q34N2TR	<---	Trust	0.945	0.044	21.231	***	.002	.945
Q21N2TR	<---	Trust	0.86	0.049	17.572	***	.002	.860
Q22N3PQ	<---	Trust	0.829	0.046	18.051	***	.002	.829
Q23N4PQ	<---	Trust	0.82	0.059	13.812	***	.002	.820

¹⁶ Standardized root mean square.

Since our data did not meet multivariate normality, it is important to examine the validity of the model also with the bootstrap method independent from multivariate normality (Arbuckle 2010, Byrne 2010, Schumacker and Lomax 2010). In the last P(ML) column of the table below we can see the significance values following the ML estimation, while the penultimate column shows the significance levels estimated by the parametric bootstrap on a sample of 1,200. Because all bootstrap estimates were significant, we can accept our model estimated by ML even in the lack of multivariate normality. In the last column we can see the parameters estimated by the parametric bootstrap, and since their values slightly differ from the values estimated by the ML, this result also enhances the validity of our model.

Another important measure of the goodness of fit is the standardized residual matrix. Fit indicators measure the goodness of fit in a single indicator, and it might happen that model fit is accepted on good indices, whereas in the case of some variables there is a bigger than acceptable difference between the predicted and observed covariances.

Table 30: The matrix of the standardized residuals

	Q34	Q54	Q55	Q56	Q48	Q49	Q50	Q33	Q23	Q22	Q21	Q19	Q18	Q17	Q16L
Q34	0.0														
Q54	0.1	0.0													
Q55	-0.1	0.1	0.0												
Q56	0.1	-0.2	0.1	0.0											
Q48	0.0	0.0	-0.1	-0.1	0.0										
Q49	-0.1	0.2	-0.2	-0.1	0.3	0.0									
Q50	0.4	-0.2	0.0	0.4	-0.4	0.0	0.0								
Q33	0.0	0.3	-0.1	0.4	0.0	0.0	0.2	0.0							
Q23	0.0	0.4	0.3	0.2	-0.2	0.0	0.6	-0.1	0.0						
Q22	0.0	-0.3	-0.2	-0.1	-0.1	-0.4	0.0	0.0	0.0	0.0					
Q21	0.0	-0.2	-0.3	0.1	-0.5	-0.3	0.2	-0.1	0.1	0.2	0.0				
Q19	-0.1	0.4	0.8	0.3	0.8	0.6	0.5	-0.1	-0.1	0.1	-0.1	0.0			
Q18	-0.2	0.5	0.8	0.1	0.7	0.5	0.7	-0.3	0.4	-0.1	-0.1	0.8	0.0		
Q17	0.0	-0.2	-0.3	0.1	0.1	-0.3	-0.1	0.2	0.0	0.0	0.1	-0.2	-0.2	0.0	
Q16	0.0	-0.2	-0.3	-0.1	0.3	-0.2	-0.1	0.0	-0.2	-0.1	0.1	-0.1	-0.1	0.1	0.0

Since we cannot interpret the value of residuals, we examine their standardized value, and if we find a value greater than 2.58 (Jöreskog and Sörbom 1993), this indicates problem with model fit in the case of the respective variables. In the matrix above, the low value of the residuals justify the excellent fit of our model.

Estimating categorical variables in Amos

The Maximum Likelihood estimation can be used in the case of continuous variables by default; however, in practice, the application of the ML is widespread in the estimation of models built with categorical variables (e.g. measured on Likert scale) (Byrne 2010). Amos recommends Bayesian estimation for estimating categorical variables, and if our model is correctly specified and stable enough, there will be no significant differences between the estimations.

In order to justify the use of ML estimation in the case of our categorical variables measured on the nine-point scale, we compare the parameters of the model with the Bayesian estimations. The Bayesian estimation can be accepted if the convergence criterium is fulfilled, that is, the largest C.S. value is less than 1.002 (Byrne 2010). In the window of the Bayesian estimation a smiley face indicates that the sampling has converged; in our case, the value of 1.004 indicates appropriate convergence.

Figure 16: The Bayesian estimation of the final consumer-based brand equity model

	Mean	S.E.	S.D.	C.S.	Skewness	Kurtosis	Min	Max	Name
Regression weights									
K17N2EL<--Elony	0.918	0.000	0.033	1.000	0.114	0.088	0.788	1.069	
K18N3EL<--Elony	0.938	0.001	0.054	1.000	0.070	0.000	0.712	1.161	
K19N4EL<--Elony	0.979	0.001	0.049	1.000	0.057	0.074	0.788	1.221	

In the table below we compare the parameters of the ML and the Bayesian estimations. Since there is no difference that we could qualify as significant, we consider that the parameters of our model can be accepted, and thus we have proved its stability with another method as well.

Table 31: Comparing the ML and the Bayesian estimations

			ML estimation	Bayesian estimation
Brand equity	<---	Trust	0.379	0.449
PI	<---	Brand equity	0.726	0.702
LSC	<---	Brand equity	0.732	0.709
Q17N2AV	<---	Advantage	0.918	0.918
Q18N3AV	<---	Advantage	0.938	0.938
Q19N4AV	<---	Advantage	0.98	0.979
Q50N3PI	<---	PI	0.967	0.968
Q48N1PI	<---	PI	0.879	0.88
Q56N3PI	<---	LSC	0.87	0.871
Q54N1LSC	<---	LSC	0.92	0.921
Q34N2TR	<---	Trust	0.945	0.95
Q21N2TR	<---	Trust	0.86	0.863
Q22N3TR	<---	Trust	0.829	0.832
Q23N4TR	<---	Trust	0.82	0.824

Reliability - Validity

In order not to accept the model merely on the basis of fitting and significance levels but also examine its conceptual validity, in the following we analyze its convergent and discriminant validity.

Convergent validity

The four indicators presented in the table below serve for establishing the convergent validity. The standardized regression weights and the explained variance

(SMC) serve for measuring the reliability and validity of indicators, while CR and AVE that of the latent variables. The standardized values and the explained variance (SMC) are oriented in the output by Amos, the values of the CR and AVE have to be calculated on the basis of the formulas given by Hair et al. (2009).

Table 32: The convergent validity of the accepted model

	Composite Reliability	Average Variance Extracted	Standardized Regression Weight	Variance Extracted (SMC)
Advantage	0.91	0.73		
Q16N1AV			0.93	0.86
Q17N2AV			0.91	0.82
Q18N3AV			0.75	0.56
Q19N4AV			0.82	0.67
Trust	0.90	0.65		
Q21N2PQ			0.79	0.63
Q22N3PQ			0.81	0.66
Q23N4PQ			0.68	0.46
Q33N1TR			0.87	0.76
Q34N2TR			0.88	0.78
Purchase intention	0.86	0.67		
Q48N1PI			0.71	0.51
Q49N2PI			0.9	0.81
Q50N3PI			0.84	0.71
Low search cost	0.92	0.79		
Q54N1LSC			0.89	0.79
Q55N2 LSC			0.9	0.81
Q56N3 LSC			0.88	0.78

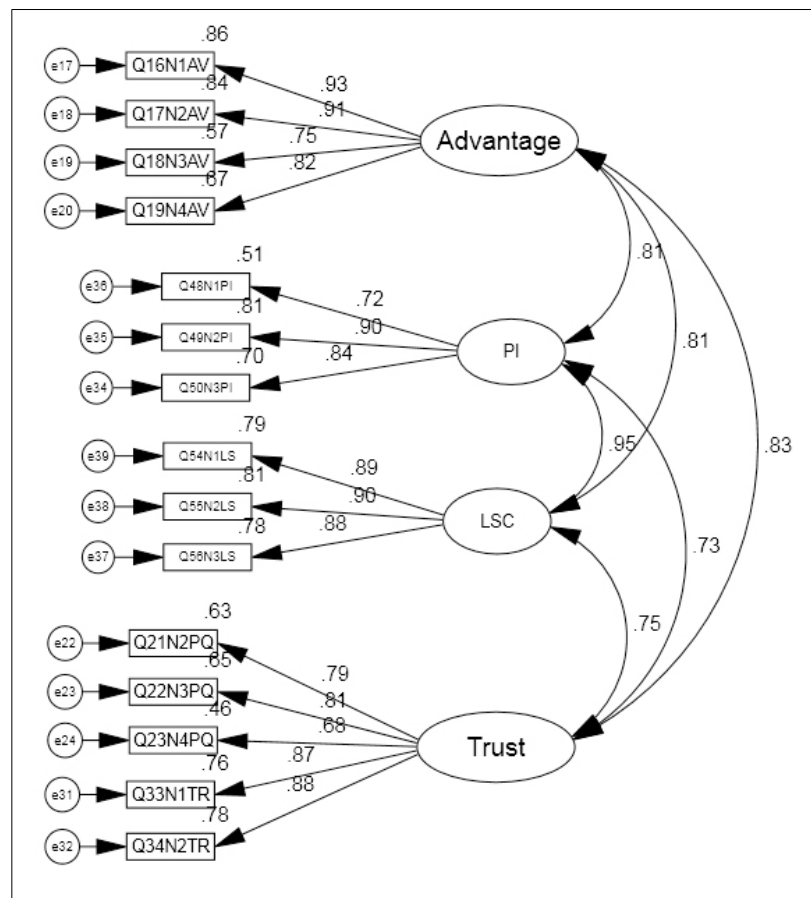
According to the requirements referring to the low values formulated by Hair et al. (2009), all variables except for one fully contribute to the assurance of validity. The explained variance of the measured variables, except for Q23, exceeds 0.5 and the standardized coefficients all exceed the 0.7 value. In the case of Q23, even if it is slightly less than the cutoff value, we decide to keep it in our model.

We were able to assure the reliability of the four latent variables. In all the four cases, the CR exceeds the 0.7 value, similarly, the AVE exceeds the 0.5 value, that is, we assume that our variables correctly map the contents of the dimensions.

Discriminant validity

In analyzing Discriminant validity, we have two options, both of which we will examine. In the first case, we built two CFA models. In the first model, we assess the four factors of the model, while in the second one we assume that every indicator loads onto a single latent variable. If the model fit of the solution with more latent variables is better than the single-latent variable solution, it means that our hypothetical model fits the observed covariance matrix better than the one-latent variable model.

Figure 17: Analyzing discriminant validity. 4- factor CFA



In the model above, the high correlation between the two consequences indicates that Purchase intention and Low search cost may not discriminate well enough.

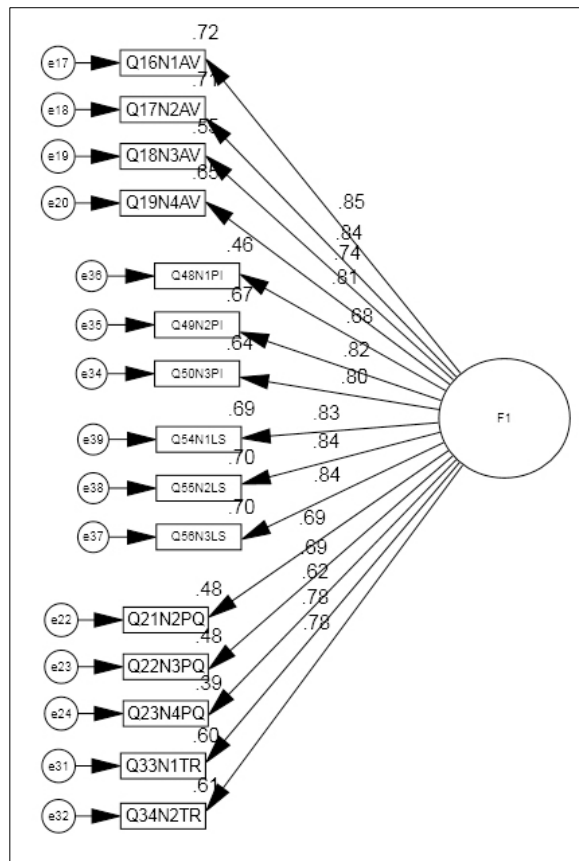
The fit indicators of the multi-factor solution are excellent.

Table 33: Fit indicators (F. 17)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
215	84	2.56	0.909	0.969	0.960	0.968	0.071

In the CFA below, every observed variable loads onto a single factor.

Figure 18: Analyzing discriminant validity. Single-factor solution



The fit indicators of the single-factor represent a poor fit to the data and a substantial decrement from overall fit of the four-factor model. Consequently, we state that the two-factor brand equity model fits the observed covariances much better than the single latent variable model.

Table 34: Fit indicators (F. 18)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
790	90	13.47	0.672	0.832	0.804	0.832	0.157

On the basis of our experiences with the single-factor CFA, data preparation and model fit assessment we find it important to formulate that brand-related research has to face the possibility of bias caused by the halo effect and common method. According to our assumptions, this bias can manifest in the fact that almost every validated construct can be fitted in reflective specification, since they will share some common variance due to brand name and common method.

A more conservative approach of analyzing discriminant validity requires comparison of the average variance explained with the square correlation estimate. If the AVE value of both latent variables is larger than the shared variance (squared correlation), discriminant validity is demonstrated (Hair et al. 2009). In the table below, data of this test can be found.

Table 35: Analyzing discriminant validity according to Hair et al. (2009)

1	2	Correlation ²	AVE1	AVE2	AVE1-Corr. ²	AVE2-Corr. ²
Trust	Advantage	0.68	0.65	0.73	-0.03	0.05
Trust	PI	0.53	0.65	0.86	0.12	0.33
Trust	LSC	0.56	0.65	0.79	0.09	0.23
Advantage	PI	0.65	0.73	0.86	0.08	0.21
Advantage	LSC	0.65	0.73	0.79	0.08	0.14
PI	LSC	0.9	0.86	0.79	-0.04	-0.11

The first column (1) contains the first variable included in the analysis, the second one (2) the second latent variable while the third column contains the square correlation estimates between them. AVE1 column presents the average variance explained of the latent variables in the first column, while AVE2 column that of the latent variables in the

second column. The last two columns contain the difference between the AVE values and the square correlation estimates.

In order to prove discriminant validity, the values in the last two columns of the table above have to be positive. We find three values with negative sign. The first (-0.03) indicates lack of discrimination between the latent variables Trust and Advantage, that is, Trust shares more variance with Advantage than the variance explained of its indicators. One of the most obvious explanations of this is the fact that we preserved the Q23 variable whose explained variance is lower than 0.5. If we eliminated it from among the indicators, the AVE value of Trust would increase to 0.70, while the correlation between Trust and Advantage would remain unchanged, and thus we could also assure the discriminant validity of the Brand equity dimension. Under the present circumstances, we still do not intend to eliminate Q23, since we consider it an important component of the construct. On the other hand, the CFA test completely convinced us that the factors included in the model appropriately discriminate.

In the case of Brand equity consequences, discriminant validity is exclusively proved by the CFA, the deviation from the requirements formulated by Hair et al. (2009) is qualified as low. We consider that we cannot meet stricter requirements because of the presence of the halo effect originating from the brand name.

If we still would like to find a solution to the problem of discriminant validity in the case of the consequences, a plausible thing would be to create composite variables from the latent variables. For this, we used the weights in the Factor Score Weight matrix estimated by Amos, in order to assure that the contents of the consequence-variables are determined only by their indicators and to avoid the biasing effect of the cross-correlations.

If we include the consequences as composite variables in the model, the correlation between the consequences decreases to 0.77, the improvement in the fit indicators shows stability and represents good model fit.

Figure 19: A solution proposal to the problem of discriminant validity

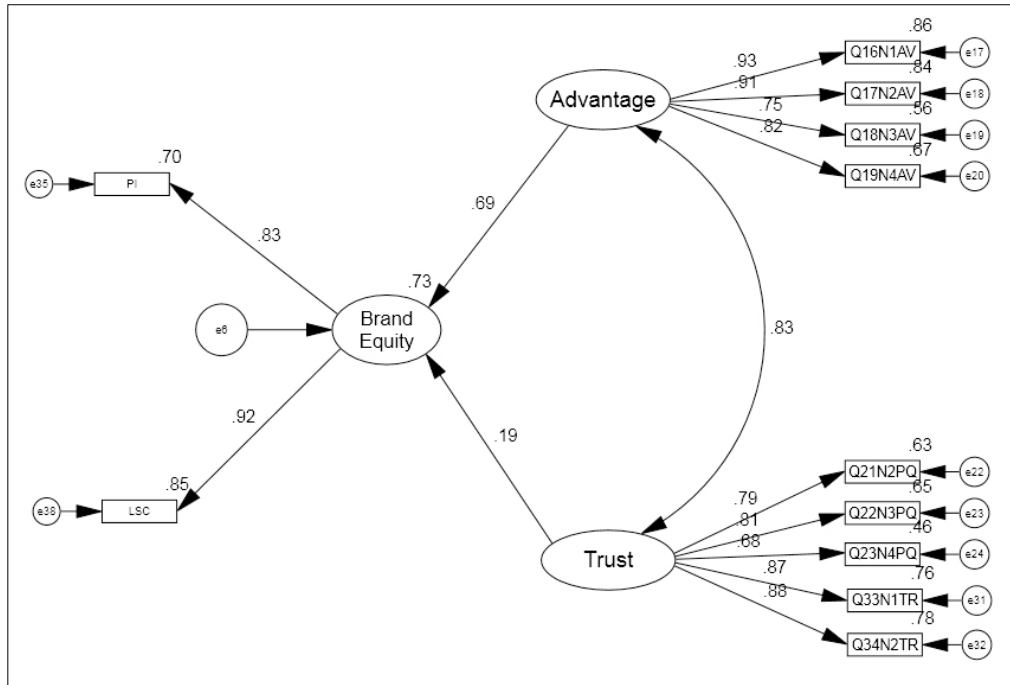


Table 36: Fit indicators (F. 19)

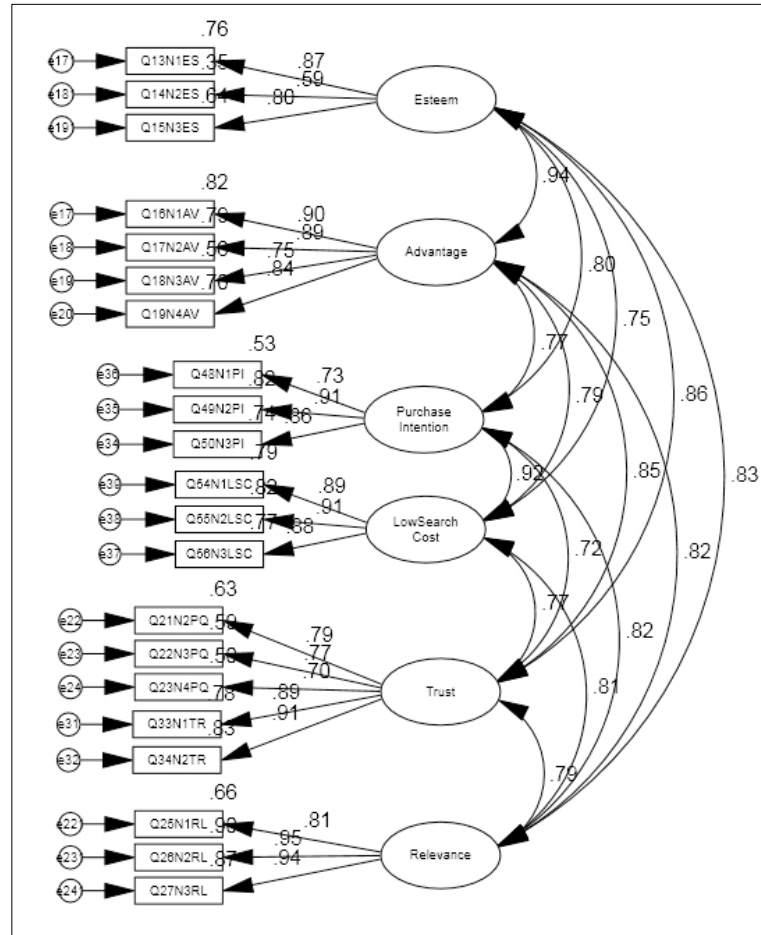
χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
112	41	2.73	0.934	0.975	0.966	0.975	0.074

Diamantopoulos et al. (2008) defined the disturbance term measured at the level of the latent variable as the most important indicator of the validity of the latent variable measured with causal indicators. Disturbance is one of the most important elements of causal specification, because, on the one hand, Brand equity can be considered a latent variable only because we are estimating disturbance (Jarvis et al. 2003, Bollen 2011), on the other hand, its low level is also the indicator of the validity of the variable. In the present case, disturbance expressed in the variance (0.27) indicates that more than 70% of Brand equity variance was successfully explained.

Bollen (1989, 2011) defined the extent and significance of the direct effect between the causal indicator and the latent variable as the most important measure of the validity of the causally measured variables. In the present case, we consider that the

significant relationships between Brand equity and its causal indicators prove the validity of the central concept of the model.

Figure 20: Analyzing the external validity of the dimensions. (CFA 1)

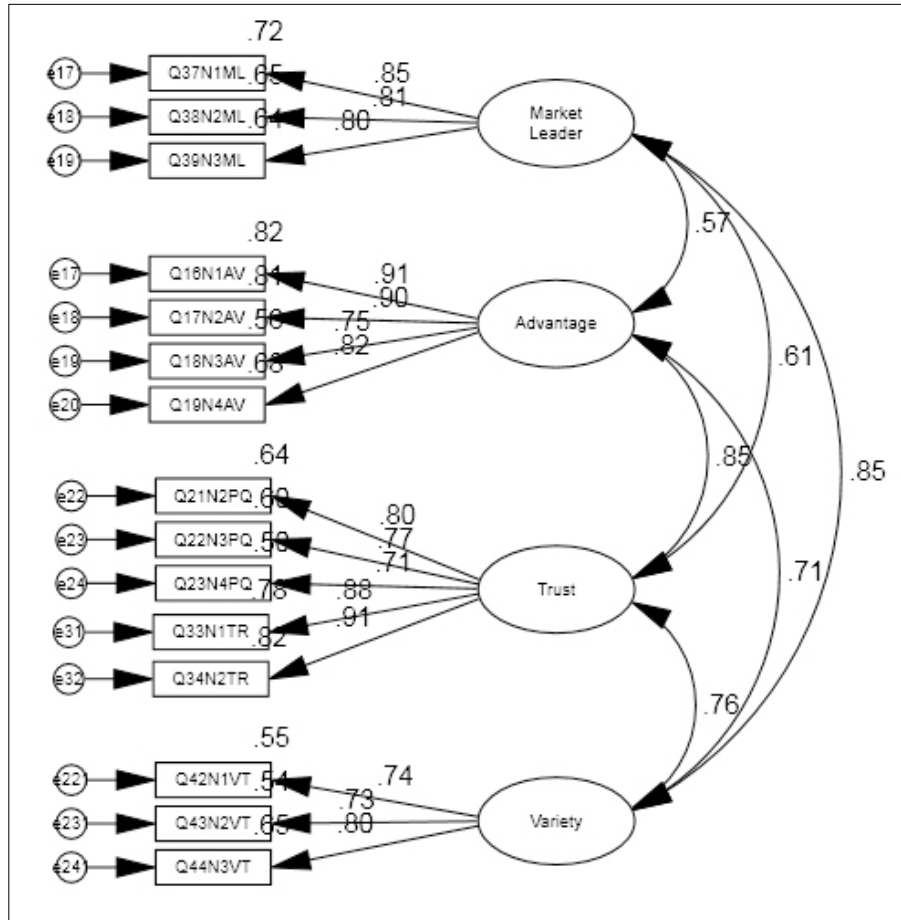


In order to examine the external validity of brand equity dimensions as well, we included two other well-known constructs from the agency-based brand equity measurement, two components of the BAV, Esteem and Relevance. The diagram above shows the correlations between the latent variables of our model and the two BAV dimensions. With the high correlation between the dimensions we proved that the dimensions of the model have valid content in comparison to similar constructs as well.

To further test the external validity, we estimated two own concepts together with brand equity dimensions, Market leadership and Variety. As in the previous cases, here

we also consider that, taking into account the extent of the correlations, we proved the external validity of our concepts.

Figure 21: Analyzing the external validity of the dimensions (CFA 2)



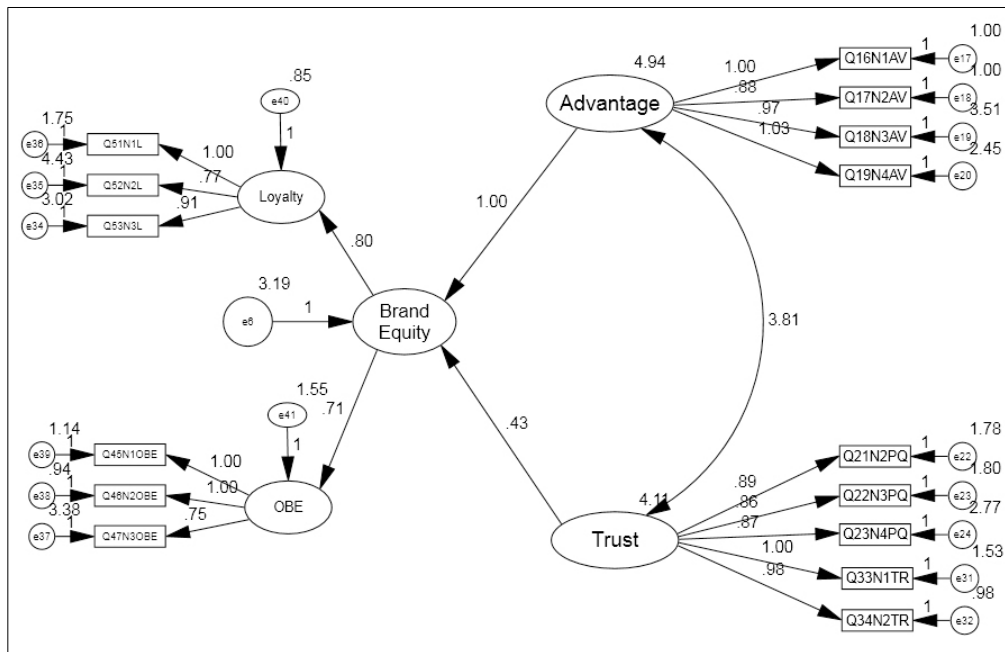
To measure external validity, Bollen (2011) advises to include our model in a larger one, together with both antecedents and consequences. If we receive the result of the expected direction and strength, we proved our theoretical assumptions. In this case, we modeled brand equity together with its consequences and its significant effect is great enough to regard our theoretical assumptions and, at the same time, the external validity proved.

In order to further prove external ability and the stability of the model we tested it with other consequences as well.

The OBE concept (Overall Brand Equity) was developed by Yoo and Donthu (1997, 2000) to test the validity of their consumer-based brand equity model. Loyalty appears in the Aaker (1991) model as part of brand equity.

The consumer-based brand equity model of the present paper, although it considers Aaker's (1991) model and the research based on it (Yoo and Donthu 1997, 2001) as a starting point, interprets loyalty as a consequence. There are two reasons for this. In the conceptual development of the present model we considered it essential that consumer-based brand equity dimensions should be merely attitude-like concepts, and we qualify it as a mistake of the research that Activity was present in the initial stages of the analysis. We consider that the fact that we could not fit Activity into the model supports our previous assumptions. Secondly, we cannot include loyalty in brand equity dimensions because Aaker (1996) qualified willingness to pay price premium as the most important means of measuring loyalty.

Figure 22: Testing the model with other consequences



Two from among the questions used for measuring Loyalty in the present research contain obvious hints at the act of buying (Q52 – *I intend to pay more for this brand*, Q53 – *If I do not find this brand in a shop, I go to another one*). We consider that neither from

the point of view of the content nor technically can variables referring to purchase that predict other purchase-related variables be included in the model.

The stability of the model is spectacularly proved by the fact that it has a good fit with other consequences as well and besides the excellent fit indicators below, the SMRS value (0.03) also indicates a good fit.

Table 37: Fit indicators (F. 22)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
244	88	2.87	0.908	0.964	0.955	0.963	0.075

4.3.1. The applicability of the model in the case of the two other brands

Searching for the causal specification of our consumer-based brand equity model and the assessment of the final model fit were carried out on data referring to the Nokia brand. Measuring consumer-based brand equity is achieved at an abstract level, since a brand can be regarded as valuable by both users and non-users. However, in order to get relevant answers to our questions, there is need for knowledge to some extent in relation with the brand. Since we did not have the opportunity to filter our respondents in advance, we referred our questions to a well-known product category. Since in our data Nokia is the best known brand, we presumed that the most relevant answers were related to the Nokia brand.

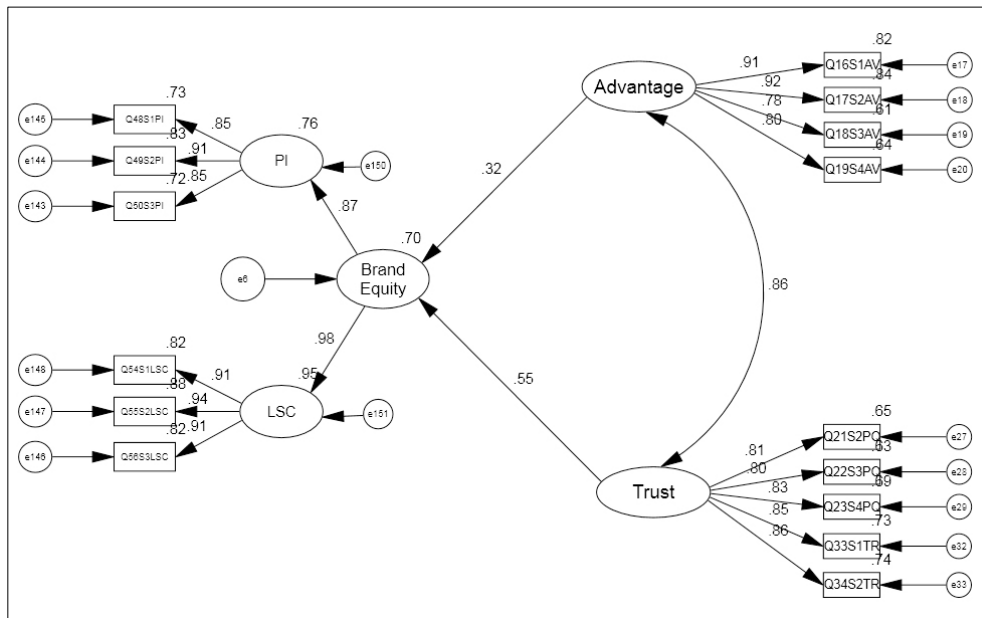
4.3.1.1. The consumer-based brand equity model of Samsung

In the case of the Samsung brand we had to create a database in the way previously presented. We started with 421 observations, and after eliminating the ones with missing data above 30%, 365 were left. Examining the multivariate normality assumption, we eliminated the observations with high Mahalanobis value and the 15-19

age group, thus 313 observations remained, the Mardia's coefficient decreased from 170 to 108, the critical ratio from 37 to 21.

Data imputation was carried out with the help of the Direct ML provided by the Amos, then we weighted the data according to gender and age, and the correlation matrix generated from the weighted data was used in Amos in order to start the assessment of model fit.

Figure 23: Testing the consumer-based equity MIMIC model on the Samsung data



All the fit indicators below can be qualified as good, such important indicators as TLI and CFI approximated the conservative value of 0.95. The 0.05 value of the SRMR also indicates a good fit, showing that there is no significant difference between the covariance matrix estimated by the model and the observed covariance matrix.

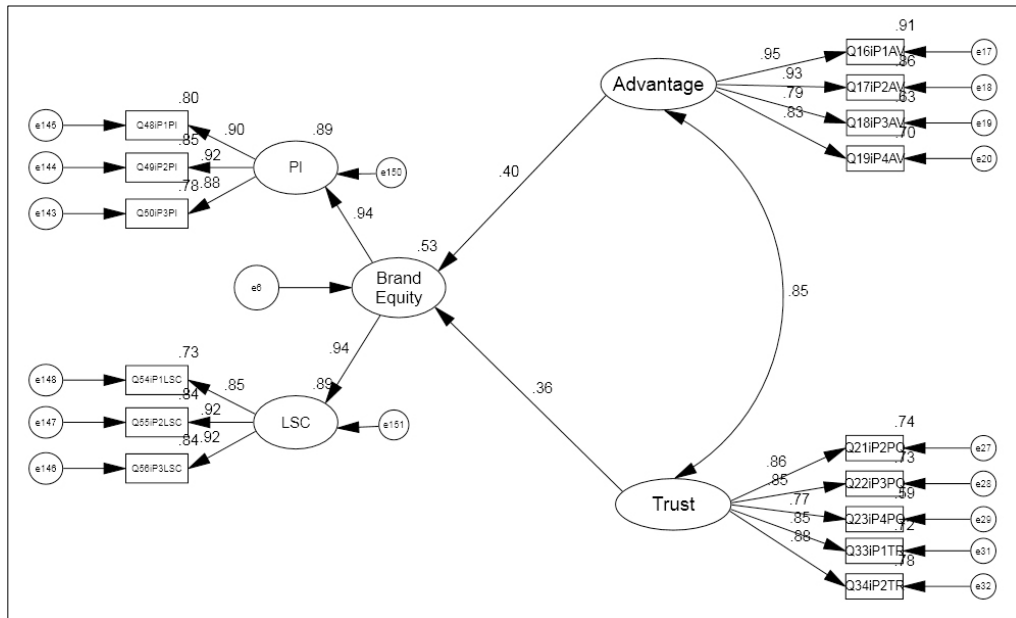
Table 38: Fit indicators (F. 23)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
347	85	4.09	0.864	0.942	0.928	0.942	0.10

4.3.1.2. The consumer-based brand equity model of iPhone

In the case of the iPhone brand, we had to create a database in the way we presented in details earlier. We started with 421 observations, and after eliminating the ones with missing data above 30%, 347 were left.

Figure 24: Testing the consumer-based equity MIMIC model on the iPhone data



Examining the multivariate normal distributions, we eliminated the observations with high Mahalanobis distance, thus 281 observations remained, the Mardia's coefficient decreased from 204 to 107, the critical ratio from 43 to 20. After eliminating the 15-19 age group, 270 observations were left. Data imputation was carried out with the help of the Direct ML provided by the Amos, then we weighted the data according to gender and age, and the correlation matrix generated from the weighted data was used in Amos in order to start the assessment of model fit.

Table 39: Fit indicators (F. 24)

χ^2	DF	CMIN/DF	GFI	IFI	TLI	CFI	RMSEA
491	86	5.7	0.804	0.916	0.897	0.916	0.125

In the case of the iPhone we could expect a less well-fitting model, since awareness of this brand is very low in comparison to the others. Despite the fact that in developing the model we stated that brand equity can be measured among non-users as well, on the basis of the answers and experience with assessing the model fit we have to formulate that some knowledge is necessary for the respondents to give relevant answers.

The relative chi-square, the IFI and CFI values indicate an acceptable fit, and the weak RMSEA is somewhat counterbalanced by the 0.05 value of the SMRM. On the basis of these values we can draw the conclusion important to us, namely that we were able to prove the stability of our model on a database of a weaker quality as well.

4.3.2. Accepting and refusing hypotheses

In the table below I summarize the hypotheses of the paper and their state on closing of the analyses.

Table 40: Summary evaluation of the hypotheses

Hypothesis	State
H1-1: <i>We are able to correctly assess the structural equation model containing the latent causal consumer-based brand equity and the two latent reflective consequences.</i>	Accepted
H1-2: <i>Awareness positively and significantly influences brand equity.</i>	Refused
H1-3: <i>Uniqueness positively and significantly influences brand equity.</i>	Refused
H1-4: <i>Advantage positively and significantly influences brand equity.</i>	Accepted
H1-5: <i>Perceived quality positively and significantly influences brand equity.</i>	Accepted
H1-6: <i>Activity positively and significantly influences brand equity.</i>	Refused
H1-7: <i>Trust positively and significantly influences brand equity.</i>	Accepted
H1-8: <i>Brand equity positively and significantly influences purchase intention.</i>	Accepted
H1-9: <i>Brand equity positively and significantly influences low search cost.</i>	Accepted
H2-1a: <i>Brand equity positively and significantly influences overall brand equity.</i>	Accepted
H2-1b: <i>Brand equity positively and significantly influences loyalty.</i>	Accepted
H2-2a: <i>Esteem positively and significantly correlates with consumer-based brand equity dimensions.</i>	Accepted
H2-2b: <i>Relevance positively and significantly correlates with consumer-based brand equity dimensions.</i>	Accepted
H2-2c: <i>Market leadership positively and significantly correlates with consumer-based brand equity dimensions.</i>	Accepted
H2-2d: <i>Variety positively and significantly correlates with consumer-based brand equity dimensions.</i>	Accepted

In our paper we formulated 15 hypotheses, out of which we accepted twelve and rejected three.

5 Conclusions

Consequently complying with the basic assumptions of the consumer-based brand equity literature, we built a model in which we consciously approach the causal specification of consumer-based brand equity.

Despite the fact that several empirical models and the theoretical assumptions support the causal specification of consumer-based brand equity, according to our knowledge, no one so far has consciously built a specified causal model with a covariance-based estimator. We consider that we have managed to meet this need, since our consumer-based brand equity model has excellent overall fit and it has a high explanatory power.

Thanks to the MIMIC specification we succeeded in clearly separating the sources of consumer-based brand equity from its consequences.

Since even literature knows little about testing causal models, there is a great need for the conscious building and use of causal models where it is theoretically grounded (Diamantopoulos et al. 2008). In the course of our research we fitted a second-order factor model with a covariance-based estimator (Amos 19), while the majority of the second-order factor models presented by Diamantopoulos et al. (2008) was estimated in PLS.

Model structure

In building the conceptual model we started from the literature based on the Aaker (1991) model, though we also took into consideration the multidimensional character of Keller's (1993) conceptual model; similarly, the Lehman, Keller and Farley (2008) article was an important source as well.

Four components of the Aaker (1991) model, Perceived quality, Loyalty, Awareness and Associations were included in the empirical research (Yoo and Donthu 1997, 2000, Washburn and Planck 2002, Chau and Ho 2008, Atilgan et al. 2009, Kim and Hyun 2010).

Unlike in the earlier practice, in developing our present model we interpreted Loyalty, similarly to Erdem and Swait (1998), as the consequence of brand equity. To measure Loyalty, following the direction indicated by Aaker (1996), we used questions explicitly referring to purchase decision making. In the case of such operationalization of loyalty though, we do not consider acceptable that the Loyalty dimension should explain, through Brand equity, a consequence of Brand equity such as Purchase intention.

We reinterpreted the three Aaker dimensions, following Aaker's (1996) instructions among others, as follows. We consider Awareness as a concept that concretely refers to the association node existing in the consumer's mind, every other brand-related concept measured has to be qualified as an association, since everything that connects with some strength to a brand name representing the node in the association network is an association (Keller 1993).

In this approach, our conceptual model included Awareness and brand name-related associations such as Uniqueness, Advantage, Perceived quality, Activity and Trust. Activity, contradicting the conception, was mistakenly included in our initial model, which had to be eliminated from the model anyway, because it was impossible to fit due to the U-shaped distribution.

Perceived quality was an important dimension of consumer-based brand equity in both Aaker's (1991) conceptual model and the empirical models. Trust is a new dimension included in the model, and it is one of its most important novelties at the same time, since we consider that in current market conditions, trust plays a significant role in decision making.

With the inclusion of Uniqueness and Advantage in the model we would have liked to include, following Aaker's (1996) instructions, the measure of Differentiation, since according to Aaker (1996), differentiation can best summarize the contents of the Associations dimension. The importance of differentiation is also indicated by the fact that Aaker (1996) presents the Associations dimension as follows: Associations/Differentiation. From among the measures of Differentiation we were able to preserve Advantage; Uniqueness carries meanings that are difficult to apply in general. On the one hand, there are few brands to which the unique epithet is valid; on the other hand, those that really stand out with their uniqueness, can keep their unique

characteristic for a short time. A certain brand can launch an exclusively unique product under its name; however, in most of the cases it also sells several conventional sub-brands, thus the presence of uniqueness are difficult to state.

Keller's (1993) conceptual model and the Lehman, Keller and Farley (2008) article suggest that consumer-based brand equity is a multidimensional concept. In the Lehman, Keller and Farley (2008) article 27 constructs were measured, which were eventually reduced to six factors. The result of the present paper and other empirical results (Yoo and Donthu 1997, 2000, Chau and Ho 2008, Atilgan et al. 2009, Vázquez et al. 2002, Martensenands Gronholdt 2004) can be opposed to the accumulation of dimensions. On the basis of the results and the experience acquired in the course of fit assessment, we state that consumer-based brand equity is not a multidimensional construct. We have found this result by consciously approaching the question of specification, by using in our estimation the correct, that is, the causal specification.

The two-dimensional structure of our model is also supported, among others, by the fact that it was able to explain 70% of the Brand equity dimension variance in the case of the Nokia brand, that is, two dimensions were enough to explain the concept sufficiently.

The two-dimensional character also assures the managerial point of view, since it makes measurements simple and economical.

All in all, we included six dimensions in our conceptual model. From among these, Awareness could not fit as an independent dimension in any of the models so far (Yoo and Donthu 1997, 2000, Washburn and Planck 2002, Chau and Ho 2008, Atilgan et al. 2009, Kim and Hyun 2010); however, taking into account the role of the concept in conceptual models, we considered it important to test its fit and to find an explanation to why difficulties occur about its fit. Activity was included contradicting the conception; becoming aware of our mistake, we eliminated it from the model in the course of the analysis. From between Uniqueness and Advantage included to measure differentiation (Aaker 1996) we retained Advantage, since, on the one hand, Uniqueness did not fit

significantly and, on the other hand, it was also problematic from the point of view of its content, as it is difficult to generalize.

Conceptual definition of brand equity dimensions

We can also re-interpret the consumer-based brand equity concept by putting the question which are the brand-related concepts that together cause something. Our answer is that these concepts are Trust, more exactly, trust in a brand, in its quality and Advantages provided by the brand.

Trust in this context can be interpreted as something that connects a consumer to a brand. In this sense, the Trust dimension contains the brand-related emotional element. It is the Advantage that a brand provides a consumer with, thus this dimension could also be the rational dimension of brand equity.

The consumer-based brand equity explained by Trust and Advantage explains the purchase intention and the low search cost.

An important characteristic of the model is that it estimates brand equity with disturbance, since thus the concept becomes interpretable, we know the extent to which its dimensions are able to explain it. Every analysis in which a concept measured with causal indicators is built without disturbance will contain significant distortions. Estimating a Type II causal model with a covariance-based estimator is a significantly greater challenge than using PLS; our estimated parameters will be more reliable and the model will better map reality, though.

In the case of the Nokia brand, in comparison to the advantages provided, Trust is only present in 40%, that is, Nokia is a valuable brand to the respondents because it provides advantages rather than they trust it. As opposed to this, with the Samsung brand Trust has a greater weight in explaining Brand equity in comparison to the advantages provided.

In the case of the iPhone, we have to treat the model with reservations, since we consider that the number of those who had some knowledge of the brand in our sample was small. Despite the low awareness of the brand our model also fits relatively well on iPhone data, indicating a good stability of the model. In the case of the iPhone, even if

not to an extent experienced with the Nokia, the advantages provided are present in a larger proportion than Trust in quality. This result is in accordance with the several novelties provided by the brand, at the same time, due to its novelty and the related news, the somewhat lower trust is understandable.

The most surprising result of our research is perhaps its resemblance to Netemeyer et al.'s (2004) model. We can say that we started on a different way, still, the final dimensions of the model resemble the dimensions of the Netemeyer et al.'s (2004) model in several points.

In the Netemeyer et al.'s (2004) model, a latent variable created from the proportion of perceived quality and Perceived Value for the Cost (PQ/PVC) and Uniqueness together determine the willingness to pay premium price. In our model, Trust (Trust in quality) contains the Perceived quality measured by Netemeyer et al. (2004) (which is part of almost every empirical brand equity model). Advantage measured by us is in many aspects similar to PVC, with which Netemeyer et al.'s (2004) goal was to measure equity provided by the brand to the consumer, while with the Advantage construct we intended to measure the advantage provided to the consumer, the advantage which differentiates it from the other brands at the same time.

One important and new dimension of our consumer-based brand equity is Trust (Trust in quality). We consider this dimension important to us because we think it casts light on the problem of measuring perceived quality, and it offers an alternative to measure it at the same time. We consider that our results proved that it is difficult for people to answer questions referring to quality; however, using trust as a proxy they are able to formulate relevant answers.

Credibility of a brand is one of the central elements of the Erdem and Swait (1998) model based on the signaling theory, one component of which is trust. Trust is an accentuated dimension in the newer brand equity models such as in Atilgan et al.'s (2009).

Another novelty of our default consumer-based brand equity model is that it also includes the most important benefit attributed to a brand by the economy literature,

namely, the low search cost, which has only appeared in the Erdem and Swait (1998) model so far.

Assessing model fit and validity

The excellent fit indicators of the two-dimensional consumer-based brand equity MIMIC model prove its stable structure. The GFI, IFI, TLI and CFI values all exceeded the conservative 0.95 cutoff value, the RMSEA value is good (0.7) and the SRMR value (0.0348) also indicates a good fit. The goodness of fit is also supported by the low values of the standardized residual matrix, which in no case exceed 2.58 (Jöreskog and Sörbom 1993).

With the parametric bootstrap procedure we have managed to prove that we can accept the parameters estimated by ML even in lack of multidimensional normality, which is also possible thanks to the fact that the condition of univariate normality was fulfilled in the case of every variable.

With the exception of the measured variable Q23, we were able to prove convergent validity. The explained variance of the measured variables exceeds the 0.5 cutoff value and the standardized coefficients exceed 0.7. In the case of the Q23 variable we considered that, despite its being a little lower than the defined cutoff value, we can keep it in the model, on the one hand, because it plays an important role from a theoretical point of view, on the other hand, it has the suitable validity on other data (Samsung). In the case of the four latent variables, composite reliability (CR) exceeded the 0.7 value and the explained variance (AVE) exceeded 0.5, that is, we assume that our variables map the contents of the dimensions correctly.

We examined the discriminant validity of our model with two different methods as well. First, we compared the four-factor confirmatory factor model with the one-factor CFA. The indicators of the four-factor CFA represent excellent fit, while the indicators of the one-factor model were not acceptable, that is, the latent variables of our model suitably discriminate. In the case of the more conservative test we found that the correlation between Trust and Advantage is slightly (+0.03) higher than the variance

explained by Trust (AVE), the reason of which being that we kept the Q23 variable with lower validity. Testing without this variable, the Trust and Advantage dimensions suitably discriminated. In spite of this, we thought that the Q23 variable had to be included in the model from a theoretical point of view; furthermore, in the case of the other brands, the validity indicators of the variable were above the cutoff value.

The disturbance term estimated at the level of consumer-based brand equity is one of the most important parameters of the model, due to which Brand equity is present as a latent variable and to which we know how accurately we explain brand equity variance (over 70%).

We examined the external validity of brand equity dimensions by estimating the confirmatory factor model with four other similar constructs: two BAV dimensions (Esteem, Relevance) and two own concepts (Market leadership, Variety). The high correlation level between the concepts proves their external validity as well.

In order to further prove external validity and model stability we also tested the model with other consequences; it indicated as good a fit as earlier with the OBE (Overall Brand Equity) and Loyalty consequences as well.

Usefulness and merits of the results

Below we summarize in headings the arguments we think characterize the usefulness and the merits of our analysis:

- Operationalizing and measuring consumer-based brand equity as a latent variable.
- The conscious approach of the causal nature of consumer-based brand equity.
- Fitting a second-order factor model with a covariance-based estimator.
- High explanatory power achieved with few indicators.
- Intuitive tool for management due to the only two dimensions.
- Our model fits other data well (Samsung brand) and acceptably well (iPhone).

- Clear separation of the attitude-type constructs (sources of brand equity) from behavior-type constructs (consequences of brand equity).
- It includes some logically appealing assumptions of the signaling theory in the consumer-based brand equity model.

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7 Appendices

Appendix I. - **Consumer-based measurement of mobile phone brands brand equity** *Questionnaire*

Dear interviewee!

Filling in the brand equity related questionnaire below you are helping me with my Ph.D. research anonymously.

The majority of the questions are related to three mobile phone brands. For each brand in turn, indicate the strength of your agreement with the statement. If you do not agree at all chose 1, if you totally agree chose 9, or chose the number that most closely reflects your opinion.

In our research we assume that every well known brand has a well developed image, and we want to learn more about this image, but we do not want to reveal specific mobile phone related knowledge.

If you cannot answer a question please chose the Don't know/Not applicable option. Before chosing this option please consider on of the numbers, and if none of them really fits your opinion, then chose Don't know/Not applicable (DK/NA).

Please feel free to contact me
Thank you for your patience

Szócs Attila
EMTE-Sapientia
0742 029 435

* 1. Please name the first three mobile phone brand that comes to your mind.

1. _____
2. _____
3. _____

* 2. How many phones do you have?

- a. 0
- b. 1
- c. 2
- d. More than 2

* 3. Please name those mobile phone brands you own that you use frequently. Name firstly the one that you use the most frequently.

* 4. What is the brand name of your last acquired mobile phone?

* 5. How much did you pay for your last acquired mobile phone (in Lei)?

* 6. What statement is true in the case of your last acquired mobile phone?

- a. I bought it with network lock
- b. Phone whitout network lock
- c. I received it as a gift and use it on a specific network
- d. I received it as a gift and use it without network lock
- e. None of them

* 7. Most people are aware of this brand.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 8. I frequently encounter this brand.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 9. I feel, some characteristics of this brand come to my mind quickly.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 10. In my opinion, this brand has unique attributes.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 11. I feel, this brand is in a class by itself.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 12. I could easily explain to my acquaintances why this brand is different from others.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 13. I hold the brand in high regard.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 14. The brand has earned a strong reputation.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 15. This brand respects me.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 16. I feel this brand is better than any other on the mobile telephone market.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 17. I feel this brand is definitely better in what concerns the essential attributes of mobile phones.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 18. I have the impression that this brand possesses such advantages that make trying out others worthless.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 19. This brand has advantages over others that I need.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 20. I think, this brand is made to high standards.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 21. I feel that all products sold under this brand name are of excellent quality.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 22. I think, this brand consistently provides the same quality.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 23. I think this brand is operational under all circumstances.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 24. It happened to me that was disappointed at this brand.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 25. The brand is relevant to me.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 26. This brand is a good one for me.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 27. This brand fits my lifestyle.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 28. I talk about this brand with my friends.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 29. I like to read about this brand.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 30. I would recommend this brand to anyone.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 31. I look for more information about this brand.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 32. I share brand-related information with my acquaintances.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 33. I feel confidence if I meet this brand.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 34. This brand always provides what it promises.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 35. No one got disappointed by this brand.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 36. If you want to buy a mobile telephone, this brand is the most trusted choice.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 37. I think this brand is a market leader.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 38. My acquaintances think this brand is a market leader.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 39. I think this brand could sell the most products on the mobile telephone market.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 40. I believe this brand entered the market first.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 41. When I encounter this brand this is the first product category that comes to my mind (only one answer per brand):

Nokia _____
 Samsung _____
 iPhone _____

- * 42. I think this mobile mobilephone brand gives access to a great variety of models.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 43. In the case of this mobile phone brand I could easily choose a specific model.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 44. I think that this mobile telephone brand assures the opportunity for anyone to choose a model suitable for them.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 45. Even if another brand had the same attributes as this brand, I would choose it.
Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 46. Even if another brand is as good as this brand, I would choose it.
Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 47. If another brand does not differ from this at all, it is worth buying it.
Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 48. I am planning to buy this brand in the future.
Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 49. If I buy a mobile telephone next, I will choose this brand.
Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 50. I buy this brand even if the concurrent one has the same qualities.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 51. I feel loyal to this brand.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 52. I would pay extra for this brand.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 53. If a store didn't carry this brand I would go to another store.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

- * 54. Knowing what I'm going to get from this brand saves me time shopping around.
*Please indicate the strength of your agreement from 1 to 9
 (Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 55. Thanks to this brand, I do not have to spend much time choosing in case I want to buy a mobile phone.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

* 56. If I couldn't decide which mobile telephone to choose, I would find the choice of this brand plausible.

*Please indicate the strength of your agreement from 1 to 9
(Do not agree at all 1, Agree completely 9).*

Nokia	1	2	3	4	5	6	7	8	9	DK/NA
Samsung	1	2	3	4	5	6	7	8	9	DK/NA
Iphone	1	2	3	4	5	6	7	8	9	DK/NA

*57. How often do you use the Internet?

- Daily (1)
- Weekly (2)
- Occasionally in a month (3)
- Rarely (4)
- Never (5)

* 58. How often do you watch television?

- I do not watch television (1)
- Not every day (2)
- Two hours daily (3)
- Two to three hours daily (4)
- Four to five hours daily (5)

*59. Are you female or male?

- Male (1)
- Female (2)

*60. Your age?

*61. Approximately how much do you earn?

Much less than average (1)

Less than average (2)

Average (3)

More than average (4)

Much more than average (5)

*62 . Where do you live currently?

* 63. In what town is your personal mailing address?
