

DEVELOPING A BRAND CONTROL MODEL USING THE ANALYTIC HIERARCHY PROCESS (AHP)¹

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Keywords: brand control, brand steering, brand valuation, integration of hard and soft factors, reduction of arbitrariness

Summary: *Although there is still no established and functioning market for intangible assets such as licences, trademarks or brands and the like, in particular brands are regularly worth huge amounts of money when a change in ownership occurs and thus represents a significant part of a company's value (Sattler 2001, pp. 19). Most research in brand valuation refers either to behavioural information or financial data. Combining both types of data is challenging. Behavioural (customer focussed) information is important as customers are the ultimate decision makers; a certain (positive) image should lead to buying intentions and finally to actual purchasing.² Financial information is crucial; it refers to economic well-being and is important for long-term survival. The Analytic Hierarchy Process (AHP) (Saaty 1980) is used to combine the behavioural and the financial view under consideration of standard marketing image concepts. The result is a brand value model based on the AHP, which is especially useful for enterprises to control their brand(s). The main difficulty however is the given interdependency of the selected criteria. In contrast to the AHP, the Analytic Network Process (ANP) (Saaty 1999; Saaty 2001) can deal with a much broader variety of such non-linear structures. Therefore in a further step the hierarchical model is extended to a network.*

1. Introduction

On a recent international symposium³ of experts and scientists in business administration a top manager of an international software company, reaching annual sales of about 7.2 billion US-\$, came up with several unsolved problems within science, from which the most pressing one was the lack of a sound and comprehensive brand control technique. He complained that there had been presented a considerable number of methodologies with widely differing outcomes and that therefore his company is actually steering their brands on the base of the arbitrary values published in the "Business Week". Figure 1 shows the explicit 2002 value estimates of the world's top ten brands.

¹ **ACKNOWLEDGMENTS:** The authors would like to thank the "Stiftung zur Förderung der wissenschaftlichen Forschung an der Universität Bern" URL: http://www.unibe.ch/stiftungen/wiss_forschung/index.html [page view 2003-06-11] for its kind and generous financial support.

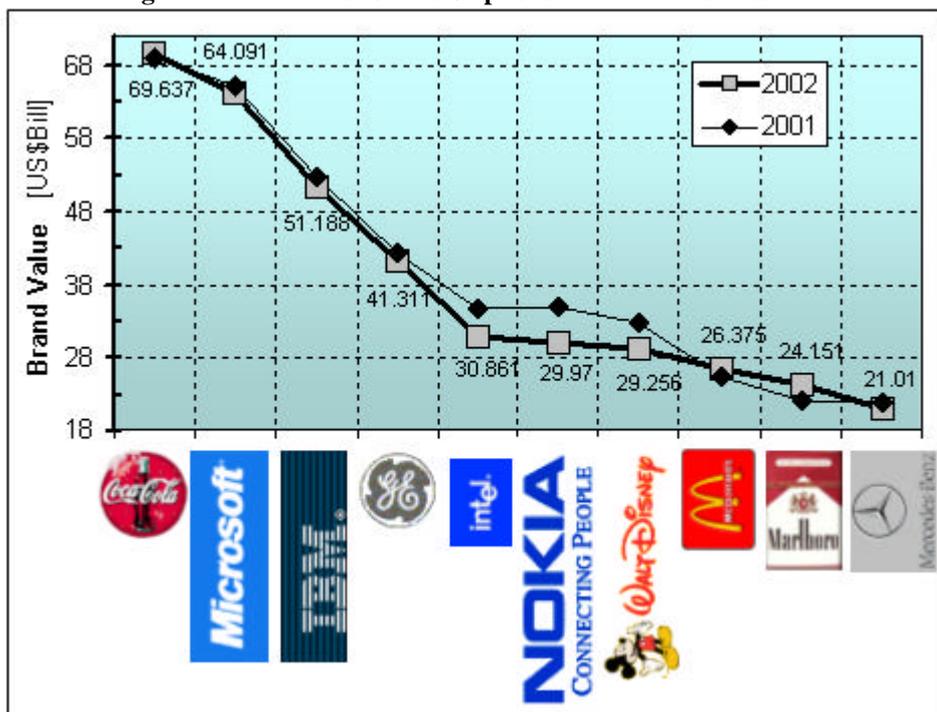
² The model which is going to be developed bases on the widespread and in marketing generally accepted hypothesis that a certain attitude leads to action (Ajzen 1988, pp. 117)

³ 56th German Day of Business Administration, Schmalenbachgesellschaft e.V., Frankfurt/M., 2002-09-23/24: URL: <http://www.schmalenbach.org/Veranstaltungen/DBT.htm> (page view 2002-12-04).

So far, there is no obligation by law or generally accepted accounting principle to quantify the value of a company's brand(s) in its business reports.⁴ Traditional continental European accounting regulations – e.g. the Swiss law – even forbids the inclusion of brand assets in the balance sheet. Existing brand assets in conjunction with other intangible factors such as human resources are however one of the major reasons why the company value differs almost always considerably from the corresponding book value.⁵ The prescriptions and/or recommendations on the accounting of intangible assets focus on whether to activate them or not and are meagre when it comes down to the determination of the corresponding value.⁶ For 2001 *Interbrand Corp.* and *J.P. Morgan Chase & Co.* estimated the value of *Coca-Cola's* brand at about 68.95 billion US-\$ (Khermouch 2002, p. 74). The market value of its common stocks amounted in the same period on average to 117.226 billion US-\$. But the balance sheet summed up to only 22.417 billion US-\$ (Coca-Cola 2001, p. 86). As figure 1 demonstrates, brand values may vary considerably from company to company and also from year to year. Managers committed to the enduring prosperity of their firm should therefore have an eye on the brand's value development, i.e. they have to steer and control it actively. For purposes of mergers & acquisitions, licensing, franchising and anti-piracy policy, the necessity of the determination of the brand's value is self-evident. Steering measures based on arbitrary numbers, such as the mentioned *Business Week's* estimates, are somewhat short-sighted and definitely not suitable for the control purpose due to their backward focus and lack of information on the brand value's origin and composition.

We are now going to present a brand control model that we developed on the base of the AHP which should harmonise the bundle of methodologies suggested by science so far. In a second step we then ask if the model can be turned into an even more comprehensive image of the brand value processes by using the ANP. It is therefore necessary to define terms like “brand” and how “brand value” is generated, managed and controlled in advance; this is the aim of the next paragraph.

Fig. 1: Brand values for 2001/2 published in the *Business Week*



⁴ Australia, New Zealand, France, Spain and the UK actually prescribe such a mentioning although the corresponding measurement question is not sufficiently treated.

⁵ Only in group financial reports some aspects of the brand value merge into the goodwill. But this summary accounting settlement cannot provide enough information necessary for steering.

⁶ International Accounting Standard 38 (IAS) on intangible assets or US-GAAP SFAS 142.

2. A glance at the conceptual bases of brand control

2.1 Brand power and brand value

A **brand** (Tomczak/Schögel/Ludwig 1998, p. 7) is more than a name, a signature and/or a symbol that makes the (potential) customer recognize an economic good; it can be considered as a bundle of a product's or service's characteristics, creating pictures and associations in a person's mind. From a financial point of view, **brand value** or **capital** is determined by the present value of all future cash inflows caused by the brand (Kaas 1980, p. 48). This conceptual logic is consistent with the well-known and nowadays widely (Horváth/Minning 2001) applied shareholder value concept by *Rappaport* (Rappaport 1986) and allows an incorporation of brand assets in the company's general information and control system. The present value as a single number leads to an incomplete understanding of the complex phenomenon because simply optimizing specific brand aspects without considering any second or higher order conditions would be feasible, but misleading. In addition to this, no relevant steering information can be derived. It is however crucial to indicate how exactly to extract this number, i.e. first to precisely predict the uncertain future cash inflows and second to separate the part caused by the brand (Sattler 2001, p. 150). Furthermore, a single number does not reveal its value drivers and is therefore useless for an active control purpose. We suggest a two-stage procedure of determining brand value, i.e. the **brand power** as the non-monetary but highly informative and therefore better controllable source of the pecuniary **brand value**. The first stage consists of the whole conception with all positive and negative aspects that are partially or completely activated in a customer's perception influencing the behaviour when the brand or certain aspects are perceived (Riedel 1996, p. 61). This "awareness" may be unconscious as well. The second stage refers to the quantified success potential of a brand in money (Kriegbaum 2001, p. 76), which can be considered as the brand's power expressed in monetary units. In the following paragraph we describe the nature and the determinants of brand power.

2.2 Brand power and its determinants

Marketers argue that brand power directly influences customer behaviour (e.g. Bekmeier-Feuerhahn 1986, p. 116). Brand power is a latent construct, thus not directly observable and therefore needs to be represented and measured by indicators (Riedel 1996, pp. 70). Whilst examining the literature we recognise that the indicators used in different brand valuation conceptualisations are distinct (e.g. Murphy 1989, Trommsdorff/Franzen/Riedel 1994). They are often arranged into two categories: The first category is represented by **economic variables**. They can be observed and measured in the market. Common examples of indicators in this category are the brand's market share, the number of customers, the age of the brand, the obtained licensing fees and so on. These variables try to capture the brand power at its effect.

Within the second category, **customer focused variables** are considered (e.g. brand image). Using common measuring techniques for these indicators and then aggregating them for example with scoring methods makes it extremely difficult to obtain reliable and valid results.⁷ A sound concept enabling the measurement or at least the registration of these psychological processes taking place in the minds of the customers was brought up by Keller (1993, p. 2). The AHP-hierarchy suggested further down (see fig. 2) is partially based on Keller's ideas. Hence, the customer's **brand knowledge** is the starting point. Keller structures it into two elements: brand awareness and brand image. He suggests determining the first element by measuring brand recognition and brand recall. Brand recognition can be measured by giving a set of brand names to respondents and asking them to identify the ones they had heard before. Brand recall is based upon asking a person to name brands in a certain product class. The first-named brand gets the highest score (Aaker 1991, p. 62). The second element – the brand image – is defined as perceptions about a brand as reflected by the brand associations held in the consumer's memory. Keller mentions three types of associations: Attributes (e.g. packaging, product information and user imagery), benefits and brand attitudes (as an overall evaluation of a brand or as global attitude). Brand image contributes to a high brand value when the associations are favourable, strong and unique.

⁷ Another opinion, especially for different AHP varieties, may be found for example by Pöyhönen/Hämäläinen (2001).

The variables introduced above are information sources and i.e. determinants of brand power and therefore of the brand value. How they are planned and controlled in a company's management and information system is explained in the next paragraph. Requirements which have to be met are a further point of interest for the development of a brand control or valuating tool.

2.3 Brand management and brand control

To manage a brand means to actively use it as an asset in order to reach the company objectives and hence to generate shareholder value. Therefore it is insufficient to just understand the brand value as a single figure (Baldauf/Cravens/Binder 2002). It is important to know which determinants (economic variables and customer focused variables) the brand value depends on and it is of a great interest with what marketing measures the determinants can be influenced. The measurement of the indicators needs to be performed both on a retrospective and on a prospective basis; like in cybernetics, a feed-back and feed-forward steering is necessary (Beer 1981, p. 189). This means it should be possible to judge – as a feed-forward steering – which bundle of marketing measures leads to the largest increase in brand value and should therefore be implemented. The cybernetic feed-back-loop is then the check of the effect.

A model intended to support these tasks must fulfil three prior **requirements**: First, it has to uncover the causes of a brand value change observed in the market; in addition it must also give hints as to what element of the brand value should be influenced and, preferably, what must be done in order to achieve such a change. Second, the tool must incorporate the most important competitors and has to measure the variables in relative terms. Third, in order to be comparable with other components of the firm's management information system, it should result in a single monetary amount (Amen 2001, pp. 1). Obviously also the general model requirements such as objectivity, reliability and validity must not be neglected.

The necessary understanding in brand managing has now been introduced. The next paragraph presents the bases of the deducted requirements for a brand control framework using the AHP.

3. The AHP based brand valuating model

With the suggested hierarchy (see sections 3.1 to 3.3) the brand power can be measured taking the behavioural considerations into account. By transforming the brand power into a monetary figure, the financial expectations are also met (see section 3.4). Section 3.5 explains why the sensitivity analysis is very useful.

3.1 Structure of the model

We need to stress that the AHP-methodology delivers ratio-scaled priorities and not monetary figures; thus the goal of the hierarchy is to measure the power of brands. Consequently brands have to be selected as alternatives on the hierarchy's lowest level. Nevertheless a monetary transformation is required and performed outside the actual AHP applied here. This is why the model belongs to the so-called "two-step-model-class" as traditionally classified in the brand valuating literature (Franzen/Trommsdorff/Riedel 1994, p. 1385). Figure 2 shows the model's hierarchy. It is important to only compare brands competing in exactly the same market. Unless the players are operating in the same – also in regional terms – market, no valid steering information can be derived. This is mainly a consequence of the following two reasons. The first is seen in possible different criteria weights.⁸ To explain the second reason let us take two different markets which differ from each other in terms of size, products and regions (e.g. the Swiss market for chocolate and the US van market). Brands acting in these two different markets can hardly be within the same order of magnitude (Saaty 1999, pp. 26). Even clustering or an adjustment of the hierarchy cannot prevent this. The criteria representing the customer-focused and the economics-focused category are both needed between the goal and the selected brands. Thus the hierarchy should contain two sub-hierarchies. In order to cope with validity we suggest basing both on existing theoretical concepts:

⁸ For consumer products it is essential to achieve high brand awareness, while for industrial products this is usually less important (Aaker 1991, p. 29).

- **Keller's concept** is reflected to a large extent in the customer-focused category of the hierarchy as seen below. These indicators are considered as being the causes of brand power and seem therefore especially useful for diagnostics. As they may tell a lot about the brand's potential to generate value, they are excellent indicators to plan and steer marketing measures in order to strengthen the brand. Consequently these variables are helpful for the comparatively rather complex feed-forward tasks (see section 2.3) (Kirchgeorg/Klante 2002, p. 34).
- The selection of the economic variables in the second category is based on a **causal-analytic study by Riedel** (Riedel 1996, pp. 62). This study leads to eight criteria, whereby six of them are economic variables and two of them are customer focused variables. Thus the customer perspective is already taken into account; these two variables are not part of the hierarchy. The remaining six criteria should measure the effect of earlier marketing actions and are therefore especially useful for the feed-back control (Jenner/Kühn 1999, p. 9).

Figure 2: Principle hierarchy

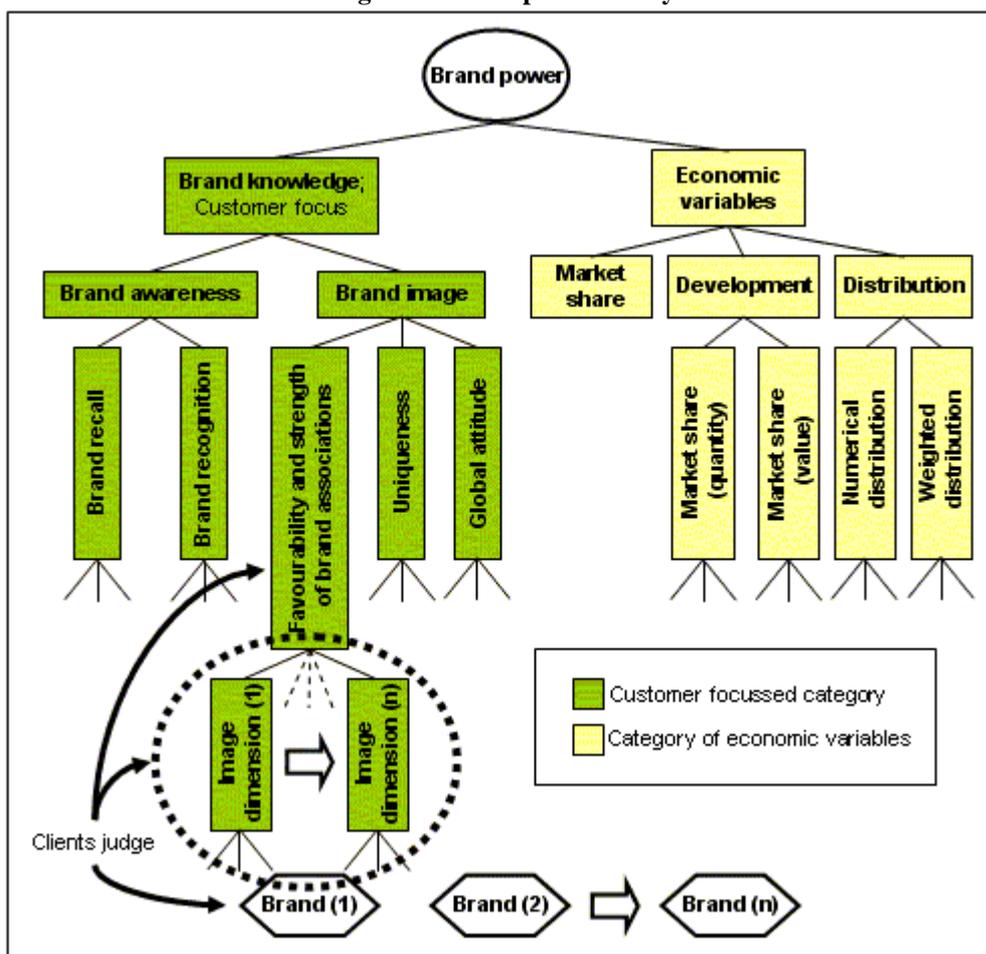


Figure 2 presents the two categories as sub-hierarchies. Brand knowledge influences the customer's behaviour by determining his buying-decision, which finally leads to cash flows. These payments determine the actual level of the economic variables. Therefore the two sub-hierarchies have a certain cause and effect relationship. Beyond that, marketers believe that the variables (i.e. criteria) are interdependent in a way a linear hierarchy cannot cope with. In the AHP-model however their independency (Saaty 1999, p. 34) has to be (heroically) assumed. We will drop this assumption in section 5 when we deal with the ANP. In order to support the model's practicability it may be regarded as a negligible weak point.

3.2 Pairwise comparisons

We suggest determining the brand power with group decisions (Saaty 1989). There are however two different groups involved: marketing experts and customers. Table 1 indicates how the two groups are involved:

Table 1: Involvement of the two decision-making groups

Level 2	The priorities of the second level are gained by standard pairwise comparisons on the 1-to-9-scale performed by the expert group.
Level 3 and 4	Same procedure by the expert group as on level 1.
Level 5	Image dimensions depend on and differ from market to market. So it may be necessary to determine them on the base of a prior consumer research. However, the customer's 1-to-9-judgments are needed here.
Level 6	<ul style="list-style-type: none"> • “Brand recall and recognition”-weightings should also come from the customers who judge the image dimensions. • The market share development codes are ratio scaled and are to be directly taken into the calculation. • “Uniqueness” and “global attitude” is up to the expert group.

3.3 Excursus: AHP's analogy to the Fishbein image measurement model

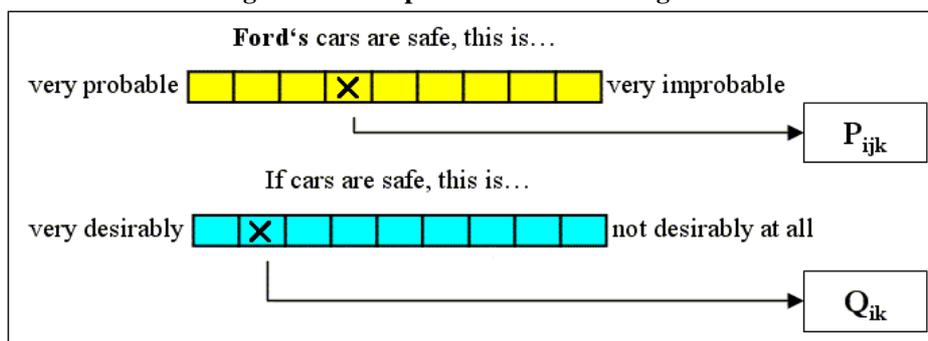
This paragraph underlines the consistency of the AHP measurement concerning the “favourability and strength” criterion within the presented hierarchy with the often-cited Fishbein-model to measure images in marketing terms.

Fishbein assumes that image, as a non-observable construct, consists of a *cognitive* and an *affective* component (Fishbein 1963) and can be measured with the help of two different rating scales. The connection is then preformed by multiplication and addition (equation [1]). E_{ij} represents the attitude score of person i for brand j . P_{ijk} is the probability with which person i believes that brand j has a certain attribute k (e.g. safety in fig. 3) and is the cognitive component. Q_{ik} is the assessment of the image dimension (i.e. attribute) k by person i and is therefore the affective component.

$$E_{ij} = \sum_{k=1}^s P_{ijk} Q_{ik} \quad [1]$$

For each image dimension an impression score ($P_{ijk}Q_{ik}$) has to be calculated. This is usually done with the help of questionnaires; figure 3 gives an example of such a question and may help to understand what is actually meant by the two components.

Figure 3: Example of a Fishbein rating scale



The AHP can incorporate the two image components more accurately than the standard Fishbein measurement with its ordinary-scaled outcome. The customer group assesses the affective component by a pairwise comparison of the image dimensions (e.g. car safety, style, endurance) with respect to the “favourability & strength”-criterion and the cognitive component by comparing the brands with respect to the image dimensions, each on the standard 1-to-9-scale. Beside the resulting scale advantage, the information is gained in relative and not in absolute terms, as by the use of the Fishbein rating scale. This comparison with competitors is indispensable for controllership aspects. In order not to exceed the number of comparisons needed, just the relevant image dimensions should be incorporated. These may be figured out by a prior explorative study. If more than nine are relevant, a further grouping may be necessary (Saaty 2001, p. 314) and more levels should then be incorporated into the hierarchy (see fig. 2). Apart from the two just mentioned advantages; the Fishbein formula (see equation [1]) is consistent with the AHP priorities synthesis. Thus Q_{ik} (i.e. the weight of the selected image dimensions) as the affective component represents partly the global priorities for P_{ijk} (i.e. the relative strength of the brands in the corresponding image dimension) and is therefore multiplied with the latter. The resulting weights are then entered into the global priorities synthesis by hierarchical adding as usual.

3.4 Monetary transformation

The result of the described hierarchical evaluation is the brand power expressed as priorities. But for steering a brand it is necessary to know the brand value in monetary terms: Priorities are not a sufficient base for budgeting. In addition, an important factor in determining the brand value has not been taken into account yet: the size of the market. Thus the created hierarchy is valuable only for one market; the brand power of two brands calculated in different hierarchies is not comparable: In a big market, a numerically identical brand power can cause much more sales than in a small market because of the higher volume. Also the cost structure can be different due to the exploitation of economies of scale.⁹ These are reasons which lead to the transformation of the priorities into a monetary brand value under consideration of the market size.

The resulting priorities are ratio scaled. Therefore if one knows the monetary value of one of the assessed brands, it is simple figuring out the others within the same hierarchy (Dellmann/Amen 2001, pp. 63).¹⁰ We propose to observe brand acquisition prices and to take such a price as a standard unit of measurement.¹¹ Nevertheless, there is a problem if brands act in more than one market. In this case, the observed price represents the monetary value of the brand considering all markets. But the developed hierarchy takes just one market into account. To get the value of a brand in one specific market, we suggest splitting up the observed price to the different markets. To put a direct proportionality into the sales and brand value relationship seems a moderate assumption and therefore we suggest splitting up the price relatively to the sales the brand is generating in the various markets. This leads to the value of the brand in one specific market and consequently to the monetary value of the other brands considered in the hierarchy.

3.5 Sensitivity Analysis

To perform sensitivity analysis standard software (e.g. *Team ExpertChoice* or the like) should be used. Only by knowing what criteria(on) are/is the very value driver(s), it becomes possible to assign the limited marketing budgets effectively and efficiently and to generate sustainable brand value as a consequence. If the software does not support such analysis for all kinds of questions that arise, i.e. when it comes down to the sub-hierarchy alone, the scenario technique may be an adequate back up. The information one gets from such variations is indispensable to harmonize the marketing measures undertaken – or that are to be undertaken – at the interface of strategic and operative brand management.

4. Evaluation of the AHP-based brand control model

To evaluate the developed model considering the requirements for such a model, the most important positive and negative aspects are deducted in this paragraph. The following pros compared to existing brand valuating/control-models, such as the brand value model of *Interbrand* (Murphy 1989) or the *Brand Per-*

⁹ “Economies of scale” is a concept in business administration that denotes basically that cost decreases if quantity increases.

¹⁰ We assume that the expressed brand value in money is a linear function of the brand power.

¹¹ If no acquisition prices can be observed, an alternative procedure of the monetary transformation suggested by Franzen, Trommsdorff and Riedel (1994, pp. 1393-1399) can be applied.

formancer of AC Nielsen (Franzen/Trommsdorff/Riedel 1994, pp. 1393-1399), are mainly due to the model's AHP core:

- The model is very **transparent** and has a clear, **flexible** structure that may easily be adjusted for different market conditions. Thus, causes (e.g. customer-focused variables) are clearly separated from the corresponding effects (e.g. economic variables).
- It is easy to calculate brand power firstly only with the economic criteria and secondly only with the customer-focused variables. The two results deliver relevant **steering information** because of their feed-forward- and feed-back-relationship.
- A lot of other **sensitivity analysis** and the **scenario technique** are applicable and therefore more steering information can be obtained.
- The **brand power is ratio scaled** and contains much more information than the usually employed scoring-based methods. These outcomes – which are on an ordinal scale at best – are then usually treated as being ratio-scaled and transformed into monetary units without further consideration; such manipulation is not necessary in the AHP.
- Brand power is influenced by **hard** and by **soft factors**. The AHP is a sound approach to combine the two sorts of data and to nevertheless stay within higher scales.
- The AHP helps to maintain – or to reach – **objectivity** (Forman/Selly 2001, pp. 24).
- The control purpose demands a **comparison with the relevant competitors**. The AHP-methodology allows and demands this very consequently.

As indicated above, the AHP is able to solve some actual brand-valuating problems that make other methods fail. But there are some negative points as well:

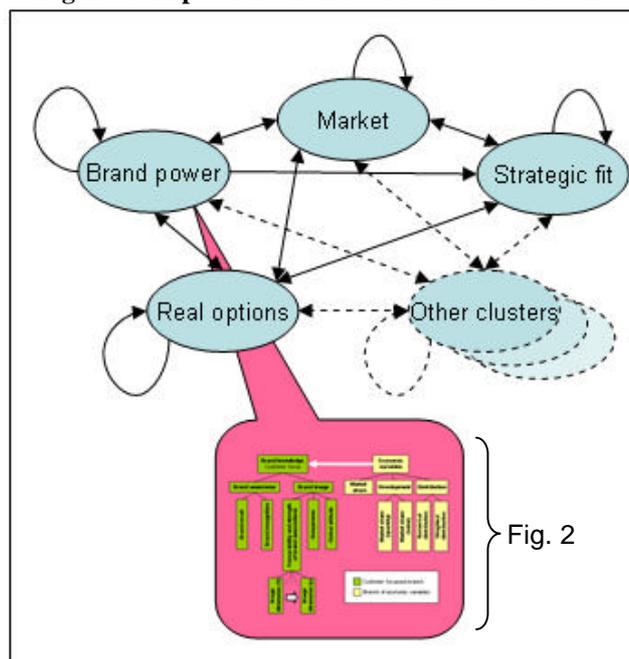
- Quite a lot of time and money is necessary to get the relevant information and to do the pairwise comparison with the two groups (experts and customers). In addition, all the collected data should refer to exactly the same moment, as the variables are not considered to be stable over time.
- The monetary transformation requires an observed acquisition price. The problem is that there is no actual brand market to observe brand values, thus a price paid is rarely observable (Schmidt 1997, p. 88).
- Unfortunately, a major problem all brand valuing methods based on scoring models deal with as well, remains unsolved. The variables are believed to be interdependent; an assumption which might not be able to be verified in some settings.

For the AHP user this leads to the question if the ANP would be a more realistic base of the model. This is discussed in the next paragraph.

5. Does interdependence matter?

So far we have assumed that brand value is brand power expressed in monetary terms. This assumption – especially for control purposes – makes sense with respect to time and money. However, if one would like to dismantle the brand value further, for example when having a property transaction on the agenda, further aspects may need to be taken into account. Beside the two mentioned categories and the market, the strategic fit and possible real options have to be considered. Strategic fit measures how harmonic a brand and the customer's brand associations are incorporated in the company's other success factors (Irmscher 1996, p. 61; Porter 1996, p. 70). Real options tackle possible future opportunities (e.g. brand extension), caused by a brand's strength (Meyers 1977; Jenner/Kühn 1999). Further clusters may be taken into account, depending on the analysis' depth. These entities are – beside the brand power itself – responsible for the brand related future cash flows but also influence the brand power. On the other hand, brand power influences these entities, too. Such relationships are predestined to be integrated into a network based model (Dellmann/Diehm 2001). Figure 4 shows a possible cluster structure.

Figure 4: A possible brand value cluster structure



If the ANP is used instead of the AHP, it is a small step to drop the independence assumption made above. It becomes therefore possible to consider for example that “brand awareness” itself could be an “image dimension” or to model the cause and effect relationship of the hierarchy’s categories explicitly, at least theoretically. The latter qualification is very important. We think the ANP is a powerful methodology that allows depicting probably every possible (e.g. non-linear) and imaginable influence structure. However, the concept assumes that the decision maker(s) can design a sound structure and is/are able to compare/measure on a rational base and not on the base of pure guessing (Saaty 1999, p. 35). The economic variables suggested by Riedel (see section 2.2) are based on a causal analytic analysis in consumer goods conditions. Unfortunately the marketing research concerning the customer focused variables as indicators of the brand construct is still in an embryonic stage. Many of them have been proposed and Brandmeyer and Schulz (1999, p. 236) remark that all of them measure “somehow” the same thing in the end. It gets even worse if the above-mentioned entities need to be incorporated, too. Until today, business administration suspects them to be important and determines “somehow” the brand value, but the actual cluster structure can only be guessed at best, certainly not rationally designed or even assessed. A basic – and also in terms of the AHP/ANP unquestionable – variable requirement is their measurability (Reinecke/Tomczak 1998, p. 102) that cannot be rationally assumed under these circumstances, not even considering the 1-to-9-scale. Also a pure technical design of every possible influence provides no solution, since it leads to “asking difficult questions in making pairwise comparisons” (Saaty 1999, p. 38) that would additionally augment exponentially and their resulting eigenvectors would be very questionable at best, certainly not useful for steering a brand and/or a company.

As long as there is no considerable progress in designing and measuring the non-simplified brand value’s interior we think the ANP cannot provide a better solution than the much simpler AHP based model. Considering time/cost-ratios and the fact that a company in competitive surroundings does not have long reaction times to actual or potential changes in their respective environments, the more heuristic AHP-approach is justified and thus reduces complexity and does not aggravate it (Kühn 1984, pp. 187).

To give an answer to the question asked in the heading: Interdependence does matter, but it is difficult to model and the vague outcome does not justify the extra effort necessary. Therefore we think it is better to stay within the proven marketing concepts applied in the presented AHP-model and also not to depict the non-linearity in the suggested hierarchy (see fig. 2). In a time when better techniques for measuring the various determinants of brand value are available and their interdependency can be better revealed and quantified the use of the ANP in this area has to be re-examined.

6. Conclusion

The presented brand control model combines the behavioural and the financial view of the brand value topic via the AHP. It takes a wide range of indicators into account, which have different units of measurement and distinct scales. Despite of these differences the AHP is able to aggregate all these determinants to priorities, which represent the brand power. The transformation of this brand power into a monetary figure follows market value considerations of the suggested transformation method. The determinants are split up into two categories (customer focused variables and economic variables), both of them base on a theoretical concept (concept of brand knowledge by Keller and causal analytic analysis by Riedel). Additionally, the measurement of "favourability and strength" within the hierarchy is consistent with the Fishbein model. After the collection of all the required data, a sensitivity analysis and the scenario technique allow a deduction of the appropriate marketing measures for achieving the brand value objectives. This is very important, especially from the brand controller's point of view. The model fulfils the requirements in an adequate manner. But the main problem of general brand management remains unsolved, namely the existence of interdependencies between the selected factors. As long as the measurement of both the customer focussed variables and the interdependencies between the determinants remain in an embryonic stage, an improvement of the model by using the ANP cannot be expected. Therefore further research in this area is requested and strongly encouraged.

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