

EVALUATION OF THE EFFECTIVENESS OF SELECTED SLOVAK BRANDS ON THE PRINCIPLE OF DEA MODELS WITH THE POSSIBILITY TO OPTIMISE THEM

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Abstract. Nowadays, when marketing and branding change, companies are trying to find new ways to evaluate the effectiveness of their marketing activities as they impact on current and future business results. The main objective of the contribution is to evaluate the effectiveness of decision making unit (DMU) production units in the form of selected Slovak brands through the non-parametric data envelopment analysis (DEA) method. The sample size consists of 10 Slovak brands (Slovenská sporiteľňa, VÚB banka, Tatra banka, ESET, Slovnaft, Matador, Rajec, Sygic, Sedita and Zlatý bažant). Through DEA, we have gained a portfolio of effective and portfolio of ineffective brands operating in Slovakia. Depending on the choice of the DEA model, effective brands included Slovenská sporiteľňa, Sygic, Zlatý Bažant, Rajec and Sedita. Other brands were classified as ineffective. The result for ineffective brands is the creation of archetypal characters that we propose in Results section. The part of Results section is the focus of the businesses of the brands in question on the use of social media, to a larger extent, create a social media voice so that the personality of the brand is reflected in contributions in social media communicating on Facebook, Instagram or Twitter. In contribution, deduction, induction, analysis and marketing research methods were used.

Keywords: brand; brand equity; decision making unit; data envelopment analysis; marketing research.

JEL Classification: C02, C52, C61, M30.

Introduction

The pressure on the company's competitive ability and the additional problems caused by the slow pace of economic growth insist on greater efficiency and better business efficiency. Branding marketing activities thus become an integral part of the business context as they impact on current and future business results. In today's world, the brand has the status of a separate international marketing mix tool, which is a valuable competitive advantage for the enterprise not only in guaranteeing the quality of the production offered but also in aggravation of customer cohesiveness with a specific group for which the brand is given.

The concept of branding and brand value is based on the belief that a successful brand has a positive impact on business revenue and customer satisfaction, ultimately resulting in higher promotional efficiency and higher market share.

During the 20th century, many authors of various scientific and professional backgrounds have contributed to the development of branding (Aaker 1991, Kapferer 1992, Kotler and Keller 1993, 2012). It follows from this that there is no generally uniform definition of brand value, but despite all the concepts of brand value, it agrees with the fact that brand value is an added value that enables a

particular brand to influence customer decisions and motivate them to buy. In line with the statements made by various authors, it seems reasonable to focus on measuring the effectiveness of brand value.

In the case of evaluating brand value efficiency, existing methodologies can be subdivided from the direct measurement aspect in which the brand value is focused on outputs and the aspect of indirect measurement focused on brand components. However, both aspects are subjective and do not provide information on sources of inefficiency, that is, sources to which an enterprise should focus in order to increase the effectiveness of selected branding variables.

The main objective of the contribution is to measure the effectiveness of selected Slovak brands through data envelopment analysis (DEA) based on the data collected from the published financial statements and through a survey conducted in the form of a questionnaire. The first part of the contribution explains process branding, including brand value and description of selected packaging data analysis models that were used to measure the effectiveness of Slovak brands. The second part characterises the methodology of DEA, in particular the CCR DEA model based on constant range income (CRS) and the BCC DEA Model based on variable profit (variable returns to scale, VRS). Subsequently, the contribution focuses on a description of acquired data and empirical findings. The conclusion of the contribution concerns the limitations of the methodology used and the knowledge for future research on the subject.

Literature Review

The primary objective of business entities in today's globalising world is to improve efficiency. In this case, we focused on evaluating the effectiveness of marketing activities related to the value of selected Slovak brands, that is, we will evaluate the level of efficiency based on the DEA models.

The beginnings of branding and operation are given up to 2,000 years B.C. The term 'brand' originated from the Norwegian word 'brands', which means burning. In this sense, branding has been associated with the determination of ownership or origin (domestic animals or slaves) (Kapferer 1992).

The beginnings of modern branding are associated with the advent of the 19th century Industrial Revolution, which was characterised by the emergence of shopping centres and the change in consumer buying behaviour because of the large number of products available on the market (Keller 1993). The 1950s of the 20th century is the period of the unique sales offer, which is characterised by the fact that the product itself is the main distinguishing feature. In the 1960s of the 20th century, this concept has changed and an emotional sales offer is coming to the fore, which also brings about changes in brand perception, that is, consumers build relationships and loyalty for brands. The 1980s is the period of the fireman sales offer that characterises the brand as a company image. In the 1990s, a brand-name sales concept emerged, making the mark the most important attribute of the seller. Technological innovation has created a new concept, 'Me selling proposition', in which consumers themselves promote the product (Kotler, Keller 2012).

The mark is considered to be the permanent asset of an enterprise that the owner will use more than the physical assets of the company. For many businesses, the brand has a higher value than all the assets in the total (Jourdan 2002). Virtually, every marketer has created his or her own 'inner' definition of brand value in accordance with his or her own subjective view of the matter. The brand value can be based on innovation, customer care or even brand durability (Fetscherin, Toncar 2009). Brand value can be measured by the customer's willingness to buy or not buy a particular brand. According to other opinions, it is the added value that the brand leverages the product or the financial value that is measurable in the transactions that belong to the branded product because of the success of the marketing programmes and activities (Majerova, Klietnik 2015). Aaker defines brand value as a 'set of assets and liabilities associated with the brand name and symbol that increases (or decreases) the value the product brings to the business or the customer'. The most important classes of this value are brand knowledge, brand loyalty, perceived quality and association with a tag (Aaker 1991). High brand value is a source of competitive advantage for its owner, such as lowering marketing costs and favouring the position of a producer when negotiating with distributors and sellers as customers want

to get their favourite brands as easy as possible (Tasci *et al.* 2018). Brand owner can increase margins because the customer is willing to pay for the brand (Seo, Park 2018). An established and valuable brand raises confidence, simplifying the brand owner's branding activities to other markets, and the brand also represents an enterprise's protection against the threat of illegal price competition (Tasci 2018).

In the following section, we focus on efficiency defined as the ratio of output and input, as measuring efficiency is an important element of performance management because it provides feedback for identifying inefficiency sources. We used the DEA method that is described in the Methodology section.

Methodology

The aim of the contribution is to quantify the degree of effectiveness of selected Slovak brands. The data set consists of 10 Slovak brands, such as Slovenská sporiteľňa, VÚB banka, Tatra banka, ESET, Slovnaft, Matador, Zlatý bažant, Rajec, Sygic a Sedita.

As DEA models require input and output variables, we have selected the communication costs in the area of support for the given brand as the input variable. Businesses do not report marketing costs directly in their financial statements. For this reason, we have chosen to approximate the value of the business to marketing from the value that is recorded in the accounting. On the basis of the theory and the consultancy with the accountants, we have chosen to approximate their value to the total value of 'Services' in the profit and loss statement. The item 'Services in the Profit and Loss Account' captures the expenses of the accounting group 51, which they usually become accustomed to the costs of advertising and representation, while meeting the requirements set out in Act no. 431/2002 Z.z. on accounting as amended, Act No. 222/2004 Coll. on value-added tax as amended, Act no. 595/2003 Z.z. on income tax as amended and the accounting procedures itself. For the purpose of our work, we decided to determine the cost of marketing costs of 15% of the cost of the service statement. The percentage of 15% of the cost of the service item was established based on the two studies for which this approximation occurred. They were the studies by Cheng (2005) and Jansky (2011). This means that the cost of marketing is determined according to the following equation (1):

$$\text{Marketing costs} = \frac{1}{2} * (0.15 * V14_{\text{column of the profit and loss statement database}}) \quad (1)$$

Brand awareness and brand loyalty are the output variables. Output variables were selected because the tags in question require an increase in these variables relative to the given input variable.

Data on the cost of communication activity in the area of branding was collected based on the financial statements from 2017, which are published on the official website of the financial statements. The data regarding the awareness and fidelity to the brands in question were obtained from a marketing survey conducted through a questionnaire. The questionnaire was distributed electronically via e-mail between 15 November 2017 and 31 January 2018. The subject of the survey was customers of the Slovak Republic. The questionnaire consisted of two parts. The first part concerned the general profile of Slovak customers. The second part deals with brand awareness or brand loyalty.

In our survey, the respondent was defined customer living in the territory of the Slovak Republic and was older than 15 years. We chose a random selection, with the respondents randomly selected from the base file as a database. When determining the sample size of respondents, we used the sample size calculator from Creative Research Systems, which is available on the Internet. A stratified randomised selection was chosen in the survey, in which respondents were divided into sub-sets based on age. The size of the base file in the case of customer surveys was determined based on the demographic statistics of the Statistical Office of the Slovak Republic on the number of inhabitants older than 15 years (4,592,689) as of 31 December 2015. The materiality level was set at 0.05, corresponding to 95% of the confidence interval and the permissible error of estimation was set at 5%. As 391

respondents surveyed the survey, the minimum sample condition was met, and the respondents' answers to the questions asked during the survey can be considered relevant and qualified based on the confidence coefficients and the maximum permissible error.

Subsequently, we applied DEA models based on constant and variable yields on a scale to classify the Slovak brands in question effectively and inefficiently. Finally, we propose measures that can help businesses increase the effectiveness of these brands.

DEA is a method of linear programming that was originally developed to assess the effectiveness of management and planning of non-profit institutions (e.g. schools and hospitals). Later, its use has been extended to other areas; using DEA models, we can compare not only capabilities amongst themselves based on the effectiveness of their work but also the effectiveness of heterogeneous activities within a single enterprise (Kliestik 2009).

By the decision making unit (DMU), we understand that the unit produces some effects and consumes some resources for its production (Nadanyiova 2015). By evaluating the efficiency of a given production unit, we evaluate essentially the efficiency of transformation of inputs to outputs. The outputs typically have a maximising character, that is, their higher value leads to higher efficiency while maintaining the same level of outputs. Inputs, on the other hand, have a minimal character, that is, their lower value leads to lower efficiency while maintaining the same level of inputs (Coelli *et al.* 2015). When analysing the efficiency, it is possible to assume that for a given task, there is a theoretical set of production possibilities, which consists of all possible combinations of inputs and outputs and determined by the theoretical effective boundary. Once production units are located at an effective border, they are effective (Jablonsky, Dlouhy 2015).

The aim of DEA models is to eliminate, or exclude, subjectivity by measuring outputs in relation to inputs. Using a linear mathematical model, inputs and outputs of individual production units are assigned scales that express the efficiency of the unit (Salaga *et al.* 2015). On the basis of these weights, the brands will be compared and ranked.

The early stages of the DEA models can be found in Debreu and Koopmans (1951) as well as by Farrell (author of the 1957 Model of Efficiency Rating). Farrell's findings were subsequently reworded by Charnes, Cooper and Rhodes (DEA CCR) and Banker, Charnes and Cooper (DEA BCC). The aim of both models is to divide the objects under investigation into efficient and inefficient in terms of consumed resources, produced production or other types of outputs (Charnes *et al.* 1978). This asserts the advantage of determining the source of inefficiency and determining how the production unit can become effective by reducing/increasing inputs and outputs. CCR model calculates the input and output weights by optimisation calculation to maximise efficiency level. Efficiency level is less than or equal 1 (Banker *et al.* 1984, Cooper *et al.* 1996).

$$\text{Minimise } e(\text{DMU}_j) = \frac{\sum_{k=1}^r u_k y_{kj}}{\sum_{i=1}^m v_i x_{ij}} \rightarrow \max, \quad (2)$$

$$\frac{\sum_{k=1}^r u_k y_{kj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1, j = 1, 2, \dots, n, \quad (3)$$

$$u_k \geq \varepsilon, k = 1, 2, \dots, r, \quad (4)$$

$$v_i \geq \varepsilon, i = 1, 2, \dots, m. \quad (5)$$

where

e is the efficiency rating of DMU being evaluated by DEA,

ε is the infinitesimal constant, according to it, input weights and output weights have positive number,

u_k is the coefficient of weight assigned by DEA to output k ,

v_i is the coefficient of weight assigned by DEA to input i ,

x_{ij} is the amount of input i used by DMU _{j} ,
 y_{kj} is the amount of output k used by DMU _{j} ,
 i is the number of input used by the DMUs,
 k is the number of outputs used by the DMUs.

We can modify previous model on linear model via Charnes–Cooper transformation in two ways. The first approach maximises the numerator of objective function if the denominator is equal to 1. It is the input-oriented CCR DEA model. The second approach minimises the denominator if the numerator is equal to 1. It is the output-oriented CCR DEA model (Podhorska, Siekelova 2016).

$$\text{Maximise} \quad e(\text{DMU}_j) = \sum_{k=1}^r u_k y_{kj} \rightarrow \max, \quad (6)$$

$$\sum_{i=1}^m v_i x_{ij} = 1, \quad (7)$$

$$-\sum_{i=1}^m v_i x_{ij} + \sum_{k=1}^r u_k y_{kj} \leq 0, j=1, 2, \dots, n, \quad (8)$$

$$u_k \geq \varepsilon, i=1, 2, \dots, r, \quad (9)$$

$$v_i \geq \varepsilon, j=1, 2, \dots, m, \quad (10)$$

or

$$\text{Minimise} \quad e(\text{DMU}_j) = \sum_{i=1}^m v_i x_{ij} \rightarrow \min, \quad (11)$$

$$\sum_{k=1}^r u_k y_{kj} = 1, \quad (12)$$

$$\sum_{k=1}^r u_k y_{kj} - \sum_{i=1}^m v_i x_{ij} \leq 0, j=1, 2, \dots, n, \quad (13)$$

$$u_k \geq 0, i=1, 2, \dots, r, \quad (14)$$

$$v_i \geq 0, j=1, 2, \dots, m. \quad (15)$$

In case of the input-oriented CCR DEA model, the efficiency rating is equal to 1. It means that DMU is located on efficient frontier. On the other hand, the efficiency rating is not equal to 1, so DMU is inefficient unit. In case of the output-oriented CCR DEA model, the efficiency level is greater than 1, so DMU is inefficient unit. If DMU is not efficient, then it is necessary to find virtual unit on efficient frontier (Fiala 2008).

The input-oriented and output-oriented CCR DEA models are mentioned as multiplier models. To evaluate the efficiency level, it is necessary to solve these models for each DMUs separately. In case of multiple set, use dual models for previous models. These models are mentioned as envelopment model (Fiala 2008). The input-oriented dual CCR DEA model has the following form:

$$\text{Minimise} \quad \theta_q - \varepsilon (\sum_{i=1}^m s_i^- + \sum_{k=1}^r s_k^+), \quad (16)$$

$$\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = \theta_q x_{iq}, i=1, 2, \dots, m, \quad (17)$$

$$\sum_{j=1}^n \lambda_j y_{kj} - s_k^+ = y_{kq}, k=1, 2, \dots, r, \quad (18)$$

$$\lambda_j \geq 0, s_i^- \geq 0, s_k^+ \geq 0. \quad (19)$$

Individual ‘ λ ’ means weights of the input and output variables. The purpose of the model is to find the linear combination of input and output quantity of all the analysed samples.

For efficient DMU, optimal value of $\theta_q = 1$; optimal value of all additional variables s_k^+ , $k=1, 2, \dots, r$, a s_i^- , $i=1, 2, \dots, m$, are equal to 0.

Radial DEA models provide information on efficiency level and answer to the question how to achieve efficient frontier. It means to change inefficient unit to efficient unit (or virtual unit) by radial DEA model. Input and output variables about virtual units are referred to as target variable for input and output variables (Jablonsky, Dlouhy 2015).

Then, Banker, Charnes and Cooper created the BCC DEA model based on variable returns to scale (VRS), that is, rising, falling as well as constant returns. In this case, a cone shape of efficient frontier is changed to convex shape. It follows that number of efficient units is greater when compared with CCR DEA model (Charnes *et al.* 1978). In analysing the efficiency based on VRS, it is necessary to complete dual model about convexity condition:

$$\sum_{j=1}^n \lambda_j = 1 \quad (20)$$

The method of quantification of BCC DEA models is almost analogous to the calculation of the CCR DEA models.

Results

On the basis of the use of the CCR DEA models of entry and exit oriented, we have concluded that effective Slovak brands include Slovenská sporiteľňa and Sygic, that is, the rate of their effectiveness is 1. Other Slovak brands are used by the entrepreneurial subjects as ineffective, that is, they do not achieve efficiency of 1 or 100%. Table 1 shows the input data to identify efficient and inefficient brands through selected DEA models.

Table 1. Entry values for CCR and BCC DEA models (Source: author's compilation)

DMU	Communication costs in support of the brand (€)	Brand awareness (number of customers)	Brand loyalty (number of customers)
Tatra banka	27,860	1,563,785	437,800
VÚB banka	15,452	276,898	389,630
Slovenská sporiteľňa	19,856	1,239,685	986,500
ESET	29,741	1,142,360	412,800
Slovnaft	35,652	986,520	896,352
Matador	14,962	127,411	389,630
Zlatý bažant	28,740	2,296,854	968,521
Rajec	17,654	2,304,586	289,652
Sedita	9,852,	312,590	458,963
Sygic	11,632	1,962,030	396,825

Table 2 shows the results of the effectiveness of the relevant Slovak brands based on the use of an input- and output-oriented CCR DEA model. It is obvious that only Slovenská sporiteľňa and Sygic brands are effective, because their effectiveness is equal to 1. Other brands do not achieve such a measure, they exceed it. In order to become effective, it is necessary to adjust their input (Table 3) and output characteristics (Table 4).

From the efficiency point of view, the least effective mark is ESET, because it achieves an efficiency score of 0.3316 (more than 33%), with a power efficiency of 3.0157. On the basis of the quantification of the given variables through the CCR DEA model, the company owning the mark should take certain steps, on the downside, to reduce the communication costs from € 29,741 to € 9,862 in support of the brand by focusing on the use of new forms of marketing communications in an online environment that are less costly and their engagement and interactivity is much greater. On the other

hand, the ESET tag can achieve the desired output efficiency through the use of new forms of marketing communication to increase brand awareness from 1,142,360 to 3,445,044 customers. Another opportunity is to immediately make changes in both the input and the output by combining them.

The second least effective brand is the Tatra banka, with an output efficiency level of less than 41%. In spite of its innovative capability, Tatra banka should take action on both the entry and exit sides in order to achieve an efficiency level of 1 or 100%.

The third least effective mark in the CCR DEA models is for the Slovnaft brand, which achieves an efficiency score of less than 51% and a 1.9761 output side. Slovnaft is a refinery-petrochemical company also focused on the concept of joint corporate responsibility. Even despite these activities, the brand works ineffective. A way to increase the effectiveness of the brand is to increase brand awareness, for example, through a more creative form of communication, or by supporting this tool online through integrated marketing communication forms.

Table 2. Results of the efficiency assessment for the input- and output-oriented CCR DEA models (Source: author's compilation)

DMU	Efficiency score of the input-oriented DEA model	Efficiency score of the output-oriented DEA model
Tatra banka	0.4069	2.4575
VÚB banka	0.5075	1.9703
Slovenská sporiteľňa	1.0000	1.0000
ESET	0.3316	3.0157
Slovnaft	0.5060	1.9761
Matador	0.5242	1.9078
Zlatý bažant	0.7719	1.2956
Rajec	0.7739	1.2921
Sedita	0.9377	1.0665
Sygic	1.0000	1.0000

Table 3. Results of the input-oriented CCR DEA model in the form of effective input and output targets (Source: author's compilation)

DMU	Communication costs in support of the brand (€)	Brand awareness (number of customers)	Brand loyalty (number of customers)
Tatra banka	11,337	1,563,785	437,800
VÚB banka	7,842	489,628	389,630
Slovenská sporiteľňa	19,856	1,239,685	986,500
ESET	9,862	1,142,360	412,800
Slovnaft	18,042	1,126,401	896,352
Matador	7,842	489,628	389,630
Zlatý bažant	22,184	2,296,854	968,521
Rajec	13,633	2,304,486	466,108
Sedita	9,238	576,756	458,963
Sygic	11,632	1,962,030	396,825

Table 4. Results of the output-oriented CCR DEA model in the form of effective input and output targets
(Source: author's compilation)

DMU	Communication costs in support of the brand (€)	Brand awareness (number of customers)	Brand loyalty (number of customers)
Tatra banka	27,860	3,843,055	1,075,908
VÚB banka	15,452	964,727	767,697
Slovenská sporiteľňa	19,856	1,239,685	986,500
ESET	29,741	3,445,044	1,244,891
Slovnaft	35,652	2,225,889	1,771,288
Matador	14,962	934,134	743,353
Zlatý bažant	28,740	2,975,706	1,254,774
Rajec	17,654	2,977,792	602,265
Sedita	9,852,	615,098	489,474
Sygic	11,632	1,962,030	396,825

Table 5 shows the results of the effectiveness of the relevant Slovak brands based on the use of an input- and output-oriented BCC DEA model. It is clear that the portfolio of effective brands (Slovenská sporiteľňa, Zlatý Bažant, Rajec, Sedita and Sygic) has expanded, as the BCC DEA models assume variable yields on the scale and their rate of effectiveness is equal to 1. Other brands do not reach such a rate, they exceed it. In order to become effective, it is necessary to adjust their input (Table 6) and output characteristics (Table 7). Effective brands include Slovenská sporiteľňa, Zlatý bažant, Rajec, Sedita and Sygic. Amongst the least efficient brands are ESET brands, Tatra banka, because they achieve an efficiency score of less than 50%. These ineffective brands should take appropriate action on both the entry and exit sides, which serve to increase their efficiency, that is, optimise the communication portfolio by using online marketing communication platforms.

Table 5. Efficiency score results for the input- and output-oriented BCC DEA models (Source: author's compilation)

DMU	Efficiency score of an input-oriented DEA model	Efficiency score of the output-oriented DEA model
Tatra banka	0.4170	1.4715
VÚB banka	0.6376	1.9359
Slovenská sporiteľňa	1.0000	1.0000
ESET	0.3614	2.0122
Slovnaft	0.5090	1.1006
Matador	0.6585	1.8695
Zlatý bažant	1.0000	1.0000
Rajec	1.0000	1.0000
Sedita	1.0000	1.0000
Sygic	1.0000	1.0000

Table 6. Results of the input-oriented BCC DEA model in the form of effective input and output targets
(Source: author's compilation)

DMU	Communication costs in support of the brand (€)	Brand awareness (number of customers)	Brand loyalty (number of customers)
Tatra banka	11,618	1,563,785	437,800
VÚB banka	9,852	312,590	458,963
Slovenská sporiteľňa	19,856	1,239,685	986,500
ESET	10,747	1,142,360	427,704
Slovnaft	18,146	1,081,259	896,352
Matador	9,852	312,590	458,963
Zlatý bažant	28,740	2,296,854	968,521
Rajec	17,654	2,304,586	389,652
Sedita	9,852	312,590	458,963
Sygic	11,632	1962,030	396,825

Table 7. Results of the output-oriented BCC DEA model in the form of effective input and output targets
(Source: author's compilation)

DMU	Communication costs in support of the brand (€)	Brand awareness (number of customers)	Brand loyalty (number of customers)
Tatra banka	22,530	2,301,185	644,244
VÚB banka	15,452	831,556	7,542,266
Slovenská sporiteľňa	19,856	1,239,685	986,500
ESET	26,100	2,298,696	830,650
Slovnaft	19,856	1,239,685	986,500
Matador	14,962	786,146	728,427
Zlatý bažant	28,740	2,296,854	968,521
Rajec	17,654	2,304,586	389,652
Sedita	9,852	312,590	458,963
Sygic	11,632	1,962,030	396,825

On the basis of the foregoing, we believe that most of the verbal tags in question should aim to optimise their communication portfolio resulting from the advancement of telecommunications and information technology. Changing the communication portfolio because of the use of new communication tools can thus have a positive impact on the profitability ratio and on the level of effectiveness, and the goal is to create a community of customers or social network users participating in brand value and to pull the product, service from tramlines and introduce it in a new light. In our opinion, Slovak brands should, in the future, try to find a new context for communication policy, including its progressive instruments, so that consumers do not surprise.

It follows from the above that the Slovak brands that do not fulfil the condition of effectiveness (ESET, Tatra banka, VUB banka, Slovnaft, Zlatý Bažnat, Sedita, Matador, Rajec) must reduce their inputs or increase their outputs through the following ways and possibilities:

- status test – currently, the consumer chooses products or services to complete his or her social status. This can be used by brands in their strategy and offer the product only to customers who have a real interest in them,
- the search for an original context with guerrilla communication activities – another trend is to search for an original communication context using a guerrilla communication activities in which brands can surprise the customer at the right moment and in the right place,
- start from yourself – to get and subsequently maintain customer confidence is not easy at the moment. One of the steps the brand can gain in credibility is to look inside the business and evaluate the internal corporate culture,
- artificial intelligence – Increasing consumer demands can also respond to brands through artificial intelligence,
- social networks using progressive communication tools – the social networking style of the communication brands chooses according to their audience. For example, the Snapchat social network allows you to share content that is lost in a minute and is one of the most effective tools for engaging audiences. According to research eMarketer to Snapchat, 22% of the US advertisers, including Pepsi, Amazon, GE, 200th Century Film Studios, Milk, and even Magnesia and Mattoni, have begun investing. The reason for using Snapchat is simple – while Facebook uploads 35% of the total number of users, Snapchat up to 65%, that is, Snapchat bets on brands that want to connect an emotional relationship with the customer (Trendy 2016).

In addition, we propose that the brands of Slovak companies in question begin to build themselves into the position of a certain archetypal figure, because each of the individual archetypes predestines the behaviour of the company, its visual presentation and communication.

The archetypal-communicating brand story acquires the potential to build a puto and relationship with others and to connect us in our humanity without sacrificing us to a homogeneous mass because it also appeals to us as an individual. The archetypal story presented and imprinted with the brand will enable the enthusiasts to identify and feel the connection at personal and individual level from the Slovak brand in question. The consumer has a sense of how the brand would speak directly to him or her, personally, because the brand speaks to a wide audience and aims to reach out to a broad target audience. If we focus on branding according to the archetypal sense, we touch the ‘soul of the brand’. The brand that binds to the archetype thus increases its chances to reach out to the innermost layers of the human psyche – the customer. Brand, a story of a brand in which the customer clearly recognises an archetypal figure and its symbolism, enhances its authenticity and credibility (Wooside, Sood 2016). Also, the brand that communicates in a given archetype not only is readily recognisable by a target group but also ensures consistent communication across channels and consistent communication over time. Archetypes are based on four basics: desires and needs, independence, stability and freedom (Bechter *et al.* 2016).

As the tag represents the personification of individual archetypal figures and impersonates the story to which the customer can join, we propose to assign ineffective Slovak brands to one of the following archetypes:

- creator – opens up new spaces, brings innovations and new ideas that it performs or helps them to do. Here we propose to include the brands of ESET and Tatra banka,
- caregiver – the main aim of the caregiver is to protect people, help others, take care of others. Here we propose to include the brand of VUB Bank,
- ruler – its purpose is to determine the rules, the direction indicator, and to determine what is important, what matters. Here we propose to include Slovnaft,
- clown – clown strategy is play, humour, joke, provocation, irony and fun behaviour. Here we suggest to include the brand Zlatý bažant,

- one of us – develops common behaviour, a common look and likes to blend with the crowd. He or she lives an ordinary, but a good life without pretense. Here we propose to include Sedita,
- magician – wants to realise his or her dreams, creates a vision, transforms or helps. Here we propose to include the brand Matador,
- innocent child – has faith, optimism and ideals. Here we propose to include the brand Rajec.

To increase the efficiency, we are also pushing for the personality to be reflected in contributions to social media, that is, to create a voice of social media similar to the way the tag in question communicates with Tweets, Facebook, Snaps and Instagram.

Conclusions

Comparison and analysis of DMU efficiency scores based on DEA models are widely used in various areas of the economy. Their goal is to identify the source of inefficiency, because the effectiveness of individual business areas has an impact on the competitive advantage of business entities.

This contribution provides information on the level of effectiveness of selected Slovak brands with the possibility of optimising the communication protocols in this area. The main objective of the contribution was to measure the effectiveness of selected Slovak brands based on DEA based on the collected data from the financial statements published in the register of financial statements and through a survey conducted in the form of a questionnaire.

On the basis of the results of the CCR models, DEA notes that only Slovenská sporiteľňa and Sygic are working effectively. On the other hand, the BCC DEA models show that there are more Slovak brands (Slovenská sporiteľňa, Zlatý Bažant, Rajec, Sygic and Sedita). The larger number of effective Slovak brands is related to the BCC DEA model, which assumes variable yields from the range. According to the quantification of these models, other brands do not reach the efficiency of 50% either. Each tag was analysed based on the input data (communication costs related to brand support) and output data (brand awareness and brand loyalty).

This research study has a specific character because there is no similar research in this field with links to evaluation of the effectiveness of Slovak brands with the possibility to optimise them, although many authors are concerned with assessing the level of efficiency of global brands, especially from North America, Europe and Asia.

A future scope of the present study could be to integrate the management's perspective into the study of brand equity and benchmark the brands against the brand equity as perceived by the management. In addition, we can add some new variables and models based on the DEA principle. Charles and Zavala measure the customer-based brand equity efficiency to identify efficient brands versus inefficient brands in terms of customer perception. The authors also represent a novel attempt to develop a satisfying DEA model to measure the customer-based brand equity efficiency under a stochastic environment that is, furthermore, free from any theoretical distributional assumptions. The proposed model is then applied to measure the efficiency of nine major cell phone brands (Charles, Zavala 2015).

Further research may be aimed at evaluating the effectiveness of the marks in question over time, that is, in addition to the CCR and BCC DEA models, we could use the Malmquist index. It is a quantitative tool that accepts a time factor. The index evaluates multiple inputs and outputs without pricing data. When evaluating effective changes over time, the index generates decomposition on two components – a relative change in the efficiency of the unit being analysed in the sector and the change in boundaries of production options caused by technology. The basic DEA models can be considered static, that is, they do not take into account the development or change in the efficiency of business activities over time. We will remove this deficiency by using the so-called Malmquist index. The Malmquist index can be formulated in various variants: input-oriented or output-oriented, with constant, variable, non-mining or non-declining yields.

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