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Brand valuation: an innovative approach based on conversion ratios

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ABSTRACT

We present a novel brand valuation method based on conversion ratios. The proposed approach uses brand-related parameters, which are usually accessible, however, the established brand valuation methods have not yet used them. These key parameters include the ability to acquire new customers and retain current customers. We argue that such parameters can be reflected through the cost of reaching new customers and retaining current customers. The method proposed relies on observable inputs, hence, it specifically addresses the limitation of the brand valuation methods defined so far. The method is based on the cost savings reached by the investors who acquire the brand. It can be applied in situations in which brand users reach average to below average results not admitting the application of income-based approaches. Furthermore, the method is a suitable analytical tool supporting financial executives, analysts, and consultants while identifying contributions made by the brand. We test the concept on a model company within a case study. The method can be also a contribution in terms of the calibration and refinement of the existing approaches and will support both researchers and practitioners to improve the understanding between the already accepted brand valuation methods and novel perspectives on the issue.

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M4; M30; M31; G14

1. Introduction

The research on brand valuation dates back to the 1980s when it became increasingly apparent that there are off-balance sheet items having a substantial impact on total firm value (Haskel & Westlake, 2018; Aaker, 2009). The necessity for assigning a financial value to a brand is increasing due to reporting requirements and transactional purposes (e.g., because of a growing role of mergers and acquisitions). Internal

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factors might also play a role, particularly in the case of winding-up companies (see, e.g., Łapińska et al., 2021; Civelek et al., 2021; Ključnikov et al., 2021; Sudolska & Łapińska, 2020; Lev, 2019; Calder & Frigo, 2019; Yuan & Shaw, 2014; Keller, 1999).

The number of approaches to brand valuation has grown significantly since the 1970s (see, e.g., Baker & Persson, 2021; Sahin, 2021; Tho, 2021; He & Calder, 2020; Calder & Frigo, 2019; Kral et al., 2020; Reyneke et al., 2014; Lagrost et al., 2010; Salinas & Ambler, 2009; Abratt & Bick, 2003; Fernández, 2002; Haigh, 1997; Simon & Sullivan, 1993). The financial valuation methods known so far are usually focused on brands that are actively used by enterprises, i.e., brand-related cash flows can be identified. In the forefront of interest are indicators concentrated on changes in the sale price (e.g., Crimmins, 1992), sales volumes, or customer behaviour (e.g., Hupp & Powaga, 2004; Samoliu et al., 2021). The secondary changes in other operating indicators, such as costs (e.g., Sander, 1994) or return on brand investment (Herremans et al., 2000) are also monitored. Some other methods are focused on the brand building cost appreciation (e.g., Abratt & Bick, 2003), the relationship between brand image and brand trust the in the brand building process (Kim & Chao, 2019), or savings achieved by a successful brand owner. The most common method is, however, the royalty relief approach which in its variants emphasises cost savings as a result of owning the brand which otherwise would have to be licensed (e.g., Paugam et al., 2016).

Not all above-mentioned methods, however, allow a valuation of brands that are currently out of use. Moreover, these approaches cannot accurately reflect the situation of brands that are used by firms with bad or very limited prospects. Against this backdrop, the objective of this study is to propose a novel valuation method suitable for brands for which the application of a cost-based approach cannot be considered due to the long brand history and other specifics. At the same time, no positive net income can be assigned to the brand, which would permit the application of income-based methods. Hence, the approach we propose here serves for standard brand valuation based on brand-related parameters, which are usually accessible, however, the established brand valuation methods have not yet used them. These key parameters include the ability to acquire new customers and retain current customers. We argue that such parameters can be reflected through the cost of reaching new customers and retaining current customers. Therefore, the method proposed in this paper relies on observable inputs, i.e., it specifically addresses the limitation of the brand valuation methods defined so far in prior research.

The article is structured as follows. In Section 2, the theoretical approaches of brand valuation are introduced. Section 3 outlines the methodology. Section 4 delivers the research results that are subsequently verified while using the case study approach in Section 5. Finally, the research findings are discussed in section 6.

1.1. Theoretical background

The difficulty in finding a consensus on the suitability of individual brand financial valuation methods comes from the fact that the term 'brand' is not clearly defined. The American Marketing Association/AMA (American Marketing Association)

(2020) defines the brand merely as 'a name, term, design, symbol, or any other feature that identifies one seller's goods or service as distinct from those of other sellers'. Within this narrow definition, the value of the brand is perceived as marginal. The brand value usually includes the effects that the brand evokes in the form of a symbol. In a wider context, the brand is perceived on the basis of actually distinguishable features of the producer's product which represent a value for the customer, i.e., which the customer perceives and follows in his decision making. However, the brand is perceived as the producer's guarantee that the promise in relation to the product will be kept. Under information asymmetry, the brand creates a mechanism of loyalty and prevents new competitors from entering the market (e.g., Górska & Mazurek, 2021; Streimikiene & Ahmed, 2021; Civelek et al., 2020; Dima & Meghisan-Toma, 2018; Flisikowski & Kucharska, 2018; Davcik & Sharma, 2015).

Customers, their attitudes, perceptions, and loyalty are key aspects of brand valuation. Avery and Keinan (2015) identify three directions for understanding a brand. The first, represented, for example, by Aaker and Keller (1990), interprets the brand as a result of investments in the (unidirectional) communication with customers where a rational approach dominates the relationship. The brand is built and managed by the producer. The second bulk of research, represented by Mick and Buhl (1992) and Fournier (1998), interprets the brand as a result of interactions between the firm and its consumers. The third direction considers the brand as a socio-cultural phenomenon. The brand is an indicator of lifestyle, ideology, etc., and it is detached from the product (Janoskova et al., 2021; Gręboszc-Krawczyk, 2019; Holt & Cameron, 2012; Holt, 2004, 2002).

Davcik and Sharma (2015) provide a summary of brand valuation concepts and assess methods for capturing the development of the brand phenomenon in time. The category of brand equity that expresses the importance of the brand for the producer is used to capture the value of the brand. This is interpreted at the level of products and, more often, at the level of a relationship with customers and financial results. For example, Aaker (1995) promotes brand assessment at the customer level while measuring the perception of difference, seriousness, satisfaction, and brand awareness among customers. Keller et al. (2008), using the Customer-Based Brand Equity (CBBE) method, measure brand loyalty, perceived quality, awareness, and associations. Sicard (2013) in her concept of the fingerprint method concentrates on other brand attributes or its perception by customers. Brand equity can also include trademarks or distribution channels (Keller et al., 2008) as well as other assets that improve the market position. Some brand financial valuation methods strive to transfer thus defined non-financial metrics into monetary units (e.g., Hupp & Powaga, 2004; Dima & Vasilache, 2009). Other authors, for example, Isberg and Pitta (2013), Ailawadi et al. (2003), and Simon and Sullivan (1993), derive brand equity from the producer's financial results. Ambler et al. (2002) propose the concept of brand equity as a result of past activity, which influences the future cash flow and corresponds to the concept of financial valuation of assets. However, specific brand attributes must be paired with corresponding changes in the expected cash flow. The fact that some authors interpret the brand as an asset refers to the usefulness of a brand as a sales promotion tool. Other authors (see, e.g., Salinas & Ambler, 2009) see the brand as an

Table 1. Concepts of brand interpretation.

Approach	Characteristics
Tho (2021)	Brand as a tool for generating positive feelings on the part of customers which make a brand a valuable commodity for enterprises that own it.
He and Calder (2020)	Interpretation of brands as financial assets; the brand evaluation is based on the idea 'how strong the brand is in determining consumer choice versus a comparatively weakly branded product'
Calder and Frigo (2019)	Brand as a business asset. Differentiation between the marketing and finance perspectives. A marketer emphasizes a 'Net Promoter Score", whereas a finance is more concerned with cash flow, return on investment (ROI), margins, and asset turns
Ragio and Leone (2009)	Differentiation between brand equity and brand value; brand equity is a perception or desire that a brand will meet its promise of benefit; brand equity is a potential influenced by many factors which does not have to be fulfilled; in financial terms it is expressed as brand value
Srinivasan et al. (2005)	Brand equity is represented by additional funds generated through consumer preferences, i.e., brand awareness, biases, etc.
Keller and Lehman (2003)	Brand value chain concept; unrealized marketing activities which are reflected in financial results
Ailawadi et al. (2003)	Brand equity is based on the ability to achieve revenue premium; the sources are image, product line, R&D, etc.
Yoo et al. (2000)	Brand equity is the result of marketing mix (price, place, distribution, advertising, promotions)
Keller (1999)	Brand as a result of marketing endeavour; comparing customer's reaction to non-branded products; measures: brand awareness, brand image
Simon and Sullivan (1993)	Brand as a sales promotion tool. The value of the brand is reflected in the producer's shares (applicable only to public companies)
Kamakura and Russell (1993)	Behaviourally based measures; consumer decision-making and choices
Farquhar (1990)	Strategic role of brand – brand as a way to strengthen the producer's position

Source: Own research based on Davcik et al. (2015).

asset that can be sold on its own. Table 1 summarises the concepts of brand interpretation described in the academic literature.

Some of the concepts shown in Table 1 result in the expression of a brand in monetary units, which makes them directly applicable to the financial valuation. However, most concepts describe the brand and its development in non-financial metrics. From a financial valuation perspective, it is essential to find adequate financial indicators through which the brand effect can be demonstrated. Another possibility is to find a transfer mechanism between non-financial metrics and their financial valuation.

The financial value of a brand might be cost-based, market-based, and income-based (International Valuation Committee, 2020). Cost-based methods express the brand value through costs that the producer would have to pay to acquire an asset that is equal or similar to the brand in question. Depending on the choice of the valuation base, inclusion of physical depreciation, functional obsolescence, economic obsolescence, etc., the cost-based valuation is expressed at the level of reproduction cost or replacement cost (Smith & Richey, 2013). The cost-based approach is promoted, for example, by Herremans et al. (2000), who assessed the relationship between previous marketing expenditures and brand value. A Damodaran (2006) proposal is to value the brand based on the last investments and their depreciation. Although the valuation methods based on historical expenditures can be the initial estimate of brand value, they do not answer the question to what extent this producer's expenditure was relevant in relation to current brand value.

The efficiency of expenditure generally depends on the industry, competitors' activities, and is also influenced by many other factors beyond the control of the producer. The issue of documentation and isolation of costs linked to the brand is difficult to address, namely, in the case of producers with a long history. Easily identifiable expenditures, such as logo design, trademarks, legal protection, etc. are rather exceptions.

Market-based approaches based on comparing the valued asset with a similar asset of a known value are rarely applicable in brand valuation. One of the reasons is the fact that brand producers try to be distinct and unique, which is a limiting factor for any comparison. Furthermore, there is the issue of brands work in the context of their own industries and competing brands. Their transferability to different industries is limited. In addition, it does not happen frequently that a transaction between two independent parties where the price is known focuses merely on the brand. The category of market-based methods can include multiplier models; see, e.g., Damodaran (2006), which derive the brand value from the higher multiples of the producer's valuation and sales relative to generic or average producers. An obvious pitfall of this method is that the cause of increased value of the multiplier can be different from the brand value (due to different marketing strategies, size of market share, decisions on production technology, fixed costs, financial leverage, etc.).

Most brand valuation methods fall into the category of income-based approaches. These methods attempt to capture the financial benefits that a brand can generate to its users. If these methods are based on the brand equity concept in the form of non-financial metrics, the methods of financial valuation seek to transfer these metrics into financial terms. The determinants of these methods are linked to the following issues: 1) On the basis of which financial indicators (e.g., revenues, margin, cash flow, marketing expenses, etc.) should the brand effect be measured? 2) What is the mechanism of assigning a share in revenues, profit, etc., to the brand? Differences are in the complexity of capture. In corporate practice, we use, for example, scoring based on marketing metrics based on which it is possible to define, among other things, the percentage share of the brand in the producer's sales (Salinas, 2009). Some solutions, however, leave a lot of room for subjective interpretation. The most frequent solution is a comparison with a generic producer. The difference in the value of a compared quantity between the branded and non-branded producer is then attributed to the brand. The complexity of capture can vary, that is, consider only 'net' revenues of the producer or also consider the costs of brand maintenance, investment in the brand, costs of improving product quality, changes in the quantity produced, etc. (see, e.g., Smith & Richey, 2013). As regards objections to the applicability of these methods, see, e.g., Skalický et al. (2021) and Davcik et al. (2015).

The royalty relief method is the most frequently used method falling into income-based approaches (Salinas & Ambler, 2009). The brand value is derived from the amount of royalties which the branded producer would pay if he did not own the brand. Defining the amount of royalty is a key issue. A solution is the scoring of non-financial brand metrics, deriving the amount of royalty from the achieved

margin or using standardised values for certain industries. The most frequently used approaches to brand financial valuation are summarised in Table 2.

Most of the above-mentioned income-based methods share the same drawback: the assumption that the brand is used, i.e., the results generated by a brand are the basis for the brand valuation. If such results cannot be captured or are not positive, the brand cannot be valued using income-based methods. Another significant drawback is the fact that the listed valuation methods often rely on unobservable parameters or parameters which are difficult to estimate (e.g., royalties, brand effect on revenues, etc.) which, however, are important parameters of valuation models with an impact on the valuation result. This leads to considerable uncertainty in the accuracy of the valuation.

The method proposed in this paper is based on brand conversion ratios and represents a response to the limitations mentioned above. The method concentrates on the perspective of a potential brand buyer (investor). The investor strives to find a new use for the brand within their business activity. Thus, the approach comes from the brand valuation in view of its function of acquiring new customers and its function of retaining existing customers. The valuation base is represented by the cost savings that can be achieved by using the valued brand compared to using an existing brand of the potential buyer. From this point of view, the proposed method can be classified as cost-based. However, the method also contains a comparison element based on the comparison between the value brand and the potential buyer's own brand. The method can be applied on the valuation of brands that are not currently in use, and therefore no cash flows are associated with it. Another suitable situation are producers who do use the brand but achieve below-average results for other reasons. Input parameters are used in the model which are either directly accessible or which can be experimentally estimated. This is why we believe that the proposed method could be a suitable tool to value a brand and, thanks to its anchoring in observable quantities, it can also be suitable as a check for brand valuation by income-based methods described in prior studies (Salinas, 2009).

1.2. Methodology

In brand valuation research, a large number of concepts has emerged. These concepts represent the starting point in the research of the issue how to design a baseline benchmark for deriving the brand value. In the model proposal we present in this paper, the brand value is derived from its contribution to the acquisition of new and retention of existing customers from a potential investor perspective (meaning that we abstract away from the brand's effect on other stakeholders). The assessed value represents the savings the buyer of the brand can achieve. The investor compares the brand parameters, i.e., fulfilment of both aforementioned functions of the brand (acquisition and retention of customers), with the alternative of building its own brand. We proceeded in analogy to the already established valuation methods which derive the brand value from a comparison with certain producer's parameters with and without the brand (e.g., profit, revenues, etc.), see e.g., He and Calder (2020). In our study, the parameters of the benchmark are the ability of acquiring new and

Table 2. Brand valuation approaches.

Approach	Characteristics
Cost-based approaches	
Historical cost of creation	Previous (historic) investments in the brand: suitable rather for newly created brands without a significant income potential (Damodaran, 2006; Herremans et al., 2000; Haigh, 1997) Limitations: relevance of previous costs, their definition and demonstrability in established brands, neglecting the income potential
Reproduction or replacement cost	Estimate of costs of recreating the brand (Reyneke et al., 2014; Smith & Richey, 2013; Reilly & Schweihs, 2000) Limitations: possibility of targeted replication of brand characteristics, time parameter of brand building
Market-based approaches	
Transaction method	Using the knowledge of valuation of an equal or similar brand based on the observed transaction (Reilly & Schweihs, 2000; Ambler & Barwise, 1998) Limitations: finding a comparable transaction, complexity of brand use agreement
Difference in price to sales ratios	Brand value corresponds to the difference between multiple EV/Sales of branded and non-branded producer (Damodaran, 2006) Limitations: influence of other factors on the EV/Sales value; finding a non-branded producer
Income approach	
Price premium/ Revenue Premium	Branded producer sells at a higher price than non-branded producer; with a defined quantity of sold goods, the difference is attributed to the brand (Ailawadi et al., 2003; Reilly & Schweihs, 2000) Limitations: separation of the brand influence
Demand Drivers	The brand influences the demand for product. The financial effect is assigned to the producer's brand (Hupp & Powaga, 2004) Limitations: separation of the brand influence
Gross margin comparison	The result of a brand use is manifested in higher gross margin (Salinas & Ambler, 2009) Limitations: finding a comparison basis and a generic producer
Operating Profit Comparison	Result of brand effect is manifested in higher operating profit (Salinas & Ambler, 2009) Limitations: finding a comparison basis and a generic producer
Royalty Relief	Branded producer does not need to pay for the brand and thus achieves savings (Reyneke et al., 2014) Limitations: defining the amount of royalty
Excess Cash flow	The brand has an impact on the amount of cash flow (Reilly & Schweihs, 2000) Limitations: finding a comparison basis and a generic producer
Excess margin	A part of the margin remaining after subtracting the revenue attributable to other assets is attributable to the brand (Smith & Richey, 2013) Limitations: identification of all involved assets and their revenues
Value of company with and without a brand	The difference in valuation of a company with brand and one without brand is attributed to the brand (Smith & Richey, 2013) Limitations: finding a producer with the same asset mix apart from the brand
Competitive equilibria analysis	Change in market share affected by the brand (Salinas, 2009) Limitations: subtracting the effects of other factors
Core brand value plus the value of the brand related assets	Brand value as the value of the brand 'core' and partial (product) brands that boost one another (Peress, 2005) Limitations: subjectivity
Model based on Customer Lifetime Value	Brand value is derived from the producer's customer base (Fischer, 2007)
Other	
Formula based	Knoppe formula; Rule of 25 % of profit, 5 % of sales (Salinas, 2009) Limitations: only approximate
Real option	Valuation of further growth potential, opening of new markets (Salinas, 2009) Weakness: option model parameters estimate
Stock price movement	Deriving brand value from market capitalisation (Simon & Sullivan, 1993) Limitations: only for public companies

(*continued*)

Table 2. Continued.

Approach	Characteristics
Percentage of market cap	Based on surveys to corporate executives (Salinas & Ambler, 2009) Limitations: the indicator does not consider other aspects, such as financial results
Risk difference	Brand use reduces risk (Skalický et al., 2021) Limitations: applicable on small producers only

Source: Own research based on Salinas and Ambler (2009).

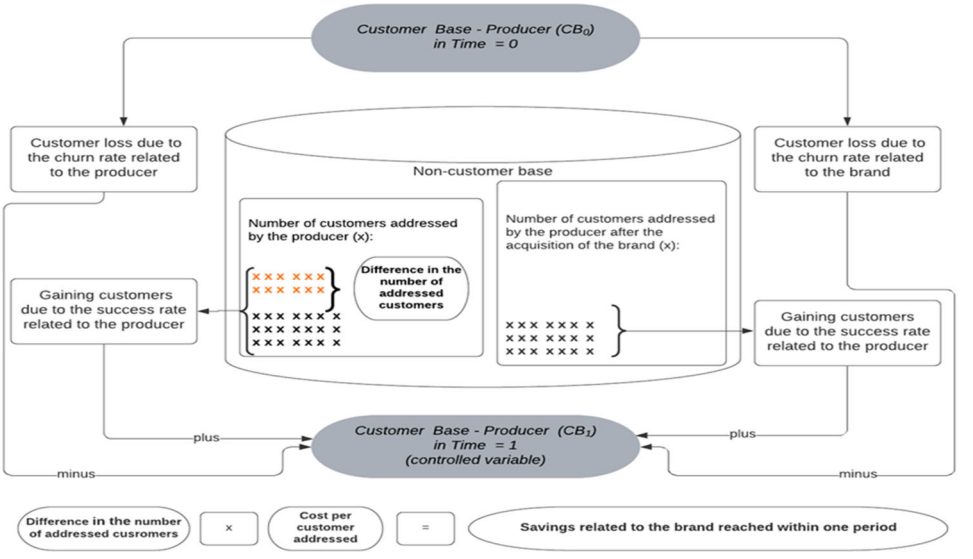

Figure 1. Brand valuation based on conversion ratios – the main principles.
Source: Own research

retaining existing customers. This might be expressed in the costs of addressing new customers.

Based on one period without the possibility of changing the conversion ratios, the main principles of the proposed brand valuation are demonstrated in Figure 1.

To verify the proposed method, we used the case study approach (see, e.g., Hashemkhani Zolfani et al., 2021). Among others, Reyneke et al. (2014), Hupp and Powaga (2004), and Fernández (2002), examined brand valuation methods within a case study while applying micro-level data resulting from real life situations. The main advantage of this method consists in highlighting and understanding the difficulties of the real life environment, although it cannot be overlooked that a generalisation of research results is very limited (Reyneke et al., 2014)

Data was collected while reviewing the success and churn rates of both the investor and investee company. Additionally, the customer base size and weighted average cost of capital related to the investor had to be estimated. An overview of input variables and data sources is shown in Table 3. The data was applied to the mathematical models shown in the following section 'research results'.

Table 3. Brand valuation based on conversion ratios – an overview of input variables and data sources.

Input Variables	Data Sources
Number of customers on the side of investor	Investor company
Number of customers on the side of investor – forecasting periods	Investor company – financial and operational plans, plans in terms of a minimal volume of entrepreneurial activity if the investor is a newcomer in the industry
Success rate in acquiring new customers related to the investor company (sr_A)	Historical records of the investor company/average values related to new competitors in the industry/ experimental estimates
Churn rate related to the investor company (cr_A)	Historical records of the investor company/average values related to new competitors in the industry
Success rate in acquiring new customers related to the brand (rate sr_B)	Historical records of the brand/experimental estimates
Churn rate related to the brand (cr_B)	Historical records related to the brand
Cost to reach a new customer	Historical records of the investor company/average values in the industry
Number of customers reached by the brand	User of the brand
Investment efficiency in the own brand of the investor company (increasing sr_A and decreasing cr_A)	Historical records related to prior investments of the investor company/efficiency of investments in a brand in the industry
Cost of capital related to investments in the brand	Investment company

Source: Own research.

2. Research results

As stated above, we define the brand as a tool for acquiring new and retaining existing customers. In the acquisition of customers, the volume of new customers to be addressed and the success rate represent the essential parameters. In terms of retaining customers, the decisive parameter is the customer retention rate. We abstract from other effects of the brand (e.g., on employees, regulators, and other stakeholders) and use the following indicators to evaluate the brand impact:

$$succes\ rate\ (sr) = \frac{new\ customers\ acquired}{volume\ of\ new\ potential\ customers\ addressed\ (Q)} \tag{1}$$

$$churn\ rate\ (cr) = \frac{volume\ of\ lost\ customers\ within\ a\ period}{customer\ base\ at\ the\ beginning\ of\ a\ period\ (CB)} \tag{2}$$

The customer retention rate indicator is defined as follows:

$$retention\ rate = 1 - churn\ rate\ (cr) \tag{3}$$

The indicators (1), (2), and (3) are referred to as the conversion ratios. Their results (taking into consideration the cost of addressing customers) determine the economic impact of enlarging and/or maintaining the producer's customer portfolio. The cycle of acquisition, loss, and replacement of existing customers is shown in Figure 2. The values of the success rate (sr) and churn rate (cr) play an important role in terms of the economic impacts of this process, i.e., these stand for the attributes that we assign to the brand. The success rate and churn rate are described as the brand conversion ratios.

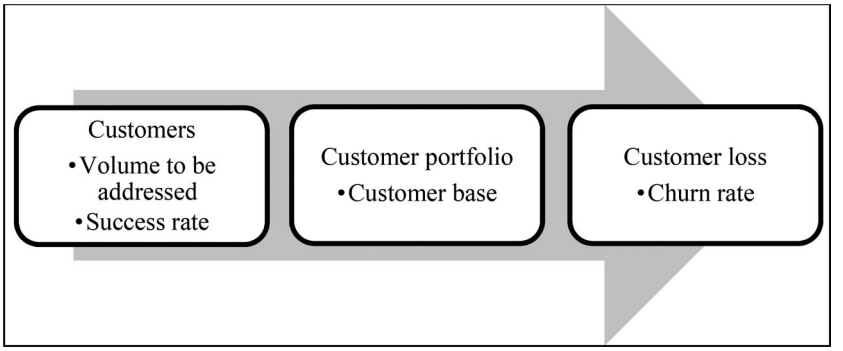

Figure 2. The impact of the brand on customer acquisition and retention.
Source: Own research

Figure 2 suggests that the producer's customer portfolio is repeatedly varying in time. New customers are being acquired while existing ones (or some of them) gradually leave – they are being lost. This process within one period can be described using (*sr*), (*cr*), the customer base and volume to be addressed.

Given the conversion ratios, we wish to influence the customer base (CB). This might be achieved through the number of customers to be addressed:

$$Q = [CB_{t+1} - CB_t*(1 - cr)]/sr \tag{4}$$

Where (Q) is the number of customers to be addressed (dependent variable), (CB_{t+1}) is the planned size of customer base (controlled variable), (CB_t) is the current size of customer base, (cr) is the churn rate, and (sr) is the success rate.

From the potential investor's point of view, the brand value by customer acquisition is determined by 1) the number of potential customers already addressed by the brand (Q_B), and 2) success rate of the brand when addressing new potential customers (sr_B).

If the cost of addressing one potential customer (c_A) and the success rate in addressing new potential customers (sr_A) are known, we can estimate the value of already addressed brand customers (Q_B) based on equation (5).

$$V_Q = \frac{c_A}{sr_A} * Q_B * sr_B \tag{5}$$

Where (V_Q) is the brand value resulting from the number of already addressed customers.

By the brand acquisition, the potential investor gains two valuable elements. The first, demonstrated in the equation (5), is the value of already addressed customers. The second is the change in the conversion ratio (success rate sr_B instead of success rate sr_A) by addressing new customers (i.e., replacement of the own brand by the acquired brand). This element of the brand value (V_{SR}) links to the future acquisition of customers by the potential investor and is expressed in the equation (6).

$$V_{SR} = \sum_{i=1}^{n} \left(1 - \frac{sr_{Ai}}{sr_{Bi}}\right) * Q_{Ai} * c_A (1 + r_A)^{-i} \tag{6}$$

Where (V_{SR}) is the brand value resulting from the change in success rate of addressing potential customers, (Q_{Ai}) is the number of customers addressed by the investor in individual future periods (i), r_A is the cost of capital, and (n) is the expected number of periods of brand use. Period indices (i) refer to the possibility of change in the variables in time.

The brand value by acquiring customers (see Figure 2, i.e., the brand as the tool how acquire customers) can be viewed as the sum of these two elements (7):

$$V_{CustomerAcquiring} = V_Q + V_{SR} \tag{7}$$

The brand also plays a substantial role in customer retention. From the potential investor's perspective, the brand under consideration can generate a value due to the lower churn rate compared to the own brand. The lower churn rate will be reflected in the saving of costs which have to be spent on acquiring new customers replacing the lost ones. If we consider the expected future use of the brand, we will gain the estimated brand value (under the condition of the same number of customers) (8):

$$V_{CR} = \sum_{i=1}^{n} (cr_{Ai} - cr_{Bi}) * CB_{Ai-1} * C_{Ai} / sr_{Ai} * (1 + r_A)^{-i} \tag{8}$$

Where (V_{CR}) is the brand value due to a lower churn rate, (cr_A) is the potential investor's churn rate, (cr_B) is the brand customers churn rate, (CB_A) is the size of the purchaser's customer base, (C_A) is the cost of customer acquisition, (sr_A) is the success rate in customer acquisition, (r_A) is the cost capital, and (n) is the expected number of periods of brand use. Period indices (i) refer to the possibility of change in the variables in time.

Both effects of the brand, i.e, the effect of customer acquisition and the effect of customer retention, are expressed separately as values (V_{SR}) and (V_{CR}) and have to be treated simultaneously. The number of customers at the end of the period 'i' results from the number of addressed customers, success rate of their addressing, previous number of customers, and churn rate of these customers during the period (9).

$$CB_{Ai} = Q_{Ai} * sr_{Ai} + \ CB_{Ai-1} * (1 - cr_{Ai}) \tag{9}$$

Where (CB_{Ai}) is the number customers at the end of the period 'i', (Q_{Ai}) is the number of customers addressed during the period 'i', (sr_{Ai}) represents success rate in addressing new customers, ($CB_{Ai\text{-}1}$) is the number of customers at the end of previous period, and (cr_{Ai}) is the customers churn rate.

If the potential investor uses the acquired brand, the following number of customers at the end of period 'i' will be achieved (10).

$$CB_{A(B)_i} = Q_{A(B)_i} * sr_{Bi} + \ CB_{Ai-1} * (1 - cr_{Bi}) \tag{10}$$

Where ($CB_{A(B)i}$) is the number customers at the end of period 'i' while acquiring customers through the acquired brand, ($Q_{A(B)i}$) is the number of customers addressed in period 'i', (sr_{Bi}) is the brand success rate when addressing customers, ($CB_{Ai\text{-}1}$) is

the number of customers at the end of previous period, and (cr_{Bi}) is the brand customers churn rate.

If the investor strives for the same number of customers at the end of period 'i' that he would have had with his own brand, the following number of new customers has to be addressed (11):

$$Q_{A(B)_i} = \frac{sr_{Ai}}{sr_{Bi}} * Q_{Ai} - (cr_{Ai} - cr_{Bi})/sr_{Bi} * CB_{Ai-1} \tag{11}$$

As a result of different conversion ratio of the brand value, the ($Q_{A(B)i}$) is different from the original number of potential customers to be addressed (Q_{Ai}). Therefore, to obtain the target at the end of period 'i' we calculate the difference between the number of customers to be addressed by the original brand (Q_{Ai}) and the number of customers to be addressed by the new brand ($Q_{A(B)i}$). This difference is multiplied by the cost of addressing a potential customer. The result represents the cost savings during period 'i' resulting from the brand use as compared to a situation when customers under the investor's own identity were addressed (12).

$$saving_i = \left(1 - \frac{sr_{Ai}}{sr_{Bi}}\right) * Q_{Ai} * C_A + \frac{(cr_{Ai} - cr_{Bi})}{sr_{Bi}} * CB_{Ai-1} * C_A \tag{12}$$

If the difference in parameters between the potential investor's brand and the valued brand persists during multiple periods, the current value of these effects can be estimated by applying the equation (13).

$$V_R = \sum_{i=1}^{n} \left(\left(1 - \frac{sr_{Ai}}{sr_{Bi}}\right) * Q_{Ai} * C_A + \frac{(cr_{Ai} - cr_{Bi})}{sr_{Bi}} * CB_{Ai-1} * C_A \right) (1 + r_A)^{-i} \tag{13}$$

Where (V_R) is the saving achieved by the acquired brand resulting from the change in success rate and churn rate for *(n)* periods, (r_A) is the capital cost of the potential investor.

The potential possibilities of an investor are not limited to the continuation of using its own identity in dealing with customers or acquiring the brand. Another option is to invest in its own brand, i.e., increase the success rate (sr_A) when addressing potential customers and reducing the churn rate (cr_A) in customer retention. The goal is to achieve certain parameters of the valued brand (supposing that the investor is interested in a brand that achieves a better conversion ratio in the circumstances). Such a brand is described as superior. If the expenditure on improving the investor's own brand is considered, we will obtain the estimate of the current costs of the transformation of the own brand conversion ratio to the level of the valued (superior) brand.

The potential investor's cost of improving its own brand has two elements. It is the direct expense (cost) of improving the brand conversion ratio and the cost of customer base retention during the period in which the own brand lags behind the valued brand (14). This phenomenon is associated with worse conversion ratio as it lags behind the valued (superior) brand.

$$V_{R(E)} = \sum_{j=1}^{m} \left(e_{(sr+cr)_j} + \left(1 - \frac{sr(e)_{Aj}}{sr_{Bj}} \right) Q_{Aj} * C_{Aj} + \frac{cr(e)_{Aj} - cr_{Bj}}{sr_{Bj}} CB_{Aj-1} * C_{Aj} \right) (1 + r_A)^{-j} \tag{14}$$

Where ($V_{R(E)}$) is the current expense associated with the improvement of customer acquisition success rate and reducing churn rate compared to the valued brand, ($e_{(sr+cr)j}$) is the expense on improving the success rate and churn rate of investor's own brand, ($sr(e)_{Aj}$) is the changed success rate due to previous expense on its improvement, ($cr(e)_{Aj}$) is the changed churn rate due to previous expense on its reduction, ($CB_{Aj\text{-}1}$) is the customer base of potential investor in the previous period, and (m) is the number of periods during which the own brand will lag behind the valued brand.

Thus, the brand value for the potential investor is defined by the number of addressed potential customers (V_Q) and the value of improved success rate and churn rate of the valued brand compared to the values before the brand acquisition. The limit for valuation of improved brand conversion ratio are the investor's possibilities in the form of measures that enable them to improve the conversion ratio of their own brand. The maximum value the investor is willing to pay for the brand can be determined on the basis of the equation (15).

$$V_{Brand} = V_Q + \min(V_R; V_{(R(E))}) \tag{15}$$

Since we only use the concept of cost savings, the criterion (15) may not be sufficient in itself because it considers only that the brand price must not be higher than the cost of improving the own brand conversion ratio to the level of superior valued brand conversion ratio.

Even though for the potential investor, it may be more advantageous to buy the brand and not create it through its own activities, the price defined like this may be too high, which would make an investment project unprofitable. The relation (16) must apply for value V_{Brand}.

$$branded\ project\ rate\ of\ return\ (V_{Brand}; x_2; \ldots x_3) \geq \text{minrate of return} \tag{16}$$

The estimated brand value from equation (15) will be reduced as long as the equality defined in (16) applies.

Figure 3 shows how to proceed with the customer's conversion ratio while valuing a brand.

Figure 3 suggests that the first step in the valuation process is related to the definition of the number of customers addressed by the brand, estimate of the success rate, churn rate, and expected development of these ratios. The starting point for the valuation is the development of the current and future success rate and churn rate of the potential investor. The expected future scope of the investor's activity is another important parameter. According to this scope, the importance of the brand for the investor can be estimated. The potential investor can also have a chance to achieve

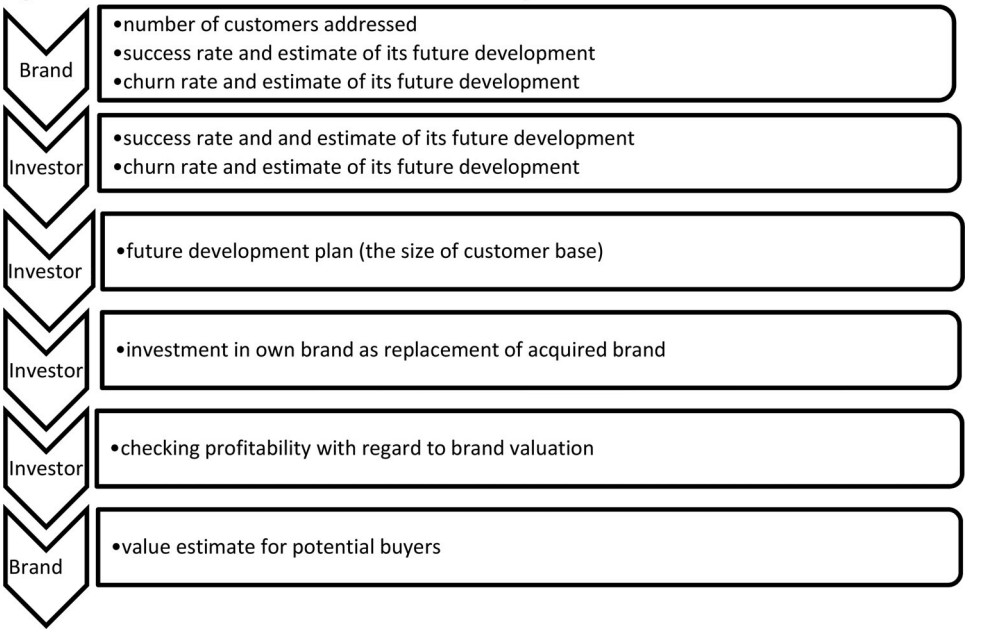

Figure 3. Brand valuation method based on changes in conversion ratios.
Source: Own research

the effects of a valued brand through marketing investments in the own brand building. This possibility must be included in the brand value calculation.

The potential investor's subject selection plays a key importance for the valuation result. A part of the brand investment value can arise from the synergies given by a special relationship of the investor to the brand. If we consider the potential investor as an undefined subject without any special relationship to the brand, the potential investor is considered an entity entering the industry. Its relationship to the brand will be indifferent due to the non-existent own customer base.

3. Case study

OldFin is a company providing financial brokerage services striving to acquire a company named *FinTech*. This is a fast growing service provider in the same industry. *FinTech* brand is also a part of the investment. For the purpose of price negotiations, the maximum value needs to be set which *OldFin* can pay for the *FinTech* brand.

According to the information OldFin and *FinTech* provided on the number of addressed customers and according to the development of customer portfolios we know that:

- *OldFin* reaches a success rate (i.e., the share of successful customer acquisitions in the total number of potential customers addressed) and churn rate (i.e., share of customers that leave within the period) at the level of 5%.
- *FinTech* reaches a success rate at 10% and churn rate at 2.5%. The current number of potential customers already addressed by the *FinTech* brand is 10,000. From the

Table 4. Conversion ratios of *OldFin* and *FinTech* brand for the next five periods (in per cent).

	FinTech		*OldFin*	
Period (i)	success rate (sr_{Bi})	churn rate (cr_{Bi})	success rate (sr_{Ai})	churn rate (cr_{Ai})
Present time (i = 0)	10.00	2.50	5.00	5.00
End of the 1st period (i = 1)	10.00	2.50	4.75	5.25
End of the 2nd period (i = 2)	10.00	2.50	4.50	5.50
End of the 3rd period (i = 3)	10.00	2.50	4.25	5.75
End of the 4th period (i = 4)	10.00	2.50	4.00	6.00
End of the 5th period (i = 5)	**10.00**	**2.50**	**3.75**	**6.25**

Source: Own research.

Table 5. Volume of the customer base - forecast (*OldFin*).

Period (*i*)	Planned volume of the customer base (number of customers)
Present time (i = 0)	5,000
End of the 1st period (i = 1)	6,500
End of the 2nd period (i = 2)	8,500
End of the 3rd period (i = 3)	10,500
End of the 4th period (i = 4)	13,000
End of the 5th period (i = 5)	**15,000**

Source: Own research.

development so far, it can be assumed for the future five periods that the *FinTech* brand will maintain its conversion ratio while the conversion ratio of *OldFin* will lag behind without any additional investment. The expected future conversion ratios of the producer of *OldFin* and the *FinTech* brand are shown in Table 4.

Furthermore, we can use the investor's investment plan which implies the need to increase the customer base, see Table 5.

We also know that the *OldFin* cost of invested capital is 10% p. a. and that the average cost of addressing one potential customer is 100 monetary units.

If we substitute data related to the *FinTech* and *OldFin* brands into equation (5), it is possible to estimate the number of currently addressed potential customers of the *FinTech* brand from the investor's point of view, i.e., *OldTech's*, at 2 million monetary units. These are potential customers that have already been addressed. Based on the achieved success rate of the brand, it is possible to quantify how many of them will actually become customers. Based on the application of equation (13), we will estimate the brand value for the investor from the change in conversion ratios (without taking into account measures to strengthen the own brand).

Based on the planned size of *OldFin* customer base and its conversion ratio, following equation (4), we can estimate the number of customers to be addressed in individual periods. For details see Table 6.

From the derived information, using equation (13), we can estimate the value of conversion ratios (V_R) of the *FinTech* brand for the producer *OldFin* for the period of the next five years. All variables are shown in Table 7.

However, *OldFin* has a chance to invest in its own brand and thus improve its existing conversion ratio. It is assumed that an investment of 1 million monetary units per year will support an increase in success rate by 1 per cent point and reduce the churn rate by a half per cent point. Gradual investment in the own brand will

Table 6. Number of addressed customers in *OldFin*.

Period (*i*)	Planned volume of customer base (CB_{Ai})	Success rate (sr_{Ai})	Churn rate (cr_{Ai})	Number of customers addressed by the brand OldFin (Q_{Ai})
Present time (i = 0)	5,000	5.00%	5.00%	
End of the 1st period (i = 1)	6,500	4.75%	5.25%	15,000
End of the 2nd period (i = 2)	8,500	4.50%	5.50%	49,289
End of the 3rd period (i = 3)	10,500	4.25%	5.75%	54,833
End of the 4th period (i = 4)	13,000	4.00%	6.00%	73,029
End of the 5th period (i = 5)	**15,000**	**3.75%**	**6.25%**	**69,500**

Note: sr_{Ai} and cr_{Ai} are values valid at the beginning of the period in question (or the end of the previous). In the first period, the addition of 1,000 customers is taken into account based on the number of customers addressed by the brand.
Source: Own research.

Table 7. Valuation of the conversion ratios of the *FinTech* brand from the perspective of a potential investor *OldFin*.

Period (*i*)	sr_{OldFin} in %	$sr_{FinTech}$ in %	Q_{OldFin} in number of customers	C_{OldFin} in monetary units	cr_{OldFin} in %	$cr_{FinTech}$ in %	$CB_{OldFinn}$ in number of customers	$(1+r)^{-i}$	V_{Ri} in monetary units
i = 0	5	10		100	5	2.5	5,000		
i = 1	4.75	10	15,000	100	5.25	2.5	6,500	0.90909	795,455
i = 2	4.5	10	49,289	100	5.5	2.5	8,500	0.82645	2,286,320
i = 3	4.25	10	54,833	100	5.75	2.5	10,500	0.75131	2,457,425
i = 4	4	10	73,029	100	6	2.5	13,000	0.68301	3,101,182
i = 5	3.75	10	69,500	100	6.25	2.5	15,000	0.62092	2,871,761
In Total			261,652						11,512,144

Source: Own research.

ensure that the *OldFin* brand's conversion ratio will match that of *FinTech*'s at the end of the fifth period. In the following period, both brands will be equal and it will make no difference which brand the investor uses. The cost of own brand building strategy is calculated in equation (14). The variables in the calculation are described in Table 8.

The calculation suggests the number of customers addressed to maintain the future customer base decreases if *OldFin* invests in its own brand (see variable Q_{OldFin} in Table 7). *OldFin*, compared to the situation without additional investment in the own brand, will achieve savings, however for five periods it will lag behind the *FinTech* brand. By applying equation (15), we will obtain the estimated value of the *FinTech* brand from the point of the investor *OldFin*:

$$V_{FinTech} = 2\ 000\ 000 + \min(11\ 512\ 144; 8\ 860\ 789) = 10\ 860\ 789$$

Monetary Units

Since this is a saving on acquiring the planned number of customers, it is necessary to apply equation (16) to check that the cost of acquiring *OldFin* customers is expended efficiently and that the minimum requirement on the invested capital return in the industry is satisfied. If this is not the case, the brand price from the *OldFin* as an investor point of view needs to be reduced to a level where there is at least an equity defined by equation (16). If this condition is met, we can say that the

Table 8. Valuation of the conversion ratios of the *FinTech* brand from the perspective of a potential investor *OldFin* taking into account the possibility of investing in the own brand.

Period	$e_{(sr+cr)}$ in monetary units	sr_{OldFin_NEW} in %	$sr_{FinTech}$ in %	Q_{OldFin} in number of customers	C_{OldFin} in monetary units	cr_{OldFin_NEW} in %	cr_{FinTec} in %	CB_{OldFin} in number of customers	$(1+r)^{-i}$	$V_{R(E)i}$ in monetary units
i = 0	1,000,000	5	10		100	5	2.5	5,000	1	1,000,000
i = 1	1,000,000	6	10	35,000	100	4.5	2.5	6,500	0.90909	2, 613,636
i = 2	1,000,000	7	10	38,208	100	4	2.5	8,500	0.82644	2,196,970
i = 3	1,000,000	8	10	33,429	100	3.5	2.5	10,500	0.75131	1,600,569
i = 4	1,000,000	9	10	35,844	100	3	2.5	13,000	0.68301	1,244,365
i = 5	0	10	10	26,556	100	2.5	2.5	15,000	0.62092	205,249
Total	5,000,000			169,036						8,860,789

Source: Own research.

Table 9. Valuation of FinTech brand based on royalty relief method.

Period	Year 1	Year 2	Year 3	Year 4	Year 5
Number of customers	100,000	110,000	118,800	125,928	130,965
Customers growth rate		10%	8%	6%	4%
Revenue on customer	100	102	104	106	108
Revenue growth on customer		2%	2%	2%	2%
Revenues	10,000,000	11,220,000	12,359,952	13,363,580	14,176,086
Revenue growth rate		12%	10%	8%	6%
Royalty rate	8.45%	8.45%	8.45%	8.45%	8.45%
Royalty income	845,000	948,090	1,044,416	1,129,223	1,197,879
Tax	25%	25%	25%	25%	25%
Royalty income after tax	633,750	711,068	783,312	846,917	898,409
Discount rate	10%	10%	10%	10%	10%
Disscount factor	0,909090909	0,826446281	0,751314801	0,683013455	0,620921323
Present value	576,136	587,659	588,514	578,456	557,842
Sum of present value (Year1 – Year5)					2,888,607
Growth rate in terminal phase					3%
Royalty income after tax in teminal phase					925,362
Terminal value					13,219,453
Present value of Terminal value					8,208,240
Brand value: Sum of present value (Yeaer1-Year5) and Present value of Terminal value					11,096,847

Source: Own research.

investor *OldFin* will be willing to invest 10.86 million monetary units in the *FinTech* brand.

The resulting value of 11.1 million monetary units represents a threshold value from OldFin's perspective. If the asking price for the TechFin brand were higher, it would be more profitable for the investor (OldFin) to invest in its own brand. The calculation of the value is thus, from OldFin's perspective, a guide for its management to decide whether it is more profitable to invest in its own brand or to acquire the valued brand.

For the purpose of comparison, we supplement the calculation of brand value based on the royalty relief method. We apply the procedure reported by Salinas (2009). The key variables for the calculation are the producer's brand-related revenues, their future development, the royalty rate, the tax rate, and the discount rate. Brand value is constructed as a share of brand-related revenues. In theory and practice, the amount of this share has been discussed intensively. We use the value of 8.45% as the midpoint of the interval derived by Smith and Richey (2013) for the

"consumer-facing segment". This share is then taxed and converted to present value. The calculation is shown in Table 9.

The calculation shows that the valuation of the key variable for the royalty relief method is revenue. Therefore, the brand thus corresponds closely to the value of the existing client tribe. While our approach focuses on a brand's ability to acquire new and retain existing customers, the view of the royalty relief method is status-based. This is why the criticism of the royalty relief method, apart from the issue of determining the royalty rate, which in many applications is essentially arbitrarily determined due to the lack of observed events, focuses on the ability to capture the further evolution of the brand over time. The royalty relief method does not systematically answer these questions. This leaves open questions about the expected development of sales, the variability of the royalty rate over time, the necessary investment in the brand, and the timeframe of the brand. Our proposed approach based on conversion rates and their comparison directly addresses these variables. However, the customer tribe is excluded from the valuation, as it is treated as a separate value.

4. Discussion

The proposed approach to brand valuation emphasises the main function of the brand, i.e., the acquisition and retention of customers. As regards the metrics which characterise this function of the brand, the method uses the number of addressed customers, success rate in customer acquisition, and churn rate in customer retention. Secondary values are the customer base size (current and planned), cost of addressing potential customers, and/or investment in improving own brand conversion ratios. We work with the assumption that in a number of cases these values (namely the conversion ratios) are being monitored and evaluated by producers using their own brands on an ongoing basis. We are not aware that any of the methods described thus far use these directly observable input values.

The observability of input values is a frequent issue in the process of brand financial valuation and a priority of valuation in financial reporting. The most often used method of brand valuation, royalty relief (Salinas & Ambler, 2009), is based on the hypothetical payment for brand use. The application of this method starts from defining the base and the percentage of payment. Abratt and Bick (2003) state that the base is usually represented by net sales, share in sales or the number of units sold. However, defining the amount of payment might be a problem. This is why the 'rule of thumb' is often applied, which some authors (e.g., Hübscher & Ehrhart, 2021) set at the level of 25% of profit or 5% of turnover (Salinas, 2009). Hübscher and Ehrhart (2021) also consider a 'rule of thumb' the 'Knoppe formula' which defines the amount of royalty rate as a ratio of one hundredfold of profit from the licenced product and triple sales from the licenced product. Nonetheless, these arbitrary rules replacing the lacking observable data are unable to cover the differences between industries and differences in individual brand characteristics. For example, Smith and Richey (2013) propose to address this problem by applying royalties as usual in the industry. If such information is available at all (independent licencing of a brand is not common and when it happens, it is usually between two connected entities), the

differences between individual brands within an industry can be dramatic as regards the parameters that we follow. The result of brand valuation based on the royalty relief method is closely linked to the assumptions the existence of which can be neither confirmed nor disproved. Thus, the valuation result often fails to meet the objectivization criteria for certain valuation categories. The income-based brand valuation approach can face the same problem as there may be a difficulty to define an adequate share in the producer's income (e.g., in the form of sales, margin, profit, etc.) attributed to the brand.

Our proposed method reacts to the above-mentioned deficiencies by grounding the brand valuation in quantities that can be derived from historical timelines or obtain these through experiment. In addition, our method is applicable also to those brands that are not associated with exceptionally valued products or brands that are no longer in active use (note: the basic characteristic is zero cash flow). The brand value is not derived from excess earnings (e.g., Reilly & Schweihs, 2000) but from savings achieved by the potential investor. This is the main limitation of this method although. The expected brand valuation result always needs to be placed in the context of the investor's overall profit rate. From the investor's point of view, the saving itself is not a sufficient condition for the positive value. Moreover, the method requires a valuation of the investor's business model and its sustainability (e.g., Pinto et al., 2015).

Compared to the cost-based approach which is applied mostly in the replacement cost and reproduction cost variants (Smith & Richey, 2013), the proposed approach takes into consideration the relevance of previously incurred costs reflecting the conversion ratios of the brand. The expected goal is not a (full) replication of the brand but the achievement of identical conversion ratios as the valued brand. Our approach also addresses the frequent lack of cost-based methods that neglect the time aspect (e.g., Reyneke et al., 2014). This is usually addressed at the level of discounted incomes and expenses. The conversion-based approach, however, considers the fact that building a brand with equal conversion parameters is time consuming. During the transition period, the producer has to acquire customers at its own expense and bear the associated additional costs as a result of worse conversion ratios. The cost-based methods do not capture, and therefore underestimate, the brand importance for the potential investor. The conversion-based approach considers this indirect cost of brand building in the valuation by comparing the conversion ratio of the valued brand and that of the potential investor when planning the customer base building.

Furthermore, the conversion-based approach represents an analytical instrument that makes it possible to identify the areas where the brand is a benefit for the potential investor and is able to quantify this benefit in monetary units. It facilitates the splitting of the total brand value to the value formed by addressed customers (V_Q) and the value of conversion ratio (V_R) in acquiring or retaining customers. Thus, the method makes it possible to express what makes it valuable for the potential investor (even a certain area can be considered). Thus, compared to existing methods, the proposed method uses a different set of input variables, relies on observable inputs, and considers alternative options for potential investors.

5. Conclusions

The brand valuation method proposed in this paper relies on the assumption that savings can be achieved in acquiring and retaining customers through a superior brand with favourable conversion ratios. It is applicable in cases where no comparison with a similar brand transaction is available and where, on the contrary, there is only information on the valued brand conversion ratios. This should be typical for industries with a large number of addressed customers and those that create customer bases. The methods known so far most frequently value the brand by attributing (additional) cash flow to the brand. This is usually a part of the revenues derived from the hypothetical royalties (royalty relief method), excessive return (excessive return method), or part of the revenues or profit margin based on the brand attribute analysis.

The precondition for using the method introduced in this paper is the knowledge of the conversion ratios (or the possibility to estimate them). The method is applicable in industries such as financial brokerage where new customers are being addressed regularly and repeatedly, customer bases are being prepared, and therefore there are historical records on the brand performance as regards the success rate and churn rate. The royalty relief method, cost method or income method which are based on attributing a part of the producer's revenue to the brand usually do not use this additional information.

Our methodological approach is limited by the fact that it is a view of a specific investor who is involved in the business in a specific scope, with specific costs, whose brand is in a specific condition (from which the savings are derived). Other entities may achieve different values of these indicators, which would result in different valuations. Valuation in selecting a specific investor must be understood as a subjective (investment) value. For its objectivization, that is, for example, defining the market value, it is necessary to find entities that have the best possible use for the brand but, at the same time, do not achieve synergy. To resolve this problem, we suggest to choose an entity that is newly entering the industry. In this way, the reference entity will be standardised. At the same time, this will eliminate entities, such as competitors, business partners, etc., who might have a specific relationship to the brand with potential synergies.

We believe that the implications of the methodological approach presented in this paper are threefold. First, it supports managers in their investment decision making, as the method is not only a tool on how to express the value of the brand in monetary units; additionally, it provides a basis for the decision to acquire the brand under valuation or invest in an own brand. Second, the proposed method is also relevant to valuation practice. It offers a valuation procedure that can be based on observable values (which is often a weak point of existing methods) and allows the valuation of brands that are difficult to value by existing methods (e.g., in cases of unused brands). Third, from a theoretical point of view, the method contributes to understanding of the different brand evaluation. It proposes the concept of measurable indicators (customers reached, success rate, churn rate) and their valuation in financial terms. It also contributes to the discussion on the relationship between the brand

and the customer tribe. These concepts and the relationships between them are not settled in financial theory.

Follow-up research should focus on the strategic importance of the pace of acquiring a market share and the role of the brand in this endeavour. Even though the method is based on the subjective conditions of a potential buyer and we use its possibilities in the calculation, it does not appreciate the fact that the number of producers' potential customers is limited and gaining a market share will be more difficult or even impossible in the future. This broader strategic view is not explicitly reflected in the proposed method, even though the change in future conversion ratios or the cost of addressing potential customers can be further modelled.

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