The Impact of Business Innovations on Brand Value

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ABSTRACT

This article deals with interaction between business innovations and brand value. Innovation and brand equity are two important dimensions that drive businesses today; innovation in particular is a primary determinant of brand equity. Innovations and brand value are two key strategic assets that play important role in company growth and success. The aim of the research is demonstrating a statistically siginificant dependence between the brand value and innovations, which in our research are represented by R&D expenditures. Expenditure on research and development is taken in absolute terms, but also in relative terms as a percentage of revenue. Article contains basic theoretical background of this topic and results of research focused on confirming the dependence between these two parameters. The research is carried out on a sample of fourteen global brands (Google, Apple, Amazon, Microsoft, Samsung, Shell, IBM, Mercedes-Benz, Oracle, Siemens, Honda, Cisco, Intel, Nestlé) with application of mathematical-statistical apparatus. The analysis is carried out by comparison of selected brand values provided by consultative company Brand Finance with innovations represented by R&D expenditure (USD, percentage of sales).

KEY WORDS: Innovations, Brand Value, Correlation

JEL classification code(s): O30, O39

POVZETEK

Članek obravnava interakcijo med poslovnimi inovacijami in vrednostjo blagovne znamke. Inovativnost in blagovna znamka sta dve pomembni razsežnosti, ki danes vodita podjetja; zlasti inovacije so primarni dejavnik blagovne znamke. Inovacije in vrednost blagovne znamke sta dva ključna strateška sredstva, ki igrajo pomembno vlogo pri rasti in uspehu podjetja. Cilj raziskave, predstavljene v članku, je pokazati statistično signifikantno odvisnost med vrednostjo blagovne znamke in inovacijami, ki v naši raziskavi predstavljajo izdatki za raziskave in razvoj. Izdatki za raziskave in razvoj se sprejemajo v absolutnem smislu, vendar tudi v relativnem smislu kot odstotek prihodkov. Članek vsebuje osnovno teoretsko ozadje te teme in rezultate raziskav, usmerjenih v potrditev odvisnosti med tema parametroma. Raziskave se izvajajo na vzorcu štirinajstih svetovnih blagovnih znamk (Google, Apple, Amazon, Microsoft, Samsung, Shell, IBM, Mercedes-Benz, Oracle, Siemens, Honda, Cisco,

Intel, Nestlé) z uporabo matematično-statističnega???. V članku smo analizirali primerjavo izbranih vrednosti blagovne znamke, ki jih je zagotovila svetovalna družba Brand Finance z inovacijami, ki jih predstavljajo izdatke za raziskave in razvoj (USD, odstotek prodaje).

KLJUČNE BESEDE: inovacije, vrednost blagovne znamke, korelacija

1 Introduction

There is no doubt innovations take an inevitable part in the continual economic development (Misankova, 2013), improving living standard (Hraskova, 2012) and development of society. Innovative activity is perceived as a source of competitiveness and economic growth. New products, utility models, trademarks and creative projects are an important element of present socio-economic reality (Roszko-Wojtowicz & Bialek, 2016). Innovation are generally considered to be an accelerator of economy (Paliderova & Hraskova, 2016). The innovation performance varies from one company to another and from one country to another, be ing influenced by a variety of factors (Sipos et al., 2014).

Innovation and brand equity are two important dimensions that drive businesses today; innovation in particular is a primary determinant of brand equity (Staake et al., 2009 in Liao & Cheng, 2014). Product innovation and brand equity are recognized as key stratetgic assets that play a fundamental role in firm growth and success (Slotegraaf &Pauwels, 2008 in Norskov et al., 2015). Innovation is a cornerstone of value creation (Mizik & Jacobson, 2003 in Slotegraaf &Pauwels, 2008).

Previous research studies suggest that customers prefer to buy products which have high brand equity compared to those with low brand equity. When a brand enjoys high equity, it triggers desirable and favorable associations, and customers feel confident about quality of the product. It enhances trust in the product and facilities the firm to extablish profitable relationships with the customers. Moreover, high brand eqity allows a firm to gain sustainable competitive advantage that provides customers compelling a reason to pay premium for buying the particular brand (Keller and Lehmann, 2006).

There are few studies that have investigated the influence of product innovation on brand equity. The relationship between product innovation and brand strategy may vary across different product categories (Sharma et al., 2016). Zhang et al. (2012 in Norskov et al., 2015) find a positive effect of the degree of innovation (radical or incremental) on brand equity (i. e. the more radical an innovation is, the greater its effect is on brand equity). Similary, Sriram et al. (2007) reveal a positive effect of new product innovation on brand equity and can explain a significant proportion of its variation. Sriram et al. (2007) argue that product innovation leads to brand equity, whereas Beverland et al. (2010 in Sharma et al., 2016) suggest that firm´s ability to innovate depends on brand portfolio strategy. In contrast to these opposite views, Slotegraaf and Pauwels (2008) assert the importance of interaction effects between brand equity and product innovation to affect sales.

Investigation of the impact of product innovations on the brand equity was aim of Norskov et al. (2015) study. They investigated the impact of product innovation attributes (relative advantage, compatigility, complexity, trialability and observability) on brand equity and whether these attributes exert a differenc effect on low- versus high-equity brands. They find,

that all attributes, except for trialability, have a significant effect on the low-equity brand. On the other hand, only observability has a significant positive effect on the high-equity brand (Norskov et al., 2015).

Guceri-Ucar (2014) analysed the relationship between innovation atributes and perceived brand equity dimensions of service brands in the context of information technology innovations. Through these, he answered the questions about how marketers can maximize the contribution of innovations to the customer-based brand equity (CBBE) of service brand.

The aim of the research is to find out whether there is a statistically significant dependence between the brand value and innovations (in our research represented by R & D expenditures) using the mathematical and statistical apparatus. Research and development expenditures are taken in absolute values as well as in relative values as a percentage of revenue.

2 Methods

Brand sample selection was affected by filtration of brands in several steps:
The first step: The criterion for brand selection was chosen in the first phase. Research was focused on the brands that ranked among the top 100 global brands in Brand Finance ranking for ten consecutive years (2008-2017). Database of 50 brands was created based on this criterion:

Google	China Construction Bank	Nike	Vodafone	FedEx
Apple	McDonald´s	The Home Depot	Orange	Target
Amazon	BMW	Citi	Honda	Walgreens
AT&T	Shell	Oracle	ExxonMobil	Santander
Microsoft	IBM	VW	Cisco	J. P. Morgan
Samsung	Mercedes-Benz	Nissan	HSBC	Allianz
Verizon	General Electric	Siemens	Intel	American Express
Walmart	Disney	Ford	Nestlé	Hitachi
Toyota	Chase	UPS	PwC	Lowe´s
Wells Fargo	Coca-Cola	Chevron	Pepsi	BNP Paribas

32 of these brands are from the USA (64 %), 5 brand are from Germany (10 %), 4 from Japan (8 %), 2 from the United Kingdom (4 %) and France (4 %) and 1 brand is from South Korea (2 %), China (2 %), Netherland (2 %), Spain (2 %) and Switzerland (2 %).

Based on the sector orientation, there are the most brand from the technology sector (10 brand; 20 % of all), 8 brand from the banking sector (16 %), 7 brands from the auto manufactures (14 %), 6 brands from retail (12 %), 5 from telecommunications (10 %), 3 brands from the oil and gas sector (6 %), 2 brands from transportation (4 %) and beverages (4 %) and 1 brand from apparel sector (2 %), commercial services (2 %), diversified financial services (2 %), food (2 %), insurance (2 %) and IT services (2 %).

The second step: The second step consisted of data collection of brand values and R & D expenditures of these brands for the period 2008-2016. Sources of the data were brand value databases from the Brand Finance consulting group and financial data published on the

Morning Star web page. Not all companies publish their R&D expenditure and some companies have not their own research and development (data of R&D expenditures cannot be found in the financial statements). Due to this fact (unavailability of some data), we had to to reduce the sample of brand from 50 to 14 brands:

Google	Microsoft	IBM	Siemens	Intel
Apple	Samsung	Mercedes-Benz	Honda	Nestlé
Amazon	Shell	Oracle	Cisco	

8 of these brands are from the USA, 2 brands are from Germany and 1 brand is from Netherland, Japan, South Korea and Switzerland.
Based on the sector orientation, there are 8 brands from the technology sector (of the original 10 brands from the base 50 brands sample) which confirm the fact that R&D is an essential part of these companies and most of them have their own R&D. Other brands are from auto manufactures sector (2), IT services (1), oil and gas sector (1), food (1) and telecommunication (1).

3 Results and discussion

A research to identify a correlation between a brand value and research and development spending was carried out.
A two-level research was carried out to find out about the interdependence of selected brand values and the expenditure on research and development (hereinafter the R&D) during the period of 2008-2016. The results are given in the table below, where r1 is a correlation coefficient between the brand value and the expenditure on R&D given in absolute terms of USD and r2 is a correlation coefficient between the brand value and the expenditure on R&D given in relative terms as a percentage of total revenues.

Table 1. Correlation between brand value and R&D (USD, percentage of sales) calculated using Pearson´s correlation coefficient during period 2008-2016

Pearson´s Correlation Coefficient	2008	2009	2010	2011	2012	2013	2014	2015	2016
r_1	0.448	0.432	0.369	0.281	0.150	0.272	0.478	0.529	0.556
r_2	0.482	0.377	0.329	0.203	-0.056	-0.156	-0.032	-0.027	0.019

Source: own processing

When interpreting the results, the correlation coefficient values are used, which are as follows: weak relationship (0 – 0.3), moderate relationship (0.3 – 0.7), strong relationship (0.7 – 1.0). Based on the results it shows that there is no strong relationship in neither case, however it shows moderate relationship in both the absolute and relative terms for the period 2008-2010 but shows the moderate relationship only in the absolute terms of USD for the period 2014-2016, which suggests that the assumption shall not be applied as a rule. Nevertheless, we drawn on the assumption that there is the direct linear relationship between the variables and proceeded to analyse each of the brands involved individually to find the relationship between the variables during the period of 2008-2016. The results are given in the table below.

Table 2. Correlation between brand value and R&D (USD, percentage of sales) using Pearson´s correlation coefficient for each brand separately

Pearson´s Correlation Coefficient	Google	Apple	Amazon	Microsoft	Samsung	Shell	IBM
r_1	0.978	0.974	0.993	0.896	0.886	0.072	0.050
r_2	0.921	0.644	0.981	-0.506	0.881	0.360	-0.340

Pearson´s Correlation Coefficient	Mercedes	Oracle	Siemens	Honda	Cisco	Intel	Nestlé
r_1	0.427	0.951	-0.431	-0.766	0.686	0.544	0.925
r_2	-0.320	0.849	0.840	-0.611	-0.188	0.537	0.944

Source: own processing

That approach proved statistically significant correlation between the brand value and the expenditure on R&D, namely, brands Google, Amazon, Samsung, Oracle and Nestlé indicate very strong relationship given in both the absolute and relative terms, however it shows strong relationship given in USD, but moderate relationship given as % of total revenues in case of Apple. Moreover, brands Shell, Mercedes, Cisco and Intel indicate moderate relationship both in the absolute and relative terms as well as individually. The extremes of Honda, varying from moderate to strong indirect linear relationship, however, are rather questionable as it normally applies the rising the expenditure on R&D the lowering the brand value and vice versa, and which may have to do with not effective innovations. Similarly, IBM indicates nearly no correlation in the absolute terms, but it shows moderate indirect linear relationship if given in the relative terms. In case of Microsoft, although it has the negative correlation coefficient given in the relative terms, this is not considered a flaw, since the company experienced year-on-year increases in revenues, thus increasing the absolute expenditure on R&D. As for Siemens, the situation is opposite, and it is, although the percentage of total revenues to expenditure on R&D increased, the absolute total revenues lowered due to reducing the revenues during the reported period; and the brand value increased until 2015 to decrease in 2016, which may be caused by, inter alia, phasing down the expenditure on R&D. Siemens has the lowest correlation coefficient value (0.06) as for the expenditure on R&D given in the absolute terms, indicating the most level expenditure on R&D during the reporting period of 2008-2016. This is, however, not acceptable considering the long period of 9 years, as the expenditure should increase proportionally to inflation at least. Amazon, on the contrary, has the highest correlation coefficient value (0.82) as for the expenditure on R&D given in the absolute terms, which means the expenditure are not cleared, and it is increasing from 1033 million USD in 2008 to 16087 million USD in 2016 (1557% increase). It is not only the increased expenditure on R&D in the absolute terms driven by increasing revenues but also the increased % of total revenues spent on R&D from 5.39 % in 2008 to 11.87 % in 2016 (a more than twofold increase); and so, in this case too, the correlation coefficient value is the highest (0.33), thus making the most significant increase as for % of the revenues spent on R&D.

The average expenditure on R&D (given as a % of total revenues) show growing trends, varying from 7.29 % (2008) to 8.87 % (2006). The chart below shows the brands fluctuating below and above the average in 2016. The brands Google, Microsoft, Oracle, Cisco and Intel

remained above the average from 2008 to 2012, and in 2013 Amazon added. The remaining ones spend a below-average % of total revenues on R&D.
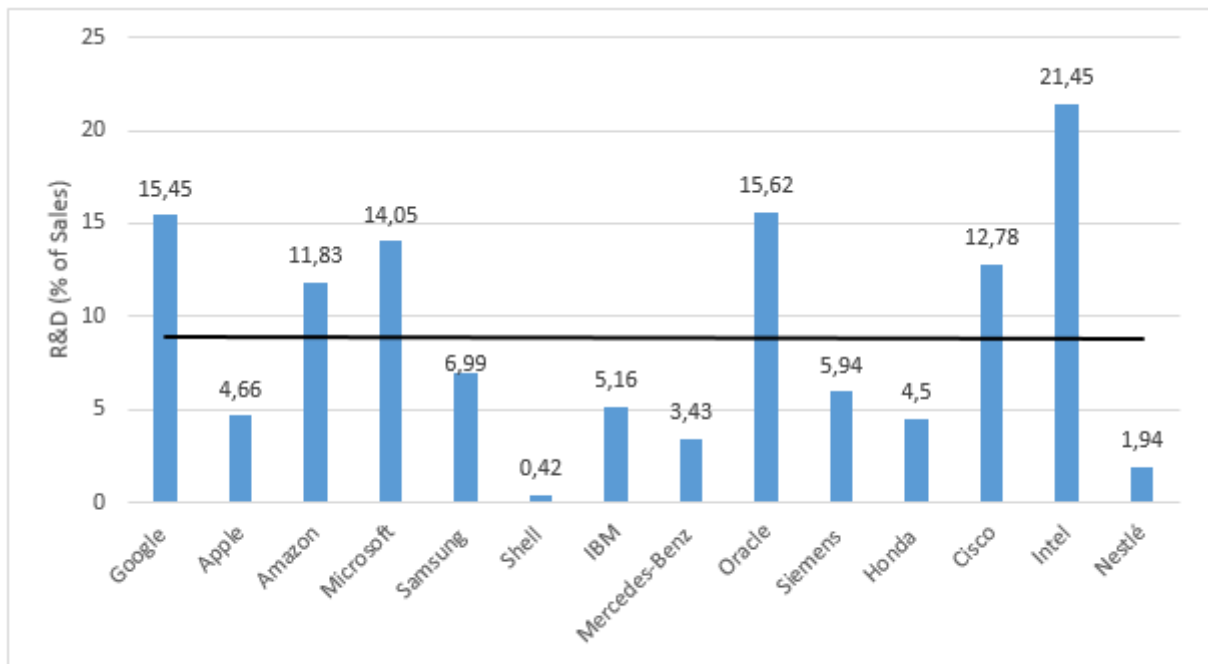

Figure 1: R&D expenditures in percentage of sales (2016). Source: own processing

4 Conclusion

Innovations are considered the driving factor in economy and undoubtedly also the key attribute of the brand value. The paper presents results of the research carried out to analyse the impact of innovations on selected brand values. The results proved the interdependence between the variables, though not with each brand. The strongest correlation in terms of direct linear relationship between innovations and brand value show brands Google, Amazon, Samsung, Oracle and Nestlé, whereas the strongest correlation regarding indirect non-linear relationship shows brand Honda.

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