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VEDECKÉ PRÍSPEVKY

SCIENTIFIC CONTRIBUTIONS

Impact of Innovation Progress in Marketing Communication on the Current Enterprise Practice and Theory

Gabriela Dubcová, Katarína Grančičová, Dana Hrušovská

Abstract

Innovations are a phenomenon that affects all areas of business activities, including marketing and its individual tools. This article briefly discusses the causes that nowadays lead to innovation changes in the area of marketing communication; it characterizes the selected innovation solutions in marketing communication and presents the results of a research that analyses and evaluates the use of innovations in marketing communication in business practices in Slovakia. In the conclusion the article summarizes the findings, points out the problems and their possible solutions.

Keywords: *innovation progress, marketing communication, creative solutions*
JEL classification*:* M3, O3 *three*

1. Introduction

Innovation is a phenomenon that affects all areas of corporate activity, not excluding marketing and its various tools. On one hand, marketing is associated with innovation by representing business activities from which we expect creativity, flexibility and development. On the other hand, this connection is also given by changes in the marketing environment and the inflow of new technological solutions, which are liable to modernization and upgrading of marketing and communication activities. Marketing and marketing communication today is marked by modernity and changes more rapidly than ever before. In marketing communication it has therefore become a traditional implementation of changes in favour of the use of creative and innovative solutions has become a necessity and a prerequisite for a more effective achievement of the goals of positive change and increasing customer value and thus the competitiveness of the company. The aim of the article is to present and disseminate the results of a scientific survey focused on diagnosis in the area of innovation progress in marketing communication, the evaluation of its impact on the current enterprise theory and practice and recommendation of the applicable steps for improvement of the status quo in this area. The mentioned scientific survey is part of the project outputs VEGA No.1/0546/15 Evaluation of the performance of modern marketing approaches and their impact on business performance.

2. Research Design

During the whole period all research activities were carried out on the basis of three-dimensional perspective logic of the research process:

Figure 1
Three-Dimensional Perspective of the Research Process

Source: Own elaboration

The Hypothesis

Applying innovation forms of marketing communication of a business depends on certain business characteristics – size, business area, market orientation, financing, the importance of marketing in the business.

Basic Research Aim

To evaluate an impact of innovation progress in marketing communication current enterprise practice and to recommend the applicable steps for improvement of the status quo in this area.

Partial Research Goals

In order to accomplish the basic aim, it was relevant to achieve an objective performance of the partial objectives:

- to define the status quo in this area of current enterprise theory and practice,
- to briefly outline the causes that lead to innovative changes and creative solutions in marketing communication,
- to characterize selected innovative solutions in marketing communication, and highlight their importance and impact on business results (business performance),
- to define measurable impact of innovation progress in marketing communication on the current business in Slovakia,
- to present the results of a survey, analysis and evaluation, of the applied marketing communication innovations in business practice in the Slovak Republic,
- to summarize the most important facts indicating the problems and to recommend possible solutions.

Object of the Research

Research object is created by the gathered data:

- the database with 323 enterprises in Slovakia,
- usage of the simple random sampling enterprises,
- survey period from October to December 2013,
- the survey sample with these characteristics: legal status, ownership/funding, number of employees, size of turnover, sector, market focus.

Methodology of the Research

Considering the complexity of the problem regarding the innovation progress in marketing communication in Slovakia, a combination of methods was applied which was appropriate to accomplish the exact goal (due to saving of space, only the outline is stated here in the Table 1):

Table 1
Particular Scientific Methods in our Project Team

APPLICATION OF METHOD COMBINATION FOR RESEARCH PURPOSES	
General methods	**Specific methods**
A/ Logical methods	questionnaire
analysis – synthesis	benchmarking
induction – deduction	structured interview
abstraction – concretization	direct and indirect diagnosticities (via indicators)
	mathematical methods
B/ Empirical methods	statistical methods
observation	graphical methods
measurement	simulation
experiment	application of information and communication technologies
Synergy (interaction)	

Source: Own elaboration

3. Key Results

We can specify key results of our research in two lines: the first - to define the status quo in this area of current enterprise theory and practice, and the second - to present the results of a survey, analysis and evaluation, of the applied marketing communication innovations in business practice in the Slovak Republic and on this basis to summarize the most important facts indicating the problems and to recommend possible solutions.

The Status Quo in this Area of Current Enterprise Theory and Practice

Changes taking place in current marketing can be described as crucial and they are primarily related to the turbulent changes in the external environment of business. Some of the main changes include:

- *Fragmentation of markets* - the shift from mass marketing to individual marketing, which is associated with the gradual shift away from mass communication to the need to communicate with smaller groups of customers or the need to communicate to a targeted group personally and individually.
- *Changes in buying behaviour of the customers* - e.g. efforts to realize the right choice/purchase, interest in the impact of their purchasing decisions, the increase of customers´ educational level, changes in attitude, values, lifestyle. A customer selects the product carefully, looking for the best deal and therefore requires much more information, more accurate information, wants to be informed more quickly, requires discussion and interactive forms of communication.
- *Economic development* - which has an impact on the buying behaviour of customers, but at the same time leads to the reduction of expenditure of the enterprises. Marketing communication with limited resources presents a task to look for such forms of communication that can stimulate the customers affected by the recession to purchase, i.e. look for more economical and efficient solutions.
- *Technology development* - the development of information and communication technologies, which also constantly changes the form of marketing communication, possibilities and bringing new means of communication. Rapid expansion of high-performance, broadband Internet connection, the development of digital video cameras and multi-purpose mobile devices tremendously affected and changed the way customers can obtain, but also process information today and forced marketers to change a number of traditional communication tactics.

Innovations in marketing communication are related in particular *to changes in the communication mix,* and the increasing importance *below the line activities*, particularly *direct marketing (*Majtán, Grančičová, & Hrušovská, 2013). The application of alternative forms of

marketing communication, that are a possible solution to the increasing immunity of customers to traditional forms of marketing communication. Alternative forms include mainly *guerrilla marketing, viral and event marketing.* Thus, the *original implementation of communication campaign* (Karlíček & Zmazalová et al., 2009) takes the attention, provokes strong emotions and experience and consequently gives rise to communication between people themselves. *Communication between each customer* is currently considered the most effective tool of marketing communication. In the current marketing communication it addresses this issue and introduces its official name *WoM - Word-of-Mouth*. *And finally*, another shift that is necessary to mention is *an increase in the importance of Internet marketing communication companies*. Today it is often referred to as one of the fundamental and critical instruments and media.

In principle, there are possible innovations in marketing communication divided into two groups. While in first group innovation is one of the categories of technology (internet and the media - especially new forms of communication in Web 2.0), the second group has a character of the original creative communication approaches and methods, so-called alternative forms of marketing (guerilla, viral and event marketing). For most of the innovation in marketing communication and for the great development of information and communication technologies we can thank especially one single medium - *the Internet*. There are several reasons. The crucial one is the *increasing digital literacy* as the Internet is now an integral part of millions of people and companies who use it for communication, entertainment as well as business.

The statistics show that the number of internet users in the world in 2015 was about 3.37 billion, which means that approximately 46,4% of the total population uses the Internet (in 2014 – 42,3%, 2011 – 28,7% and in 1995 only 1%). Slovakia is on the 18th place with 4,5 million users and a penetration of 83,1% within the EU (in 2014 - 4,3milion users and penetration 79,0%), of which 2.3 million are users of facebook (facebook penetration rate 42,4%) (Internet World Stats 2016). Regarding the use of various online activities, the Slovaks are rated similarly as the European average (Europe direct). Further *advantages* compared to traditional communication media that the Internet provides are in particular: directness, high penetration, interactivity, flexibility, low and simple measurability of results and assessment of the effectiveness of online campaigns. In terms of internet marketing communication it also offers the full range of communication options, pages through a variety of services and tools - banners, text ads, websites, e-mail, sending newsletters etc. In addition to these options, which correspond to more traditional patterns, the internet communication also offers a number of possibilities of active communication with customers on the internet that the summary referred to the concept of Web 2.0., respectively *social media.* Scott defined Social media as "a set of technologies and tools that enable online sharing content, exchanging opinions and ideas, and create a base of contacts.

The fundamental difference between the two sides and the traditional media is that the content of social media may form, participate in it and comment on the user" (Scott, 2010). It is therefore a new generation of services, applications, sites etc., additional and expanding the original internet. Users not only use the internet but also help shape its content. In these media users can discuss, participate in various projects and belong to a certain community. According to multiple sources the customers decide about the purchase of certain products in accordance with opinions, references, recommendations or other internet users posted through social media. These are becoming increasingly frequent source of information that affect their buying decision. The results of a study by Nielsen state that 90% of people believe recommendations from friends and 70% believe the website (Nielsen 2009). According to the IPSOS Social media provides a chance to the reliability of products and services, learn about customers from their friends. Confidence in each brand is increasing in this regard and 38% of people recommend a brand with which they have a good experience and they love (Wiltfong, 2012).

Monitoring social media that can represent a competitive advantage for businesses - as a source of customer reactions, the possibility of influencing communication between the users and the like. Social media also offer many forms/tools, and constantly discover new innovative services in this area, while others disappear or merge. It is therefore a very dynamically developing field of marketing communication. The most frequently reported forms/means of social media mainly include: blogs, networks for sharing photos and video (multimedia), forums, message boards, wikis, website evaluation, social networking, podcasting. From the category of *creative innovative approaches in marketing communication*, which now become important, we can mention in particular: event marketing and "engagement" (event marketing and direct involvement of customers in marketing communication), guerilla marketing and viral marketing. A common feature of all three methods is a selected experience that attracts customers, profits and often convinces product purchases. They are used as a solution to the current problem of marketing, fight against increasing immunity customers against traditional forms of advertising and marketing communication.

Event marketing and *such engagement*, namely the involvement of customers in marketing events is heading to leadership in the world's fastest-growing form of marketing (Event & Experiential Marketing Industry 2015). Event marketing (experiential marketing) can be simply defined as a form of extraordinary experiences, which attracts attention and gives interested target group. The intention of staging experiences (events) within corporate communications is to induce psychological and emotional incentives that promote the image of the company and its products, in order to maintain long-term relationships between a company and its target audience. Event strength lies primarily in the unique position of experience (Přikrylová & Jahodová, 2010).

Event marketing can have different forms (e.g. thematic conferences, including the accompanying social and cultural programs, corporate days, open days, social events, meetings - receptions, commencement of shops, etc.). Event Marketing Institute (Event & Experiential Marketing Industry, 2015) shows the importance of this alternative form of marketing both in terms of customer acquisition, as well as the impact on business performance results of the survey. The effect of event marketing to the buying behaviour of customers continues to grow. The reason and the main motivation of the customers to attend events is that they can first try or obtain samples of products, discounts, special offers besides having the opportunity to learn more about the product. Events and experiences also enhance the positive perception of the brand: for example 74% of involved customers have much more positive view on a company, brand, product, than before visiting the event. The survey results also point to the fact that 70% of customers who bought the product in the event, later became regular customers. According to the survey Event Marketing Institute, enterprises providing events indicate that sales in response to the increasing tendency of the event, have an increasing ROI - return on investment for event marketing campaigns, which in turn lead to an increase in the number of events and budgets in this area.

Guerrilla marketing is unconventional form of advertising since its inception significantly shifted - to upgrade its character and especially the form in which it is practiced mainly due to the development of markets and information and communication technologies. Today it represents an approach in marketing communication with the growing importance. In general, it is a form of marketing in order to generate maximum interest using a limited budget, with the result that the recipient pays attention to the campaign without ever being aware of the fact that it is a marketing promotion (Levinson, 2009). Guerrilla marketing is therefore now used mainly by companies, both small and large, to realize the potential of creative marketing (Levinson, 2009). First reasons why the guerrilla marketing is appropriate and effective is that it uses a non-traditional advertising media, most of which Western civilization has successfully avoided. It is also inexpensive and works with human psychology, and has the ability to produce

secondary publicity (hacker.blog, 2016). And therein lays the power of this type of marketing communication. Guerilla marketing today also communicates with customers using a variety of specific communication techniques, which are also commonly called specific types of marketing, but also as a form of guerrilla marketing tool. For instance: Ambient Media, Ambush marketing, Buzz marketing, Astroturfing, Street art marketing, Viral Marketing also the most widespread. For the development of the right type of guerrilla marketing here are the important factors: the size of the company, focus of its activities - nature of the products, the nature of the market - customers, fitness for a particular market segment, as well as from their relationship to the alternative media.

Experience shows that there is a very effective use of guerrilla marketing in relation to young age groups advertising in printed media or TV. In their environment the effect of guerrilla marketing is increased by viral marketing, for example by spreading through social networks. Our previous research deals with the topic of whether and to what extent responsible marketing communication enterprises in Slovakia for mentioned innovative trends. The basic findings are presented in the next section of this post.

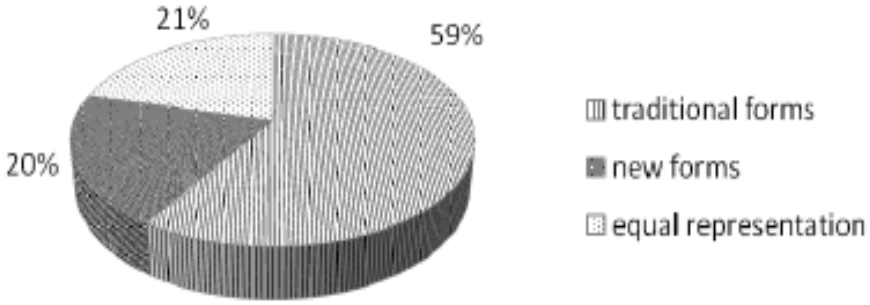
Presentation of the Survey Results of the Applied Marketing Communication Innovations in Business Practice in the SR

A realized research in the Slovak enterprises was aimed at assessing the level of marketing communication with the emphasis on utilizing its innovative forms, namely the Internet and its means of communication and alternative forms of marketing - viral, event, guerilla marketing and so on. Data gathering took place from October to December 2013 in enterprises in Slovakia. The sample consisted of 323 firms included in the database. Simple random sampling was used, enterprises were the sampling units. The survey was implemented through a structured questionnaire and it was used in personal interviews and a part of the questionnaire was sent electronically.

A sample of business surveys are characterized by legal status, ownership / funding, number of employees, size of turnover, sector, market focus. These approaches verified also the existence of the marketing department in the company. In terms of financing/ownership surveyed, more enterprises are financed only in domestic capital (59%), foreign capital prevailed in the fifth of businesses (19%), companies financed only by foreign capital accounted for 12% and domestic capital prevailed in 10% of companies. The distribution of the number of employees in each group was represented as follows: most were micro-enterprises (35%) and the other size categories (small, medium and large enterprises), the number of enterprises in the range of 21-22% in each group.

When examining the size of enterprises in terms of turnover, half of the enterprises had an annual turnover 2 million EUR (50%). Fifth of enterprises had a turnover in the range of 2 million euros to 10 million EUR (19%), fewer enterprises had turnover in the range of 10 million to 50 million EUR (14%) and 18% of enterprises reported a turnover of over 50 million euros. According to the business areas surveyed service companies (37%) were at the top, followed by commercial enterprises (23%) and the rest were manufacturing companies. In terms of market focus 59% of businesses were in the category B2C and 41% of companies represented B2B orientation. 52% of enterprises of the total number of enterprises had a separate marketing department and 48% of enterprises did not have its own marketing department. Following the contribution the results of the survey indicate the following findings in particular. The examination of the use of traditional and innovative forms of marketing communication of individual respondents found that the predominantly traditional forms of marketing communication (59%) are used. Only 17% prefer innovation in this area and 22 % both categories use equally. The survey results are provided in the Figure 2.

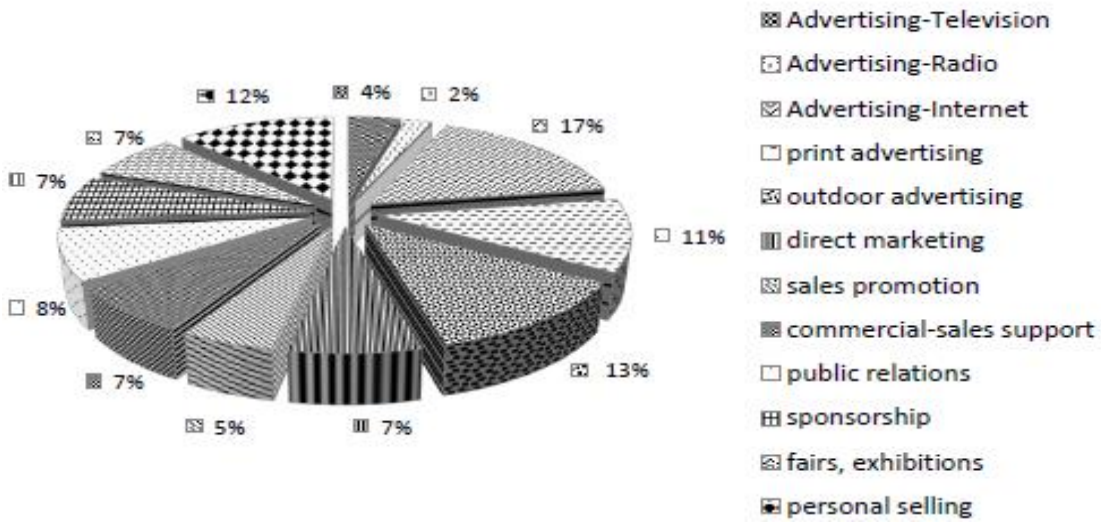
Figure 2.
Usage of Traditional and Innovative Forms of the Marketing Communication



Source: Own elaboration

Based on the test of independence assumption of the existence of a statistically significant dependence was verified between exploiting innovations in marketing communication companies and selected attributes enterprises - size, ownership/financing, business area, market focus and formalization of marketing in the company. The choice of those attributes was based on a certain logic to assume their potential impact on the investigated. Significant relation was confirmed for all the studied variables. Thus it can be concluded that all investigated factors affecting the level of marketing communication in Slovakia in terms of the utilization rate of its innovative forms, was not so significant (the biggest impact has been confirmed for the attribute - the existence of the marketing department). All tests were performed at a significance level of $p>0,05$. From traditional marketing communication tools the greatest importance to advertising has - Internet advertising (16%), outdoor (12%) and print media (11%). The smallest percentage was involved in advertising on radio (2%). Personal sales/communication also takes an important place (12%). Importance of the other components of communication (sales promotion, PR, direct marketing) has been settled and moved in the range of 8% - 4%. Compared to other marketing communication tools enterprises the Internet has at least equivalent (28%) or is more important (27%). By examining the various forms of marketing communication on the internet businesses reported as the most frequently used public relation on the Internet - e.g. Business Websites (35%), followed by direct marketing on the internet - e-mail and sending newsletters (17%), less was used banner and text advertising (15%). At least it used sponsorship web site and affiliate marketing (3%). The survey results are presented in the Figure 3.

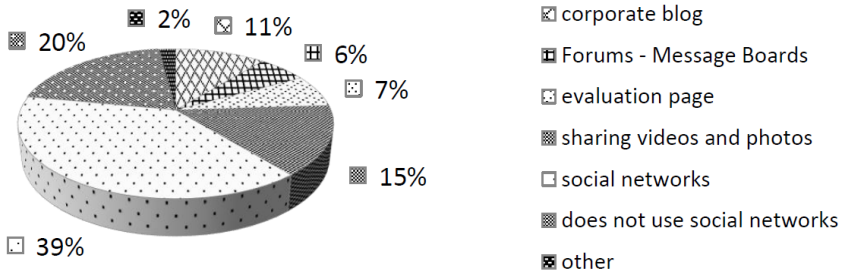
Figure 3.
Traditional Marketing-Communication Tools



Source: Own elaboration

Use of social media was examined in the categories of corporate blogs, forums, evaluation sites, sharing videos and photos and social networks on the Internet. Of these forms, respondents most used social network on the Internet (39%). In this case it was mostly on Facebook, Twitter and LinkedIn. One-fifth of enterprises (20%) indicate that social media are not used at all. The main reasons reported were: lack of time, lack of funds, impersonal contact, and also that they are not interested or do not consider such communications to be effective, given the nature of their products. The survey results are given in the Figure 4.

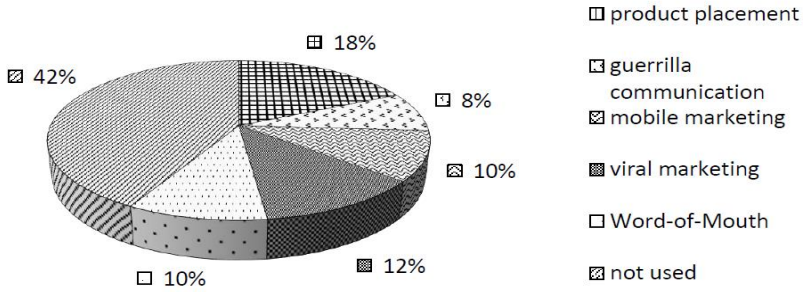
Figure 4.
Applying the Social Media



Source: Own elaboration

Conversely performance of businesses in social media is mainly due to monitoring attitudes and opinions of customers in discussions on forums and blogs (29%). Followed by the creation of discussion forums about products and obtained information about registered users (18%). The least important reason was the offer of cooperation with the most active bloggers (4%). After exploring alternative forms of marketing communication, such as product placement, guerilla marketing, mobile marketing, viral marketing, word-of-mouth and their utilization by enterprises we can conclude that the most frequently used form of marketing communication is product placement (18%). Mobile marketing and viral marketing firms were utilized evenly (10-12%) and the least used form was guerilla marketing (8%). 42% of enterprises did not use alternative forms of marketing communication at all. The survey results are presented in the Figure 5.

Figure 5.
Applied Alternative Forms of Marketing Communication



Source: Own elaboration

We examined the reasons why the companies do not use alternative forms of marketing communication. From the results of the survey we can conclude that companies do not know about such forms of communication or are not considered as relevant/effective in terms of their orientation. The enterprises often reported that that is due to the high financial costs despite the fact that the forms are classified as low-cost forms of marketing communication.

4. Conclusions and Recommendations

In the context of the issue of innovation in marketing communication, the results of our previous survey showed that the business practice in Slovakia in marketing communication of innovative approaches used in addition to conventional media especially the Internet. Evaluated business *consider internet/digital communication* if not *more significant, at least equivalent* communication tool, compared with other traditional media types. This finding is somewhat confirmed by data reported by media and research agencies in Slovakia. Based on the survey results, we can conclude that the hypothesis that the use of innovation forms of marketing communication of a business depends on certain business features - size, line of business area, market orientation, financing, the importance of marketing in the business has been confirmed.

Addiction is not too significant. Another fact pointed out by the survey is that most companies also make use of *internet marketing* but *inadequately implement the possibilities it offers*. In this area, enterprises using only web site and e-mail, which is no longer a competitive advantage, but commonplace it is necessary to exploit the potential of the Internet in a more comprehensive way. A tool that offers more than just the targeted communication, but at the same time falls into the category of low cost and also keeps track and periodically evaluates the success of campaigns. It allows to make changes to campaign settings much more quickly than it is the case with traditional media.

Despite the fact that social media are among the world's foremost innovations in marketing communication, with huge potential according to the results of the survey are less frequently used forms of communication of our businesses. Here it is important to understand what options are open in terms of business marketing action in the field of social media. In addition to publishing information about the company, it is also commenting, discussion and review. Customers here can express their views or ask questions about the products. Feedback is quick and easy. On the other hand, it should also be noted that enterprises that had already decided to act in this area and to be effective, should have a defined goal - they want action on the social network to reach and accordingly, in the long-term to be active and create quality content. The problem of enterprises in Slovakia is also the use of innovative forms of marketing, the categories of creative solutions, so-called *alternative forms of marketing*. The reason is some mistrust and underestimation of these forms, but most of them have a lack of experience in this area. The way to their higher use could be to examine the possibilities for their implementation in the company. The popularization of these forms should be through successful examples from practice marketing companies in Slovakia.

In conclusion it is noted that the current state of upgrading and modernization in this field indicates that the future of marketing and marketing communication will be focused on the creation of new activities and further development of existing activities depending on the specific interests and needs of society. The future of marketing and marketing communication will depend on its technical and knowledge level. The result of from the perspective of corporate marketing and marketing communication should be mainly the ability to personalize thanks to the permanent establishment of lasting customer base.

Acknowledgement

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Testovanie vlastného accounting modelu na vybranej vzorke podnikov farmaceutického a oceliarskeho priemyslu v SR
Testing of own accounting model on selected sample of the enterprises of the pharmaceutical and steel industry in the SR

Helena Majdúchová, Daniela Rybárová, Bernadeta Siváková

Abstract
Risk of each bond paper divides into two basic groups: specific risk and market risk. Investor can diversify the specific risk, however, not the market one. Share of risk of the individual bond paper in fully diversified portfolio is connected with the sensitivity of this bond paper on moves on the market. This sensitivity is most often specified by beta coefficient. This parameter serves for specification of the systematic risk, which cannot be diversified. Beta coefficient quantification is not definite. Most of model used are based on data of the publicly traded companies, which are not suitable for small companies. Recently, the processes which search relation between accounting parameters and systematic risk are being developed. The goal of this article is testing of the financial coefficients of own accounting model for purpose of determination of beta coefficient value (eventually, systematic risk determination) of selected enterprises of the pharmaceutical and steel industry in the SR and comparation of reached results with the publicly available data of beta coefficient.

Keywords*: systematic risk, beta, coefficient, accounting model*
JEL classification: *G30, G33, M20*

1. Úvod

Teória portfólia predpokladá, že investor sa správa racionálne, maximalizuje svoju užitočnosť pri rôznom postoji k riziku a vplyvom ďalších faktorov ako sú vek, skúsenosť a iné. Riziko každého cenného papiera sa rozdeľuje na dve základné skupiny: špecifické riziko a trhové riziko. Investor môže diverzifikovať špecifické riziko, ale nie trhové. Riziko plne diverzifikovaného portfólia sa potom rovná trhovému riziku. Podiel rizika individuálneho cenného papiera v plne diverzifikovanom portfóliu súvisí s citlivosťou tohto cenného papiera na pohyby na trhu. Táto citlivosť sa najčastejšie vyjadruje koeficientom beta. Tento parameter slúži na zachytenie *systematického rizika* cenného papiera, ktoré nie je možné diverzifikovať.

Príspevok sa zameriava na výpočet beta koeficientu s využitím dostupných účtovných parametrov aplikovaných vo vlastnom accounting modeli. Cieľom príspevku je testovanie vybraných finančných ukazovateľov vlastného accounting modelu za účelom stanovenia hodnoty beta koeficientu (stanovenia systematického rizika) vybraných podnikov farmaceutického a oceliarskeho priemyslu SR a komparácia dosiahnutých výsledkov s verejne dostupnými hodnotami beta koeficientu.

2. Teoretické východiská a metodika realizovaného prieskum

Beta koeficient má vplyvom modelu CAPM široké využitie nie len na finančných trhoch, ale aj v podnikovej sfére. Využíva sa predovšetkým v oblasti prepočtov efektívnosti podnikových procesov so zohľadnením nákladov na vlastný kapitál, v investičnom rozhodovaní a tiež v procese ohodnocovania (Mařík, M. - Maříková, P., 2008). Hodnota beta koeficientu má značný vplyv na výsledok, no jeho kvantifikácia nie je úplne jednoznačná, odrazom čoho sú publikované rozdielne hodnoty beta koeficientu. Dôvodom sú rôzne postupy

a metódy, snahou ktorých je čo najreálnejšie postihnúť systematické riziko. Napr. pri výbere trhového indexu, ktorý by mal čo najpresnejšie vyjadrovať trhové portfólio môžeme vychádzať buď z nadnárodného indexu ako je MSCI index, alebo z nemeckého indexu DAX, ktorý sa zdá viac vhodný pri stanovení hodnoty u slovenských podnikov. Tiež pri rozhodovaní o frekvencii, s akou budeme sledovať výnosy cenných papierov, máme na výber denné výnosy, mesačné, ale stretneme sa aj s 20 až 50 dňovými výnosmi cenných papierov. Pre všetky tieto rozhodnutia nie sú jednoznačné usmernenia, čo vytvára priestor pre vznik rôzne veľkých odchýlok vo výpočte. Ďalší problém pri vyčíslení beta koeficientu nastáva pri spoločnostiach, ktorých akcie nie sú obchodované na trhu cenných papierov a spoločnostiach s krátkou existenciou. Pre tento typ spoločností nie je možné odhadnúť trhový beta koeficient, ale využíva sa beta koeficient odvetvia, ktorý sa následne upravuje o vplyv kapitálovej štruktúry. Jedným z prístupov k určeniu beta koeficientov daných spoločností je spôsob výpočtu, ktorý vychádza z využitia účtovných premenných a ich asociácii so systematickým rizikom. Štúdií zameraných na vzťah medzi systematickým rizikom a účtovnými premennými bolo už realizovaných niekoľko. Vo väčšine prieskumov sa potvrdilo, že účtovné premenné vedia v priemere vysvetliť 45 % variability v beta koeficiente.

V roku 2016 bol realizovaný prieskum vzťahu medzi systematickým rizikom a účtovnými premennými na vzorke spoločností z 15 krajín Európskej únie za obdobie rokov 2005 až 2014. Išlo o spoločnosti, ktorých akcie boli obchodovateľné na trhu. Pre analýzu údajov sme využili panelové dáta a jednoduchú lineárnu regresiu. Analyzovaný bol Brimble-Hodgson accounting model a vlastný accounting model. Z prieskumu vyplynulo, že Brimble-Hodgson accounting model dokázal vysvetliť 28 až 77 % variability systematického rizika a vytvorený vlastný accounting model, ktorý vysvetlil 21 až 75 % variability systematického rizika v závislosti od odvetvia (Majdúchová, H. - Siváková, B., 2016). Na základe výsledkov testovania týchto modelov možno konštatovať, že účtovné premenné sú pozitívne korelované so systematickým rizikom a tiež, že odvetvie je významným determinantom systematického rizika spoločnosti. Výsledkom bola skutočnosť, že pre jednotlivé odvetvia sa menila štruktúra a tiež počet štatisticky významných premenných. Za najdôležitejšie determinanty systematického rizika boli identifikované: veľkosť spoločnosti, rentabilita aktív, finančná páka, čistý pracovný kapitál, úrokové krytie a umelá premenná pre ukazovateľ EBIT. V prieskume boli analyzované oba modely pre všetky odvetvia. Podniky boli rozdelené do odvetví podľa SIC – Standard Industrial Classification.

V príspevku sa zameriame na charakteristiku východiskových atribútov modelu a testovanie navrhnutého výsledného accounting modelu pre odvetvie priemyslu v podmienkach farmaceutického a oceliarskeho priemyslu.

2.1 Deskriptívna štatistika premenných modelu a analýza panelových dát v odvetví priemyslu

Odvetvie priemyslu, označené ako SIC D, je zhodné s odvetvím priemyslu v Slovenskej republike. V tomto odvetví bolo analyzovaných 3948 pozorovaní. Výsledný regresný model je uvedený v tabuľke 1. Na hladine významnosti α=0,05 sme zamietli nulovú hypotézu a prijali alternatívnu hypotézu, čo znamená, že model je štatisticky významný. Pri skúmaní p-hodnoty u jednotlivých indikátorov sme dospeli k záveru, že všetky sú štatisticky významné na hladine významnosti α=0,05. Koeficient determinácie je 0,2671, čo znamená, že 26,71 % variability trhového beta koeficientu vieme vysvetliť týmto modelom.

Tabuľka 1
Lineárny regresný model pre odvetvie priemyslu

Linear regression

Number of obs	= 3697
F(4, 3692)	= 397.73
Prob > F	= 0.0000
R-squared	= 0.2671
Root MSE	= .24785

beta	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Size	.074573	.001986	37.55	0.000	.0706793	.0784668
DUebit	-.1081229	.0224296	-4.82	0.000	-.1520986	-.0641472
lnFlev	-.0353128	.0132206	-2.67	0.008	-.0612332	-.0093924
lnIbeta	-.0173795	.0055986	-3.10	0.002	-.0283562	-.0064027
_cons	-.4406514	.0431854	-10.20	0.000	-.525321	-.3559817

Zdroj: Vlastné spracovanie v programe Stata

Následne bol model otestovaný na prítomnosť heteroskedasticity, šikmosti a zakrivenia. V závere sme porovnali navrhovaný accounting model s výsledným accounting modelom pre odvetvie priemyslu.

Tabuľka 2
Porovnanie vlastného accounting modelu s výsledným modelom pre odvetvie SIC D

Variable	OLS_Mode~a	OLS_Mode~D
lnFlev	0.97*	0.97**
DOZ	0.99	
DUebit	0.95*	0.90***
Ibeta	2.18***	
NWC	1.00	
Size	1.08***	1.08***
AG	1.01*	
ROA	0.62***	
lnIbeta	0.96***	0.98**
totdebtequ~y	1.00	
_cons	0.56***	0.64***
N	3667	3697
r2	0.27	0.27
r2_a	0.27	0.27

legend: * p<0.05; ** p<0.01; *** p<0.001

Zdroj: Vlastné spracovanie v programe Stata.

Počet signifikantných premenných klesol z 5 na 4. Napriek tomu, že klesol počet štatisticky významných premenných, hodnota upraveného koeficientu determinácie *(r2_a)* sa nezmenila, čo znamená, že kvalita modelu ostala rovnaká. Výsledný accounting model pre **odvetvie priemyslu** má nasledovný tvar:

$$\widehat{beta}_i = -0,4406514 - 0,0173795 \times \ln(Ibeta)_i + 0,074573 \times Size_i - 0,0353128 \times \ln(Flev)_i - 0,1081229 \times DUebit_i \quad (1)$$

Tabuľka 3
Charakteristika parametrov výsledného accounting modelu pre odvetvie priemyslu

Parameter	Popis
$\boldsymbol{Ibeta_{it}}$	Prevádzkový beta koeficient počítaný ako podiel prevádzkového zisku a celkových aktív
$\boldsymbol{Flev_{it}}$	Finančná páka
$\boldsymbol{DUebit_{it}}$	Znamienko výsledku hospodárenia - umelá *(dummy)* premenná, ak bude VH záporný, dosadí sa nula, inak 1.
$\boldsymbol{Size_{it}} = ln\ (celkové\ aktíva)$	Veľkosť počítaná ako prirodzený logaritmus celkových aktív.

Zdroj: vlastné spracovanie

Z modelu vyplýva, že trhový beta koeficient je negatívne korelovaný s prirodzeným logaritmom prevádzkovej páky, finančnej páky a umelou premennou ukazovateľa EBIT a pozitívne korelovaný s veľkosťou spoločnosti. Pozitívny vplyv veľkosti spoločnosti na systematické riziko sa prejavil v oboch modeloch vo väčšine analyzovaných odvetviach. Pozitívny vplyv veľkosti na systematické riziko nie je úplne nový poznatok. Rovnaký vplyv tohto ukazovateľa dosiahli vo svojich výskumoch aj Bergesen a Ward pri analýze juhoafrických spoločností (Bergesen,M. - Ward, M., 1996) a Castagna, Matolcsy a Brimble, Hodgson pri analýze austrálskych spoločností (Castagna, A. D. - Matolcsy, Z. P., 1978), (Brimble, M. - Hodgson, A., 2007). Castagna a Matolcsy tvrdia, že tento pozitívny vzťah medzi systematickým rizikom a veľkosťou môže byť výsledkom nasledovných dvoch faktorov: relativita veľkosti spoločnosti na rôzne veľkých trhoch a ochota daných spoločností podstupovať riziko. Relativita veľkosti znamená, že to, čo sa pokladá za veľkú spoločnosť na malých trhoch, ako sú trhy v Austrálii a v Južnej Afrike, je v skutočnosti malá spoločnosť na veľkých trhoch. Druhý faktor, ktorým je ochota podstupovať riziko vyjadruje, že väčšie spoločnosti na menších trhoch sú spravidla aktívnejšie v rizikovejších oblastiach ako malé spoločnosti. Dôkazom je aj správny, teda záporný vzťah tohto ukazovateľa so systematickým rizikom pri testovaní spoločností v USA (Kachecha, C. - Strydom, B., 2011).

Pri porovnávaní koeficientov determinácie pre odvetvia v Brimble-Hodgson accounting modeli a vo vlastnom accounting modeli boli dosiahnuté nižšie hodnoty tohto koeficientu vo vlastnom accounting modeli. Podľa nášho názoru je to spôsobené tým, že vo vlastnom accounting modeli sa nenachádzajú trhové ukazovatele, ako market to book ratio, cash flow a výplatný pomer. Myslíme si, že pri accounting modeloch, ktoré obsahujú trhové ukazovatele, je možné lepšie vysvetliť variabilitu v systematickom riziku. Vzhľadom k tomu, že naším zámerom bolo testovať model, ktorý by sa dal aplikovať u spoločností, ktoré nie sú verejne obchodovateľné, trhové ukazovatele sme nemohli do vlastného accounting modelu zahrnúť.

Výsledný accounting model sme testovali na vzorke spoločností, ktoré vykonávajú svoju podnikateľskú aktivitu v rozdielnych sférach odvetví priemyslu, konkrétne vo farmaceutickom a oceliarskom priemysle. Tieto dve vybrané odvetvia považujeme z hľadiska charakteru ich činnosti, postavenia v štruktúre priemyslu a reakcie na zmeny na trhu za dostatočne odlišné pre testovanie. Údaje sme získali z web stránky www.registeruz.sk a z publikácie Stredné hodnoty finančných ukazovateľov ekonomických činnosti pre jednotlivé odvetvia za roky 2012 – 2015.

3. Testovanie výsledného modelu na vzorke podnikov vo farmaceutickom priemysle

Predpokladáme, že systematické riziko podnikov je značnou mierou ovplyvnené vývojom odvetvia. Preto v prvom rade špecifikujeme tendencie vývoja odvetvia ako celku a následne určíme beta koeficient vo vybraných podnikoch daného odvetvia v SR pomocou navrhnutého accounting modelu.

3.1 Charakteristika farmaceutického priemyslu

Farmaceutický priemysel je vysoko inovatívne odvetvie s rastúcou náročnosťou na kapitál investovaný do výskumu a vývoja. Riziká tohto odvetvia možno identifikovať v nasledovných oblastiach:

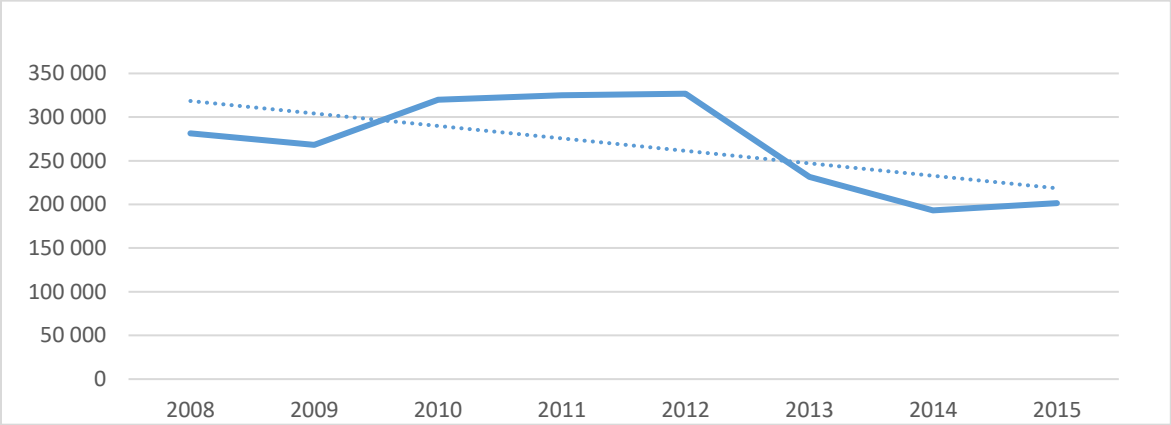
- veľmi dlhý, nákladný a rizikový výskum a vývoj liekov kvôli vysokým nárokom na bezpečnosť, trvá v priemere 12 rokov,
- vysoké náklady na patentovú ochranu a rastúci podiel výroby generických liekov, pričom spoločnosti, ktoré vyrábajú a predávajú generiká neniesli žiadne náklady na ich výskum a vývoj,
- presun klinického výskumu do krajín, ktoré nemajú tak prísne legislatívne predpisy na ochranu zdravia, čím sa vyspelé krajiny dostávajú do nevýhodnejšej konkurenčnej pozície a zároveň sa zvyšuje riziko pre pacienta,
- rastúci objem falšovaných liekov.

Toto odvetvie je možné charakterizovať ako jedno najvýkonnejších sektorov v oblasti high-tech. Kým sa nový produkt dostane na trh, ubehne 12 až 13 rokov a náklady sa pohybujú nad 1 miliardou eur. Farmaceutický sektor vykazuje najvyššiu mieru intenzity R&D v pomere k predajom, ešte pred IT sektorom. Podľa údajov Eurostatu tvorí sektor najvyššiu pridanú hodnotu na jedného zamestnanca. Zároveň je však nutné konštatovať, že európske farmaceutické spoločnosti výrazne zaostávajú v objeme investícií do výskumu a vývoja nových liekov a to najmä za USA, ale aj za Čínou, Indiou a Brazíliou. Aj keď roku 2010 sa v Európe investoval farmaceutický priemysel do výskumu a vývoja približne 27 miliárd eur a celkovo v Európe priamo zamestnával 640 000 ľudí a v roku 2015 tento objem investícií stúpol na 31,5 miliárd eur a počet zamestnaných stúpol na 725 000 ľudí, konštatujeme, že tento vývoj nemusí byť dlhodobý, keďže sa výskumné aktivity čoraz viac presúvajú do rýchlo rozvíjajúcich sa trhov – Brazílie, Číny a Indie. Trhy Indie, USA a Číny napríklad v roku 2015 rástli tempom 11-12%, zatiaľ čo Európsky trh iba 2,6%.

Tieto skutočnosti si uvedomujú aj farmaceutické spoločnosti na Slovensku. Nasledujúci graf 1 udáva vývoj produkcie vo farmaceutickom priemysle od roku 2008. Napriek mierne zvýšenej produkcii v rokoch 2010-2012 je nutné konštatovať, že celková produkcia vo finančnom vyjadrení klesá. Za základné príčiny tohto poklesu môžeme označiť: rastúcu investičnú náročnosť tohto odvetvia, najmä v oblasti investícií na výskum a vývoj, ktorá je v ostrom protiklade s nedostatočnou kapitálovou silou slovenských farmaceutických spoločností, klesajúci počet patentov v tejto oblasti, sprísnenie legislatívy týkajúcej sa ochrany zdravia pacientov a klinických skúšok.

Na celkovej produkcii priemyselnej výroby SR sa chemický a farmaceutický priemysel podieľa 18,5 %. V odvetví prevažujú malé a stredné podniky. V súčasnosti podniká 275 podnikov s viac ako 20 zamestnancami

Graf 1
Výroba základných farmaceutických výrobkov v SR v tis. Eur



Zdroj: vlastné spracovanie na základe zdrojov ŠÚ SR

Za deväť mesiacov roku 2016 zaznamenal chemický a farmaceutický priemysel na Slovensku medziročný pokles tržieb o 1,2 % na 7,155 miliardy eur. Vývoj odvetvia je rozdielny v jednotlivých segmentoch. Farmaceutické výrobky a prípravky narástli o 5,9 %, ale tento rast len dobieha vlaňajší celoročný pokles až o 14,2 percenta.

Tabuľka 4
Stredné hodnoty vybraných ukazovateľov časti farmaceutického priemyslu (244 - Výroba far. prípravkov, chemických produktov a produktov z rastlín pre lekárske účely)

Podnikateľské subjekty		26	25	23	21	23	23	21	21
Ukazovateľ	**Štat. char.**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
	DK	0,20	0,24	0,02	0,03	0,00	0,09	0,49	0,33
Obrat aktív	Me	0,88	0,79	0,63	0,50	0,64	0,73	0,69	0,73
	HK	1,59	1,14	1,11	0,82	0,98	1,18	1,04	0,94
	DK	35,07	23,44	9,29	21,38	19,30	11,06	14,76	19,27
Celková zadlženosť aktív	Me	52,32	39,46	32,28	31,09	35,91	31,60	25,82	27,18
	HK	106,75	56,15	58,44	60,52	90,39	58,86	59,56	79,86
	DK	-3,53	-3,68	-0,11	0,72	0,11	0,70	0,70	-1,24
Rentabilita aktív - hrubá	Me	6,37	1,57	2,35	2,25	1,85	2,16	3,04	8,14
	HK	21,26	18,53	18,75	3,68	4,18	8,04	5,78	18,12
	DK	-5,69	-12,73	1,69	0,01	0,01	0,03	0,04	2,05
Prevádzková rentabilita tržieb	Me	10,11	4,91	6,94	3,03	0,74	0,74	0,47	12,79
	HK	21,41	18,12	26,36	11,73	16,92	15,68	10,02	17,29

Zdroj: vlastné spracovanie podľa údajov CRIF – Slovak Credit Bureau, s.r.o.

Vývoj stredných hodnôt vybraných finančných ukazovateľov v tabuľke 4 je v protiklade s predchádzajúcimi údajmi o vývoji tržieb vo farmaceutickom priemysle (graf 1) a rozdiely sú aj v závislosti od posudzovaného kvartilu. Výsledky horného kvartilu[1] poukazujú na

[1] Pozn. medián, horný a dolný kvartil sú štatistické veličiny, ktoré rozdeľujú odvetvie na štvrtiny. Ak podnik dosiahol hodnotu istého ukazovateľa nad hodnotu mediánu, znamená to s istotou, že dosiahol vyššiu hodnotu ako polovica podnikov v odvetví. Ak dosiahol hodnotu nad hodnotu horného kvartilu, znamená to, že daný ukazovateľ mal vyššiu hodnotu než totožný ukazovateľ u troch štvrtín podnikov v odvetví.

skutočnosť, že sa z pohľadu všetkých vybraných ukazovateľov sú najhoršie roky 2011 2012. Výsledky mediánu indikujú ako najhoršie obdobie roky 2012 a 2013 a to u ukazovateľov rentability aktív a tržieb. Ukazovateľ obratu aktív je pri mediáne najnižší v rokoch 2011 a 2012. Zadlženosť aktív ukazuje na najhoršie výsledky v roku 2008. V ukazovateľoch obratu aktív a celkovej zadlženosti aktív dolného kvartilu sa ako najhoršie ukazuje obdobie rokov 2011 a 2012, pričom ukazovatele rentability dosahujú najhoršie výsledky v roku 2009.

Spoločným prienikom všetkých ukazovateľov a všetkých období je obdobie rokov 2011-2012. Paradoxne práve v tomto období stúpali tržby v odvetví, ale za cenu nižšej efektívnosti vkladaných zdrojov.

3.2 Výsledky testovania accounting modelu na vybraných podnikoch farmaceutického priemyslu v SR

Výsledný accounting model (1), ktorý bol skonštruovaný pre odvetvie priemyslu ako celok, sme aplikovali na 7 vybraných podnikov farmaceutického priemyslu. Vzhľadom k tomu, že výsledný accounting model bol vytvorený z panelových dát za podniky s obchodovateľnými akciami, aplikovali sme ho na väčšie podniky z rebríčka TOP 100 podnikov chemického a farmaceutického priemyslu. Vybraná vzorka podnikov predstavuje najväčšie podniky farmaceutického priemyslu podľa výšky majetku. Základné parametre vybraných podnikov použité na výpočet beta koeficientu sú uvedené v tabuľke 5.

Tabuľka 5
Vybrané parametre podnikov farmaceutického priemyslu zaradených do hodnotenia v období rokov 2012-2015

mil. eur	2012			2013			2014			2015		
	majetok	tržby	HV h.č.	majetok	tržby	HV h.č.	majetok	tržby	HV h.č.	majetok	tržby	HV h.č.
Biotika, Slovenská Lupča	47,9	61,8	5,4	55,0	54,0	8,3	48,0	53,8	3,4	46,2	57,8	4,3
Generica	3,6	5,1	0,3	3,3	4,9	0,2	3,0	5,6	0,1	2,8	0,3	-0,0
Saneca Pharmaceuticals	15,2	0,0	-0,7	47,1	52,8	8,0	55,8	72,4	9,1	53,3	60,8	2,2
HBM Pharma	20,6	21,7	-2,7	22,8	27,4	2,9	22,0	25,7	1,6	22,6	23,8	2,0
IMUNA Pharm	28,6	16,1	0,6	25,5	14,9	0,6	29,8	20,4	0,3	50,6	23,9	-2,1
Innopharma	4,2	12,0	0,8	7,2	13,7	1,4	5,5	13,1	0,4	4,5	14,0	0,4
Unimed Pharma	7,3	10,2	2,6	8,7	11,0	3,1	10,9	11,4	3,8	13,9	12,4	4,1
Priemer	**18,2**	**18,1**	**0,9**	**24,2**	**25,6**	**3,5**	**25,0**	**28,9**	**2,7**	**27,7**	**27,6**	**1,6**

Zdroj: www.registeruz.sk

Najmenšou spoločnosťou bola spoločnosť Generica, ktorej majetok sa pohybuje v rozpätí od 2,8 do 3,6 mil. eur a najväčšou bolo spoločnosť Biotika, Slovenská Lupča, ktorej majetok dosahoval hodnotu od 46,2 až po 54,0 mil. eur. Záporné výsledky z hospodárskej činnosti dosiahli dve spoločnosti v roku 2012 a dve v roku 2015. Najsilnejším rokom z hľadiska tržieb bol rok 2014 a najvyšší výsledok hospodárenia z hospodárskej činnosti podniky dosiahli v roku 2013. Majetok spoločností postupne rástol. Najslabším rokom vybraných podnikov bol rok 2012, čo približne zodpovedá vývoju daného odvetvia, ktoré sme zaznamenali pri pomerových ukazovateľoch.

Tabuľka 6
Beta koeficienty vybraných podnikov farmaceutického priemyslu v rokoch 2012-2015

Rok	2012	2013	2014	2015
Koeficient	$\widehat{beta}_i$	$\widehat{beta}_i$	$\widehat{beta}_i$	$\widehat{beta}_i$
Biotika, Slovenská Lupča	0,80	0,80	0,81	0,80
Generica	0,61	0,61	0,54	0,64
Saneca Pharmaceuticals	0,68	0,77	0,80	0,81
HBM Pharma	0,77	0,69	0,71	0,71
IMUNA Pharm	0,76	0,75	0,78	0,87
Innopharma	0,60	0,60	0,63	0,62
Unimed Pharma	0,65	0,66	0,68	0,51
Priemer	0,73	0,73	0,74	0,75

Zdroj: vlastné spracovanie

Vypočítaný beta koeficient v tabuľke 6 nevykazuje naznačenú tendenciu vývoja odvetvia z analýzy pomerových ukazovateľov, kedy rokom s najnižšou výkonnosťou bol rok 2012. Je však v súlade s vývojom tržieb v odvetví (graf 1). Výpočet beta koeficientu najcitlivejšie reaguje na zmenu objemu majetku, pričom táto zmena objemu majetku pôsobí kladným spôsobom na hodnotu beta koeficientu.

Tabuľka 7
Beta koeficienty pre farmaceutický priemysel v USA, Európe a vybraných podnikoch SR

Rok	Beta koeficient		
	USA	**Európa**	**vlastný accounting model**
2012	1,12	0,86	0,73
2013	1,08	0,88	0,73
2014	1,10	0,89	0,74
2015	1,03	1,27	0,75
2016	1,02	1,18	-

Zdroj: www.damodaran.com

Vypočítaný priemerný beta koeficient (počítaný z priemerných hodnôt parametrov analyzovaných podnikov) sme porovnali s koeficientmi vypočítanými a publikovanými prof. Damodaranom pre USA a Európu. Kým v USA koeficient klesá, v Európe má rastúcu tendenciu. Zmena nastáva až v roku 2016. Rovnako rastúcu tendenciu vykazuje beta koeficient vypočítaný navrhnutým accountingovým modelom. Dosiahnuté výsledky sú o niečo nižšie ako priemer za Európu a ani zmena v roku 2015 nebola tak zásadná. Na druhej strane ani podniky, ktoré sme do vzorky zaradili, nevykazovali významné medziročné zmeny.

Testovanie výsledného modelu na vzorke podnikov v oceliarskom priemysle

Determinanty oceliarskeho priemyslu a jeho vývoj je odlišný od farmaceutického priemyslu, čo bolo dôvodom nášho výberu pre testovanie accounting modelu.

Charakteristika oceliarskeho priemyslu

Európska únia je po Číne druhým najväčším výrobcom ocele na svete s produkciou viac než 170 miliónov ton ocele ročne, čo predstavuje 1,3% HDP EÚ. Oceľ je súčasťou významných priemyselných hodnotových reťazcov a úzko súvisí s mnohými nadväzujúcimi priemyselnými odvetviami, ako je automobilový priemysel, stavebníctvo, elektronika, strojárenstvo a elektrotechnika. Má významný cezhraničný rozmer: v 23 členských štátov EU sa nachádza

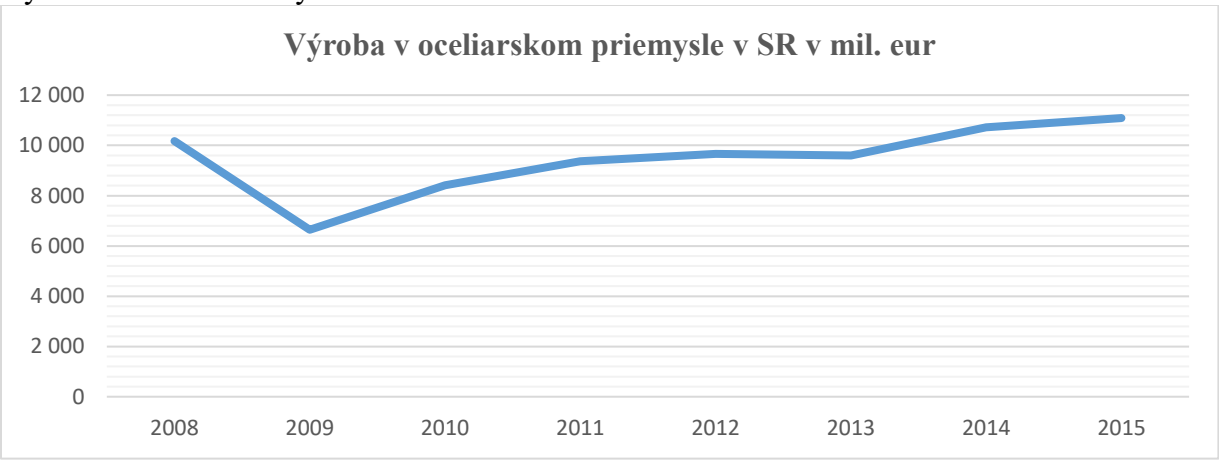
500 výrobných miest, vďaka čomu ide o skutočne európsky priemysel. V roku 2015 toto odvetvie zamestnávalo 328 000 ľudí. Európske oceliarstvo charakterizujú moderné, energeticky úsporné závody s nízkymi emisiami uhlíka. Najväčším produkcentom ocele v Európe je Nemecko s 39,7 mil. tonami ročne, nasleduje Taliansko s 20,5 mil. tonami, Francúzsko s 14,0 mil. tonami ročne.

V súčasnosti sa európske oceliarske odvetvie nachádza vo veľmi zložitej situácii. Hospodárska kríza viedla k významnému poklesu výrobnej činnosti a súvisiaceho dopytu po oceli, ktorý zostáva o cca 30 % nižší než pred krízou. Od roku 2014 sa k tomu pridalo aj spomalenie ekonomického rastu Číny a ďalších rastúcich ekonomík. Okrem toho v niektorých tretích krajinách a najmä v Číne vzrástla voľná výrobná kapacita, ktorá sa napr. v tejto azijskej krajine odhaduje na 440 mil. ton, čo predstavuje via ako dvojnásobok ročnej produkcie EÚ. Nadmerná svetová kapacita tlačí ceny ocele nadol. V dôsledku toho bolo niekoľko významných výrobných kapacít zatvorených alebo došlo k obmedzeniu produkcie, čo následne viedlo k strate pracovných miest, pričom v uplynulých rokoch ich zaniklo až 85 000. Preto zostane v predvídateľnej budúcnosti tlak na reštrukturalizáciu a zníženie výrobnej kapacity jednou z hlavných výziev pre toto odvetvie.

Vyššie uvedené skutočnosti ovplyvňujú aj vývoj oceliarskeho priemyslu na Slovensku. Ročná produkcia ocele na Slovensku predstavuje cca 4,5 mil. ton, čo tvorí cca 2,4% výrobnej kapacity EÚ. Aj na Slovensku je však viditeľný pokles a spomaľovanie výroby kovov a to od roku 2014, vývoz objemovo klesá permanentne od polovice roka 2015. Podľa predbežných údajov zahraničného obdchodu bol export hlavných oceliarskych výrobkov vyrábaných na Slovensku v porovnaní s rokom 2015 nižší takmer o 11%. Klesá vývoz hlavne do Rakúska, Českej republiky, Nemecka a Talianska. Medzi základné príčiny stagnácie oceliarskeho priemyslu v SR patria:

- prebytky čínskej produkcie, ktorá disponuje nadvýrobou cca okolo 440 mil. ton ocele, pričom celková spotreba EÚ je 155 mil. ton ročne,
- lacný dovoz oceliarskych výrobkov, ktorý spôsobil pokles ceny ocele vyrobenej na Slovensku od roku 2011 o viac ako 11%,
- prísne ekologické nomy v celej EÚ.,
- vysoké ceny enegie, ktoré sú ťažiskovým vstupom do výrobného procesu.

Graf 2
Výroba kovov a kovových konštrukcií v SR



Zdroj: vlastné spracovanie na základe zdrojov ŠÚ SR

Výroba kovov a kovových konštrukcií ako súčasť oceliarenskeho riemyslu dosiahla v sledovanom období svoje minimum v roku 2009 a od tohto roku má výroba mierne rastúcu tendenciu, pričom na úroveň roku 2008 sa dostala až približne v roku 2014. V ekonomike

Slovenska stále zohráva oceliarsky priemysel významnú plohu. Podieľa sa na celkovej zamestnanosti v priemyselnej výrobe cca 20% a pracuje v ňom okolo 100 000 zamestnancov. Vláda SR proklamuje, že má maximálny záujem na udržaní výroby ocele na Slovensku na súčasnej úrovni. Historicky výroba ocele je a zostane jedným z hlavných pilierov rozvoja priemyslu SR.

Tabuľka 8
Stredné hodnoty vybraných ukazovateľov časti oceliarskeho priemyslu (24 – Výroba a spracovanie kovov)

Podnikateľské subjekty		92	91	97	97	87	88	87	84
Ukazovateľ	**Štat. char.**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
	DK	0.69	0.44	0.54	0.74	0.64	0.59	0.64	0.52
Obrat aktív	Me	1.36	1.20	1.35	1.44	1.31	1.22	1.42	1.42
	HK	2.22	1.80	2.08	2.25	2.19	1.98	2.13	2.06
	DK	41.53	43.17	38.66	38.00	38.39	44.33	46.19	37.01
Celková zadlženosť aktív	Me	72.16	70.45	68.65	73.38	69.72	72.95	62.50	60.46
	HK	95.65	101.24	96.17	96.89	95.56	96.21	92.21	82.89
	DK	-11.02	-8.97	-1.86	-6.59	-2.23	-5.28	-0.30	-2.66
Rentabilita aktív - hrubá	Me	0.11	-1.78	2.14	0.68	1.13	0.77	2.02	2.89
	HK	6.73	3.06	10.93	7.22	9.43	6.57	8.69	10.79
	DK	-11.89	-24.48	-6.71	-5.91	-2.18	-11.28	-4.05	-0.81
Prevádzková rentabilita tržieb	Me	0.56	-0.96	2.21	1.33	2.01	1.50	2.39	2.45
	HK	4.14	3.76	6.62	4.48	6.82	5.67	6.97	8.24

Zdroj: vlastné spracovanie podľa údajov CRIF – Slovak Credit Bureau, s.r.o.

Vývoj stredných hodnôt vybraných finančných ukazovateľov potvrdzuje predchádzajúce zistenie, že rok 2009 bol vo všetkých štatistických rozhraniach rokom, kedy podniky oceliarskeho priemyslu na Slovensku dosahovali najhoršie výsledky. Oceliarský priemysel zareagoval na druhú vlnu hospodárskej krízy v roku 2012 poklesom rentability a rastom zadlženosti v roku 2013. Je nutné však uviesť, že napriek postupnému rastu tržieb v nasledujúcom období, podniky vykazujú nedostatočnú investičnú aktivitu, o čom vypovedá pokles relatívnej zostatkovej hodnoty hmotného a nehmotného majetku. Hodnota ukazovateľa obratu aktív, ktorá demonštruje účinnosť majetku je dlhodobo veľmi nízka. Vo väzbe na predchádzajúce faktory ovplyvňujúce problémy oceliarskeho priemyslu v EU a na Slovensku sa ako nevyhnutnými ukazujú rozsiahle investície do inovatívnych riešení, ktoré umožnia zníženie nákladov v rámci cenovej politiky v oblasti energií, ktoré sú ťažiskovým vstupom do transformačného procesu podnikov. Výsledky podnikov v hornom kvartile poukazujú na pomerne vysokú zadlženosť aktív. Pri jej bližšom skúmaní však nie sú jej zdrojom iba investičné úvery, ale zadlženosť z bežného obchodného styku, čo poukazuje na dlhý výrobný cyklus a nie celkom priaznivú platobnú disciplínu. Ukazovatele rentability dosahujú nízke hodnoty a to aj v hornom kvartile, kde rentabilita tržieb neprekročila 9%.

Výsledky testovania accounting modelu na vybraných podnikoch oceliarskeho priemyslu v SR

V oceliarskom priemysle sme do testovania zaradili 10 podnikov, ktorých veľkosť majetku sa pohybovala od 10,4 mil. eur až po 1 816 mil. eur na základe rebríčka TOP 100 podnikov hutníckeho a oceliarskeho priemyslu.

Tabuľka 9
Vybrané parametre podnikov oceliarskeho priemyslu zaradených do hodnotenia v období rokov 2012-2015

mil. eur	2012			2013			2014			2015		
	majetok	tržby	HV h.č.	majetok	tržby	HV h.č.	majetok	tržby	VH h.č.	majetok	tržby	VH h.č.
US STEEL	1 816,0	2 478,0	0,0	1 471,0	2 243,0	-0,5	1 646,7	2 251,6	0,0	1 382,9	2 192,5	0,1
Slovalco	228,1	326,5	52,5	231,3	321,4	59,9	208,5	341,5	34,8	220,8	394,5	52,3
Bekaert Hlohovec	195,0	264,4	13,0	187,6	262,6	16,3	187,6	262,6	15,9	222,7	271,6	12,2
Železiarne Podbrezová	277,4	278,8	3,7	292,5	243,9	-7,0	286,9	239,0	2,3	270,8	221,0	0,1
OFZ Istebné	104,6	110,8	-2,2	100,1	123,3	1,5	95,7	121,6	3,0	95,9	121,7	2,1
Nemak Slovakia	51,4	66,0	6,4	60,5	66,4	9,6	55,2	82,0	10,5	69,9	99,6	15,4
Sapa Profily	43,8	54,9	-0,9	32,8	50,2	-12	32,7	60,6	1,3	29,5	59,1	1,4
Cortizo Slovakia	29,1	37,9	1,4	28,6	38,2	1,4	33,7	51,8	3,6	29,6	60,1	4,5
C.L.N.Slovakia	28,8	46,6	1,0	30,7	44,6	0,7	27,6	54,9	0,3	24,3	62,8	0,3
Medeko Cast	10,4	47,5	0,8	10,9	43,5	0,9	10,9	59,8	1,1	12,5	52,1	0,8
Priemer	**278,5**	**371,1**	**7,6**	**244,6**	**343,7**	**7,1**	**258,6**	**352,5**	**7,3**	**235,9**	**353,5**	**8,9**

Zdroj: www.registeruz.sk

Celková hodnota majetku analyzovaných spoločností postupne klesala, čo potvrdzuje nízku investičnú aktivitu v danom období. Tržby poklesli v roku 2013, pričom najväčší podiel na danom poklese mali US STEEL. Rok 2013 je z pohľadu súhrnných ukazovateľov najslabším rokom, avšak k zásadnému zhoršeniu nedošlo. Môžeme konštatovať, že vybrané spoločnosti kopírujú vývoj odvetvia.

Tabuľka 10
Beta koeficienty vybraných podnikov oceliarenského priemyslu v rokoch 2012-2015

Rok	**2012**	**2013**	**2014**	**2015**
Koeficient	$\widehat{beta}_i$	$\widehat{beta}_i$	$\widehat{beta}_i$	$\widehat{beta}_i$
US STEEL	1,22	1,26	1,31	1,19
Slovalco	0,91	0,91	0,91	0,91
Bekaert Hlohovec	0,88	0,87	0,79	0,89
Železiarne Podbrezová	0,96	1,06	0,97	1,03
OFZ Istebné	0,98	0,88	0,85	0,86
Nemak Slovakia	0,81	0,79	0,80	0,81
Sapa Profily	0,92	0,84	0,77	0,77
Cortizo Slovakia	0,68	0,77	0,77	0,77
C.L.N.Slovakia	0,77	0,78	0,79	0,79
Medeko Cast	0,64	0,64	0,64	0,64
Priemer	**0,95**	**0,94**	**0,94**	**0,94**

Zdroj: vlastné spracovanie

Vypočítané beta koeficienty vykazujú najvyššiu citlivosť na veľkosť a zmenu výšky majetku. Najvyšší priemerný beta koeficient vybraných podnikov bol v roku 2012, čo zodpovedá vývoju daného odvetvia.

Tabuľka 11
Beta koeficienty pre oceliarenský priemysel v USA, Európe a vybraných podnikoch SR

Beta koeficient			
Rok	**USA**	**Európa**	**vlastný accounting model**
2012	1,68	1,41	0,95
2013	1,65	1,46	0,94
2014	1,19	1,66	0,94
2015	1,31	1,65	0,94
2016	1,43	1,52	

Zdroj: www.damodaran.com

Porovnaním vypočítaných beta koeficientov s koeficientmi publikovanými prof. Damodaranom, možno konštatovať, že ich vývoj má opačnú tendenciu v porovnaní s beta koeficientmi pre Európu a podobný s vývojom v USA. Vypočítané beta koeficienty sú však podstatne nižšie, čoho dôvodom môže byť, že do vzorky boli zaradené najväčšie podniky oceliarskeho priemyslu SR.

4. Záver

Cieľom príspevku bolo testovanie vybraných finančných ukazovateľov vlastného accounting modelu za účelom stanovenia hodnoty beta koeficientu vybraných podnikov farmaceutického a oceliarskeho priemyslu SR a komparácia dosiahnutých výsledkov s verejne dostupnými hodnotami beta koeficientu. Výsledky predchádzajúceho prieskumu, z ktorého sme v príspevku vychádzali, preukazovali existenciu pozitívneho vzťahu medzi účtovnými premennými a výsledným beta koeficientom. Aplikáciou výsledného accounting modelu pre odvetvie priemyslu na vybraných pododvetviach priemyslu, ktorých vývoj v analyzovanom období bol odlišný, sme preukázali využiteľnosť daného modelu pre stanovenie beta koeficientov podnikov v odvetví priemyslu. Pri testovaní modelu sa preukázalo, že model je vhodný skôr pre väčšie podniky práve z dôvodu pozitívneho vplyvu veľkosti majetku na výslednú hodnotu beta koeficientu. Vypočítané hodnoty sme porovnali s hodnotami beta koeficientu uverejnenými na stránkach prof. Damodarana, ktoré sú najčastejšie využívané v ohodnocovacom procese a investičnom rozhodovaní. Zistené odchýlky naznačujú potrebu využitia modelov založených na účtovných premenných, aby bolo možné identifikovať špecifiká analyzovaného podniku v porovnaní s priemerným podnikom odvetvia. Tento prístup umožní identifikovať a kvantifikovať determinanty systematického rizika konkrétneho podnikateľského subjektu a zvýši objektivizáciu stanovenia jeho hodnoty vo vzťahu k priemerným hodnotám odvetvia.

Poznámka

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Analysis of business model of start-ups

Štefan Slávik

Abstract
Start-up is an attractive form of business that elicits a lot of expectations, but brings mostly disappointing. There is little knowledge about the internal working of start-ups. The topic of the research are business models of start-ups that are undergoing metamorphoses over the business and investment cycle and their level of development and functionality affect the business performance of start-up. New knowledge should contribute to greater efficiency of start-ups, mitigate their failure and particularly accelerate those ones who are the most capable.

Key words: *business model, start-up, development of business idea, financing cycle of start-up*
JEL Classification: *M10, G24*

1. Introduction

Start-ups are young, beginning, fast and dynamic growing companies, which are expected to be massively scalable with high return on invested funds in a relatively short time, so their business is usually based on innovations, improvement of high technologies and shaping their consumer applications. Start-ups are seeking to create new needs, explore an empty competitive space and capture a customer with an original product or service or captivate him/her with a convenient, fast and cheap access to a traditional product or service. Facilitation, simplification and getting pleasant of standard working and living duties and situations are in the background of simpler but also extremely demanding tasks with special hardware and software challenges which the start-ups deal with.

2. Mission and properties of start-up

Start-ups are innovative complement of medium and large enterprises, as they get down to topics that larger companies consider unattractive, risky and unimportant, or they are completely out of their field of view. Start-ups are few and simple business form that provides space for self-fulfilment, adventure thinking, creativity, informal working relationships, but also hard work and if successful, above average or exceptional reward.

Start-ups are also a source of jobs for young people and graduates who have decided to take their life plans into their own hands, they do not want to be regular employees and they see a tool in the business how to secure their livelihood through meeting the needs of other people.

Start-ups are expected to play a social role when creating jobs, an economic role, if they achieve highly efficiently valorise invested resources and an entrepreneurial and progressive role when satisfying unsaturated needs or improve the quality of life by creating, discovering and meeting the needs of entirely new ones. The path to fulfilling these roles is full of pitfalls, failures, returns, resumptions, losses, risks but also satisfaction, greater or lesser reward, recognition and sometimes has got a happy end.

Peter Thiel (2014, p. 10), co-founder of PayPal, does not perceive a start-up as clearly demarcated business entity. Start-up is for him mostly a community of people who came together to achieve a remarkable goal through extraordinary intellectual effort and unconventional corporate culture. Of particular characteristics of start-up by Peter Thiel, it can be concluded that a start-up is also a modern cultural and business phenomenon that is less

formal than a normal company, however not without rules. Coordinating and welding binder of start-up may be an unfettered individual self-realization.

Respected business matadors of Steve Blank and Bob Dorf describe a start-up more formally than Peter Thiel. They write that (2012, p. XVII) "The start-up is a temporary organization to find scalable, replicable and profitable business model." According to their findings (2012, p. XVIII), *a scalable start-up* is a job of traditional technology entrepreneurs. The base a company with a vision to change the world and their company will have sales worth millions if not billions of dollars.

Makers of canvas visualization in their latest work do not pay explicit definition of a start-up, but their characteristic of start-up entrepreneur says about internal situation in this business entity (Osterwalder, Pignieur, 2014, p. XVIII): "The start-up entrepreneur operates in other limit than the project manager of new business inside existing enterprise. He/she must bring a proof that ideas are functional at a limited budget too, to gain investor interest (if the idea develops), to risk money spent before finding the right customer value and business model, but on the other hand, he/she has got an advantage of fast and agile decision making and enjoy ownership motivation to achieve success." As mentioned, the start-up is placed in a constant effort to confirm its existence, it works in rather limited and dramatic circumstances, while it is expected to achieve a result, which is an acceptance of the product on the market and attractive returns for investor.

Eric Ries (2011, p. 27), who was introduced to the world of business with the concept of a lean start-up, defines: "Start-up is a human institution designed to create a new product or service under conditions of extreme uncertainty." He choose the concept of institution because start-up hires creative people, coordinates their activities and shapes a corporate culture that delivers results. A contribution of Eric Ries to defining start-up resides mostly in adding unpredictable context that differs start-up from normal company. It may therefore be indirectly inferred that the start-up is the creator of the future, the creator of new needs that it rather creates business opportunities than finds them.

Meaning of start-ups for social well-being is so obvious that this phenomenon and its trend has to be reacted by public, especially the state economic and financial policy. The concept of the Slovak Government (Koncepcia …, 2015) defines start-up for the purpose to obtain selected support tools. In the document, start-up means a capital company based in Slovakia, 36 months and more have not expired from its establishment, it has been originated for the purpose to design an innovative product or service, it is a micro, small and medium enterprise and the majority of the voting rights belong natural persons who are its founders. Innovativeness of product or service will be assessed according to whether individually created products and services according to customer specifications there is not capable to produce an existing company on the common European market with the same or very similar method and in the same or a very similar quality.

Those allegations and definitions may be summarized in a few keywords. Start-up operates in an environment of insecurity and uncertainty, but at the same time it tries to find some concrete and useful solutions, it grows dynamically and tentatively boundlessly, it employs people giving up certainties of regular employment at the price of an exciting personal growth and achievement of concrete results, it can or may not work on the basis of technology and ceases to be start-up after overcoming certain limits (acquisition, revenues, profit, number of employees, etc.). Start-up against a standard SME distinguishes (www.podnikajte.sk) a unique and innovative product with the potential of a dynamic and global growth with an assumption for the revenue of tens of millions of euros.

3. Business idea

Entrepreneur transforms an idea into business when the idea after many changes serves to meet the needs of the customer who is willing for a product that is a carrier of the usefulness to pay. In the payment there is hidden a customer satisfaction and profit of businessman. The very origin of the idea, its transformation into a product or service, its acceptance by customer, however, is a complicated process, it has a lot of blind alleys, inefficient branches, returns and twists, failures culminated by lost resources, frustrated entrepreneurs, disappointed investors, irritated customers, more skilled competitors, sometimes mild success and rarely entrepreneurial performance of a decade. In the latter case, the entrepreneur is the bearer of social progress, he/she changes lifestyles, makes the values accessible that were only available to the highest levels of the social hierarchy and experts, for the broad masses of customers.

Good business ideas are based on commercial opportunities consisting of market needs. *Opportunities can be created* through radical or incremental product or market innovations, while there is little or no evidence of market needs. *Opportunities can also be spotted* in finding unmet customer needs. Both approaches are successful only if they are linked to customer needs. The process of making ideas has got three stages (Burns, 2014, p. 52):

1. Entrepreneur is exposed to the greatest possible number of diverse and different ideas, influences and people and is aware of them.
2. Entrepreneur recognizes market opportunities at observing the daily life of customers and asks them within their needs can be better satisfied better or otherwise. He/she doubts and makes experiments. He/she is challenging the status quo and asks if things cannot be done differently.
3. He/she formulates and reformulates business idea to become of it a viable business model. Not all the products work since its inception and not all the ideas are immediately commercially viable and therefore entrepreneur makes experiments to improve a product or service and business model.

Business idea and personality of entrepreneur are two inseparable phenomena. However, an entrepreneur must demonstrate in addition of creativity also perseverance and resourcefulness at the implementation of the business idea. It means, an idea has to be articulated not only, but also it has to be designed and then sold as a product. Especially a frequent and mistaken impression emerges in the sale phase that the superior product will sell itself. Just a moment of formulation of the idea as an unforgettable and unique moment of creation obscures the fact that even seemingly routine processes e. g. execution of production and sales require adaptation, innovation, resourcefulness and perseverance at finding the way to the customer. The business idea is often presented as the result of chance and happy moment even by businessmen, however, it obscures the previous period of preparation, trials and errors, whereby there are plenty of methods which may encourage, make more transparent, accelerate and increase quality of idea making process. There are ideas that are the result of exceptional mindfulness, observation skills and sensitivity to external stimuli, they occur objectively without the assistance of the observer and there are the ideas that result from subjective active creativity. Production of business ideas may rise when the entrepreneur knows and purposefully uses its propensity to quality observation or original creation. Business idea usually finds the possibilities of implementation and develops its potential on base of business model, which is a test of business idea.

4. The business model

From the theory and practice a range of business models is known, to be more precise spoken they are visualizations of business models that have different structure, but their common purpose is to depict the functioning of the company, thus functioning start-up too as provisionally an incomplete company which progressively operationalizes all blocks of its business model according to the selected visualization before it becomes a standard enterprise. Effective business model provides to a customer a value that the customer accepts and pays for it, on the other hand, a company covers all its costs on the base of sales and earns a profit. The business model contains and displays all the relevant sources, processes and conditions that connect hypothesis (cause and consequence): *If a company offers an acceptable value to a customer, thus it earns an adequate profit.* Just in the detail and the content of displays of the connection various visualizations are different from one another.

Alan Afuah offers one of the less complex visualizations (2014, p. 5). The content of his model are customer value proposition, resources and processes, market segments, growth and revenue model. An essential contribution of this concept is that the profit potential of the business model is evaluated by a set of criteria VARIM (Afuah, 2014, p. 25) (Value, Adaptability, Rareness, Imitability, Monetization).

Oliver Gassmann et al. put together a simple visualization, which is better suited as a tool for workshops than for the comprehensive systematization. It includes four dimensions, which are arranged in a triangle (Gassmann, 2014, p. 7):

1. Customer (centre of gravity) - Who is your target customer (segment)?
2. Value Proposition (peak C) - What do you offer to the customers?
3. Value Chain (peak B) - How is the value proposition created?
4. Profitable mechanism (peak A) - Why does the business model generate profit?

The purpose of the scheme is to make a clear understanding of customer segments, value proposition, value chain and the creation of profit and also provide a basis for future innovations. Authors call the scheme the magic triangle, because the change in the one peak automatically requires adjustments in the other two peaks.

The most widespread visualization of business model is the canvas concept of authors A. Osterwalder and Y. Pigneur (2009, pp. 15 – 44). Their nine block model is widely quoted and has been sufficiently described and applied in previous research, and therefore it will not be described in detail and explained (Fig. 1).

Figure 1
Scheme of visualization of the canvas business model

<table>
<tr><td rowspan="2">Key partners</td><td>Key activities</td><td rowspan="2">Customer value proposition</td><td>Customer relationships</td><td rowspan="2">Customer segments</td></tr>
<tr><td>Key resources</td><td>Distribution channels</td></tr>
<tr><td colspan="2">Cost structure</td><td colspan="3">Revenue streams</td></tr>
</table>

Described business models stimulate the question of why, on what grounds can any visualization be selected? The model of A. Afuah appears to be quite simple and simplistic, but a set of VARIM criteria is also applicable to the other, more complex model. The visualization of O. Gassmann et al. is a good choice for a quick description of a business model in essential features. It is verified by plenty of applications. However, if it is necessary similarly concise model with a larger but limited level of detail, the canvas visualization can be considered the best choice.

Blank and Dorf confirm the meaning and usefulness of the business model when they write (2012, pp. 8 – 18) "... the sole aim of start-up is to find a repeatable and scalable business model." While existing firms pursue the business model, thus start-ups seek it. This difference is, according to Steve Blank (2013), a core of lean method, which focuses on three principles:

1. Instead of a complicated business plan some hypothesis are summed up to the concept of *the canvas business model*.
2. An entrepreneur goes out in the field, pursues *the development of customer* and tests hypotheses. After taking into account of customer feedback, a revision of assumptions and making small (iterations) or more essential adaptations (pivots) follow.
3. Lean start-up practices *agile development*, hence iterative and incremental development of a product in line with the development of the customer. Start-up creates *a minimum viable product* that has a few main characteristics only and serves to obtain feedback from customers.

Lean start-up is a business concept that is contrary to the traditional concept of a company. Everything is simplified and accelerated. Failures are a natural part of business activity. The role of the plans is significantly suppressed and start-up is developing along the line of improving the functionality of the business model.

5. Objectives and methods of research, research sample

It is assumed that a key condition of successful start-up and its transformation into an enterprise that earns is robust (resistant) and viable business model. The business model is in this case a tool and means to implement the business idea. The object of the research is to examining how a business model clarifies, fulfils and specifies itself at every stage of the start-up cycle progress. The main research question is, how does a business model develop, what is a content of start-up business model in particular stages of the investment cycle and of the cycle of business idea development? The working hypothesis is that the quality (developed) business model is fundamental and central assumption for the success of start-up. The hypothesis will confirm a relationship between the level (development, quality) of business model and performance of start-up.

Development phases of a start-up are recorded on *the scale of business idea development (business cycle)* (Slávik, 2015, p. 51): 1 - idea/concept/research, 2 - product development, 3 - prototype of product/testing, 4 - the first income 5 - rising incomes and on *the scale of start-up financing cycle (investment cycle)*: 1 – pre-starting capital (angel stage, idea, no product), 2 - starting capital (seed phase, work on product, made/realized prototype, detecting interest in the product), 3 - capital for early development and further growth (series A/B phase, 1st, 2nd round, investment in a company that has already customers, it generates revenues), 4 – venture/development capital (3rd round, mezzanine capital), 5 - IPO (public market) . The level or *degree of development* (functionality, perfection) of *investigated attribute of start-up* is evaluated according to a scale 1 - none, 2 - the first concept, 3 - a comprehensive concept, 4 - experiments with execution, 5 - complete, or almost fully functionality, unless it is quoted otherwise.

The research was conducted on a sample of 72 start-ups. Each start-up has been studied by a member of the research team who personally in a managed interview usually with a leading person recorded answers to closed and open questions in the questionnaire.

6. Research results

Research has documented the transformations of the business model in the cycle of development of business idea and the investment cycle. Imperfection, incompleteness or malfunction of the business model is considered to be the main reason for failure of start-up. Research should show how the start-up depicted by blocks of the business model visualization and by the relationships between blocks evolves and transforms. It is important to know what is a cohesion of the blocks of the business model, what is a development degree of business model blocks in single phases of the business and investment cycle and how does a development degree of individual blocks impact a business performance of start-up (number of users, number of customers, sales). The question is whether some detected facts should be considered as positive or normative and accordingly also interpreted.

Correlations/correlation coefficients between the blocks of the business model (Slávik, 2016, p. 32) are relatively strong, with the exception of key partners. This means that the blocks are linked, that a model is compact, that the change of one block will be reflected in other blocks too. The business model according to the correlation matrix is a set of blocks that constitute a whole. According to previous findings about the development degree of blocks (Slávik, 2016, p. 27), it is believed that a value for the customer is the initiative block.

Business model with advancing phases of business idea development increases a degree of its development, but of Table 1 there is obvious that during the first stage the model is already quite developed (it is near to the self-contained concept) and the progress to the final phase represents less than 1,5 evaluation point (slightly above some realization trials), respectively **a progress between the phase one and the phase five is only 33.3%**, if 4.24 is 100 %, even in the phase 2 there is a slight reduction of development degree of the model and the increment between phases 4 and 5 is minimal. According to the number of start-ups, however, priority phases for the research are phases 3, 4 and 5. In the first two phases there is 15.3% of the sample only.

Table 1
Average development degree of a business model in single phases of business idea development

Phase of business idea development	1	2	3	4	5
Degree of business model development	2,83	2,58	3,32	4,16	4,24
Number of start-ups (total 72)	3	8	**20**	**23**	**18**
Percentage of start-ups (%)	4,16	11,11	27,77	32,85	25,0

The business model with advancing phases of investment cycle funding increases a degree of its development. As in the previous case, but now of Table 2 there is obvious that the business model is in the first phase relatively developed (slightly above self-contained concept) and the progress to the final phase is less than 1.5 evaluation point again, respectively **the progress between the phases one and five is 30.5 %**, if 4.63 is 100 %. The high degree of development from the first phase probably causes lower increments in subsequent phases, e.g. an increment between the phases 4 and 5 is minimal. According the number of start-ups, however, priority phases for the research are phases 2 and 3. In the first, fourth and fifth stage there is 18 % of the sample only. The centre of gravity of the sample is displaced approximately by one phase to the start of the cycle compared to the business idea cycle.

Table 2
Average development degree of a business model in single phases of investment cycle

Phase of start-up investment cycle	1	2	3	4	5
Degree of business model development	3,22	3,43	4,12	4,49	4,63
Number of start-ups (total 72)	9	**33**	**26**	3	1
Percentage of start-ups (%)	12,5	45,83	36,11	4,16	1,38

Developmental trends of business model blocks (Table 3) are a decrease of evaluation in the second stage in addition to relationships with customers, then mostly growing trend in next stages, but in the last phase 5 there are recorded small declines (it is probably manifestation of insecurity that development is approaching the end and feedback from reality corrects evaluation) or small increments in comparison of the previous phase only. The results (Table 4) are similar as before. Customer value dominates and revenue streams lag.

Table 3
Structure of business model in business idea cycle

Development degree of business model blocks	Phase of business idea development				
	1	2	**3**	**4**	**5**
Customer value proposition	3,00	**3,00**	**3,78**	**4,57**	**4,61**
Customer segments	**3,55**	2,96	3,55	4,38	4,15
Distribution channels	3,00	**2,13**	3,15	3,96	4,17
Customer relationships	**1,67**	2,75	3,40	4,30	4,39
Key processes	3,00	2,63	3,40	4,09	4,33
Key resources	3,00	2,75	3,45	4,35	4,33
Key partners	3,33	2,5	3,40	**3,65**	**3,72**
Revenue streams	2,20	**1,85**	**2,31**	**3,52**	**4,11**
Cost structure	2,67	2,63	3,45	**4,61**	4,39

Table 4
Structure of business model in investment cycle

Development degree of business model blocks	Phase of investment cycle				
	1	**2**	**3**	4	5
Customer value proposition	**3,67**	**3,86**	**4,46**	**5,00**	5,00
Customer segments	**3,67**	3,74	4,10	4,33	4,67
Distribution channels	3,56	2,97	4,04	**5,00**	5,00
Customer relationships	3,00	3,64	4,15	4,33	5,00
Key processes	3,33	3,48	4,12	4,33	5,00
Key resources	3,56	3,64	4,15	4,33	5,00
Key partners	3,22	3,27	3,73	4,33	**2,00**
Revenue streams	**2,38**	**2,62**	**3,71**	4,47	5,00
Cost structure	2,56	3,67	4,65	4,33	5,00

Of the data in the Table 3 and 4 there is evident that customer value is most of all worked up, revenue streams are among the least developed. Discrepancy is apparent, it fails to

adequately monetize the value offered to the customer. It may be several reasons. Offered value is attractive, but the customer does not want to pay, because it is not created a suitable model of revenues/payments, or the value is attractive, but the customer does not think so, and therefore the value is attractive only seemingly, or the value is attractive, but gets to the customer the wrong way e.g. too soon or too late in an inappropriate location, a distribution channel does not work, customers are few/many and the price is too low (the value does not earn) or too high (value discourages). Eye-catching knowledge of tabular data is that start-ups are trying to move forward autonomously and give lower priority to building partnerships.

Comprehensive picture about the transformations of the business model and its performance gives phase 3 (Table 5), which is relevant penetration of the largest numbers of start-ups in both kinds of cycles. The values of examined parameters in the investment cycle are apparently and much higher than in the cycle of business idea. Investors obviously force start-up businessmen to higher performance, respectively they induce an environment with high expectations. Sales in the idea business cycle record a decline from phase 1 to phase 3. Between phase 1 and 2 there are tiny drops of other monitored parameters.

Table 5
Business performance of start-up in the cycle of business idea and investment

Performance indicators of start-up	Phase of business idea development				
	Cycle of start-up investment				
	1	2	**3**	**4**	**5**
	1	**2**	**3**	4	5
Number of users – business idea	2,00	1,75	2,80	3,52	3,94
Number of users – investment cycle	2,78	2,73	3,58	5,00	5,00
Number of paying users - business idea	1,67	1,25	1,65	3,09	3,78
Number of paying users - investment cycle	1,56	2,18	3,15	4,67	5,00
Sales - business idea	2,33	*1,63*	*1,25*	2,87	3,78
Sales - investment cycle	1,67	2,10	3,12	3,00	5,00

7. Discussion

It seems that start-up businessmen consider their business models from the first phase of the development as a highly developed, which may not be the whole truth, and then in the next phases of development small gains in improving occur only or they recognizes a reality with arrival into the higher phases of the business and investment cycle and they are cautious in their assessments. Thus, at the beginning of the cycle start-up businessmen are too optimistic and overstate/exaggerate/magnify assessment of reality, or a reality seems to them like this simply and they become realistic at the end of the cycle. It is believed that a lacking real performance, which is paying customers and sales especially, is an effective criterion of real looking at the world.

What has a business model got parameters, the extent of development, what has it got specific attributes in single phases of business idea development and the phases of investment cycle? Model usually records positive development, individual blocks are continuously improved and differences in the degree of their development between single phases of the business idea and investment cycle are visible even if they are not too large (max. 1.5 evaluation point out of five points along all the cycle). On the base of the cycle of business idea development there are relevant phases 3, 4, 5 with the number of start-ups 20, 23, 18. The most developed is customer value, followed by approximately well-developed blocks of customer

segments, customer relationships, processes and resources, cost structure, less developed blocks are distribution channels and partners, the least developed block is sales. It can be concluded that start-ups know what does the customer need, they know the customer, if they reach him/her so they can serve him/her. Then resources and processes are slightly less developed, but start-ups have a problem to approach to a customer and cash in on him/her, in addition, they do not pay an adequate attention to connect some partnerships. In the third phase, the range between the least and most developed block is from 2.31 to 3.78 (39.9 %), in the fourth phase, the range is from 3.52 to 4.57 (23 %) and in the fifth phase is the range 3.72 - 4.61 (19.3 %).

On the base of investment cycle there are relevant phases 2 and 3 with the number of start-ups 33 and 26. Previous tendency of blocks aggregation according to their degree of maturity is also characterized with small deviations for the transformation of the business model in the investment cycle. In the second phase there is the range between the less and the most developed block from 2.82 to 3.86 (27 %) and in the third phase there is the range from 2.71 to 4.46 (39.3 %). In this case, however, the span between the most and least developed block is not diminished, but widened.

8. Conclusion

Start-ups are significantly committed and focused on customer value, they perceive quite markedly the customer himself/herself and have processes that deliver results. Less effective/functional there are customer relations, cost structure and resources. Significantly weaker there are distribution channels and key partners have minimum impact/importance. Start-ups little work with some partners. It is a significant finding because they are very small company with limited resources, have limited volume, variety and quality of their own scarce resources. Key partners are an essential complement to the limited tangible and intangible resources. While start-ups know the value for the customer and the customer himself, but they are unable to approach him well enough because of less functional distribution channels and cannot attach him because of less functional customer relationship. Customer value and customer itself are an entrance into prosperity, but the key of it there are distribution channels and customer relations.

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Herausforderungen an das Finanzmanagement bei der Post-Merger-Integration - besondere Berücksichtigung der Transaktion vom Tier1 zur Tochtergesellschaft eines OEM
Challenges for financial management in post-merger integration - special consideration of the transaction from Tier1 to the subsidiary of an OEM

Martin Barth, Peter Markovič

Abstract
The article provides a compressed overview of the state of the scientific literature in relation to the investigative problematic. Starting from a brief explanation of the overall context as well as the problem situation, a more precise definition of the data basis and an exact delimitation of the object of investigation follows. Subsequently the specifics of a vertical post-merger integration (PMI) from tier 1 to the subsidiary of an "original equipment manufacturer" (OEM) are explained using a model. From this, financial challenges are presented in a structured manner and are also transferred to a model. In the following, current research discourses will be presented and integrated into the investigation topics. In the end, essential, theoretically sound recommendations for action are derived and approaches for further research are defined.

Keywords*: Financial Management, Post-Merger-Integration, Reputation, vertical Integration*
JEL classification*: D 92, G 34, L 22*

1. Einleitung

Im vorgelegten Artikel soll der aktuelle Stand der wissenschaftlichen Literatur für Post-Merger-Integrationsprozesse bei der Rollentransformation von einem Tier-1-Lieferanten zu einer Tochtergesellschaft eines „Original Equipment Manufacturer“ (OEM) im Premiumautomobilbausegment zusammengefasst werden. Dabei sollen spezifische Herausforderungen des Finanzmanagements bei der PMI im Vordergrund stehen.

M&A gehören sein jeher zu den Instrumenten der letzten Chance, wenn klassische Sparmaßnahmen ihre Wirkung nicht zeigen oder wenn Outsourcing zur großen Belastung für den Markenimage sein sollten. Die Erfolgsmessung von M&A kann nicht nur anhand von Wertermittlungen und Wertänderungen der beteiligten Unternehmen durchgeführt werden, man sollte auch die Nachhaltigkeit einer solchen Transaktion näher verfolgen. Der hohe Innovationsdruck, welches die Automobilindustrie in den letzten Jahren erlebt, stabilisiert die Anzahl der Automobilhersteller, führt zusammen Marken, bei der Lösung von ökologischen Fragen und stellt in den Vordergrund die Wünsche und Erwartungen von Kunden. Die elementare Frage ist nicht „Was, wie und für wem produziert werden soll?“ sondern „Wo befindet sich der Kunde in der gesamte Wertschöpfungskette?“ Dynamisierung von Prozessen und Redefinition des erwarteten Endergebnisses führt zum Entstehen neuer Strukturen, die im M&A-Prozess strengeren Forderungen entsprechen müssen. Somit bekommt auf die Post-Merger-Integration eine weitere Funktion, auf welche wir uns konzentrieren sollten.

1. Stand der gelösten Problematik

Die Automobilindustrie in Europa ist geprägt von einer stark volatilen Umgebung. Die Modellzyklen haben sich in der letzten Dekade mehr als halbiert. Innovationspotenziale müssen

immer schneller generiert und eingesetzt werden. (Gastrow, 2012) Diese komplexen und dynamischen Prozesse stellen die Branche vor extreme Herausforderungen. (Raubold, 2011)

Die Reaktion und Einstellung auf diese Volatilität der Umweltparameter kann aber nicht durch die OEM allein realisiert werden, denn die Zulieferer, eines in Deutschland hergestellten Fahrzeuges, erbringen rund 75 Prozent der Wertschöpfung.(Rennhak, 2009) Tier-1-Lieferanten sind die direkt an den OEM liefernden Unternehmen. Diese müssen eng in den Produktentwicklungsprozess einbezogen sein, um zweckmäßige Lösungskonzepte erarbeiten und anbieten zu können. Im Rahmen der sehr komplexen Zuliefererlandschaft kommt es entgegen dem Trend des „Outsourcings“ regelmäßig zur Übernahme hochspezialisierter Zulieferer. (Tang, Qian, 2008)

Das Nutzen von Synergieeffekten steht im Mittelpunkt bei „Merger & Acquisitions“-Aktivitäten, dabei „wird der Erfolg einer Fusion letztlich an der Höhe der Wertgenerierung“ gemessen. (Picot, Bartels, 2005; Srbinovska, 2016) Eine Vielzahl von Studien verweisen allerdings darauf, dass die mit dem Zusammenschluss angestrebten Ziele, oft nicht erreicht werden. (Frantz, 2014; Gomes et al., 2013; Gleibs et. al., 2008; Grube et al., 2002) Bei Investitionen in mehrstelliger Millionenhöhe ist dieser Zustand katastrophal für die gesamte Branche.

Im Spannungsfeld dieser Problematik kommt der Post-Merger-Integration besondere Bedeutung zu. Diese ist neben der strategischen Analyse- und Konzeptionsphase und der Transaktionsphase die dritte Stufe einer idealtypischen Akquisition. (Jansen, 2016) Diese PMI-Prozesse müssen in Zukunft zielführender vorangebracht werden, um Skalierungspotenziale für die Automobilindustrie und damit auch für die Mitarbeiter dieser Branche nutzbar machen zu können. (Trivedi, 2014) Dafür ist ein tiefes Verständnis für den Lieferanten / die Tochtergesellschaft und für den OEM gleichermaßen relevant.

Bei einer Übernahme ist die Entstehung einer rechtlich selbstständigen Einheit als Tochtergesellschaft nicht zwangsläufig gegeben. Denkbar ist auch eine komplette Integration in das übernehmende Unternehmen. Der Vorteil bei der Gründung einer Tochtergesellschaft liegt allerdings in der Minimierung des ökonomischen Risikos für den Akquisitor. Der Nachteil einer rechtlichen Selbständigkeit der übernommenen Einheit ist hauptsächlich in der jeweilig dualen Besetzung zentraler nichtwertschöpfender Tätigkeitsfelder gegeben. Synergieeffekte von Abteilungen wie dem Rechnungswesen, dem Einkauf oder zentraler Stabsstellen sind somit kaum realisierbar. In dieser Untersuchung sollen spezifische Herausforderungen des Finanzmanagements einer Unternehmung im Post-Merger-Integrationsprozess untersucht werden. Ziel ist es dabei spezifische finanzwirtschaftliche Problemfelder zu definieren um wissenschaftlich fundierte Handlungsempfehlungen zum Umgang mit diesen ableiten zu können.

2. Forschungsdesign

Das Leitmotiv dieser forscherischen Arbeit im komprimierten Überblick zur Problematik Post-Merger-Integration, im speziellen Fachgebiet, aus dem Bereich Automotive. Dabei wurde die Literaturrecherche nach spezifischen Aspekten durchgeführt. Um einen möglichst aktuellen Überblick der publizierten Literatur geben zu können, wurden ausschließlich Journals, Reviewartikel, Hochschulschriften und weitere Beiträge der letzten 10 Jahre betrachtet. Monographien und Sammelbände hingegen wurden ohne eine zeitliche Einschränkung in die Untersuchung einbezogen. Es wird davon ausgegangen, dass das bekannte Wissen von veröffentlichten Erkenntnissen vor dem Jahr 2007 in diesen Werken bereits hinreichend berücksichtigt wurde.

Zur Präzisierung der Literaturrecherche auf die eigentliche Untersuchungsthematik wurden bestimmte Strömungen der Post-Merger-Integrationsforschung nur am Rande berücksichtigt. Die Thematiken der IT-PMI, der Einfluss der PMI auf den Aktienkurs, die PMI „cross-border

Forschung“ sowie PMI-Prozesse von Ländern oder Unionen wurden nur dann berücksichtigt, wenn sie einen signifikanten Mehrwert oder eine Verdeutlichung der Abgrenzung zur Untersuchungsthematik beitragen.

Unter Berücksichtigung dieser Aspekte konnten 425 Quellen mit thematischem Bezug identifiziert werden. Diese setzen sich aus 286 Journals und Reviewartikel, 66 Monographien, 30 Sammel- / Tagungsbänden, 16 Hochschulschriften, 14 Internetdokumenten und 15 anderen Beiträgen zusammen.

Anschließend erfolgte eine Priorisierung in 3 Kategorien. Für diese Einteilung ist die Relevanz der gefundenen Quellen für die Untersuchungsthematik ausschlaggebendes Kriterium. Als „Priorität1“ wurden die Veröffentlichungen mit sehr hohem Themenbezug und sehr hoher Relevanz gekennzeichnet. Die Quellen der „Priorität2“ haben sequenziellen Themenbezug und ermöglichen eine Präzisierung sowie die Ausarbeitung einer breiten Forschungsbasis. Als Quellen der „Priorität3“ wurden Publikationen eingeordnet, welche zu einer Ergänzung von Aspekten der Forschungsthematik beitragen. Der aktuelle Stand der Literatur wird ausschließlich mittels identifizierter „Priorität1“-Quellen zusammengefasst.

Prinzipiell kann eine Tochtergesellschaft durch Übernahme, Neugründung oder durch Beteiligungen entstehen. Der Schwerpunkt wird auf finanzwirtschaftlich bedeutende Aspekte bei der vertikalen Post-Merger-Integration eines Tier1 nach einer Übernahme gelegt werden. Dabei erfolgt eine Fokussierung auf den Betrachtungsgegenstand der PMI nach der Gründung einer OEM-Tochtergesellschaft. Die Anlaufzeit einer übernommenen Einheit ist in der Regel wesentlich kürzer als bei einer Neugründung, da sowohl die technischen als auch die personellen Voraussetzungen bereits bestehen. (Macharzina - Wolf, 2015)

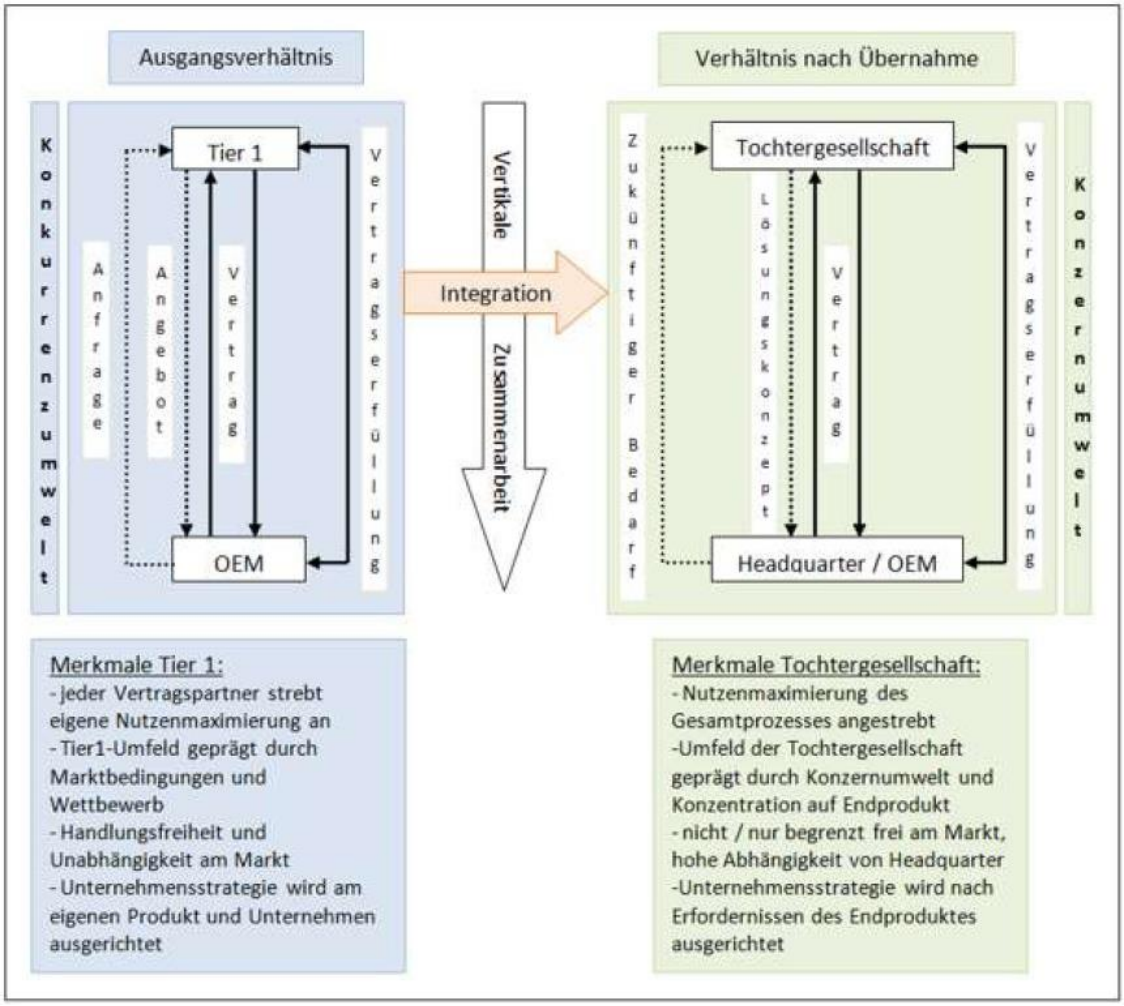
Dem Headquarter (HQ) wird in dieser Untersuchung die Rolle des Endproduktherstellers zugeteilt. Bezogen auf die Automobilindustrie ist unter der Headquarterunternehmung praktisch ein Automobilhersteller zu verstehen.

3. Forschungsergebnisse

Anschließend an die allgemeine Priorisierung, hinsichtlich des gesamtheitlichen Themenbezugs der einzelnen Quellen, erfolgte eine tiefgründige, sequenzielle Analyse der Datenbasis. Der Hauptschwerpunkt der PMI-Prozessforschung ist demnach die Untersuchung nach dem bestmöglichen und strategisch zielführenden Integrationsvorgehen. (Jackie, 2007)

Dies erfolgt hierbei hinsichtlich der Veränderung der Marktpositionierung von einem selbstständig agierenden Tier1-Lieferanten hin zu einer Tochtergesellschaft eines Endproduktherstellers und den daran anschließenden Interaktionsprozess zwischen Headquarter und Tochtergesellschaft. Dieser komplexe Zusammenhang wurde zur Generierung eines bestmöglichen Überblicks in einem Modell (siehe Abbildung 1) umfassend dargestellt.

Abbildung 1
Interaktionsmodell zwischen Tier1/Tochtergesellschaft und dem OEM vor/nach der Übernahme



Quelle: eigene Darstellung.

In den folgenden Abschnitten wird das Ausgangsverhältnis, der Übergangsprozess sowie die Spezifika der Beziehung nach einer Übernahme nacheinander charakterisiert. Im Anschluss daran schließt sich eine tiefgründige Analyse finanzwirtschaftlicher Besonderheiten im PMI-Prozess an.

Im *Ausgangsverhältnis* ist der Tier1 frei und unabhängig am Markt sowie unter Marktbedingungen tätig. Bei der Vergabe eines, dem OEM eigenen Wertschöpfungsprozess vor- oder nachgelagerten, (Teil-) Leistungserstellungsprozesses werden im Regelfall Angebote verschiedener Lieferanten eingeholt. Diese Konkurrenzumwelt ist geprägt vom Wettbewerb zwischen Unternehmen mit gleichen beziehungsweise ähnlichen Produkt- und Leistungsportfolios. Wesentliche Auswahlkriterien seitens des Kunden sind unter anderem die erwartete Qualität und der angebotene Preis für die Erfüllung des Anfragegegenstandes. Nach Eingang der Angebote sollte eine Plausibilisierung dieser durchgeführt werden. Im Anschluss erfolgt die Lieferantenauswahl. Diese Entscheidung ist als Findungsprozess, welcher in beliebig vielen Iterationsschleifen zwischen den Lieferanten und dem Kundenunternehmen durchgeführt werden kann, zu verstehen. Erfolgt eine Einigung im Verhandlungsprozess, wird ein Vertrag geschlossen. Dieser regelt alle Rechte und Pflichten der Vertragsparteien und ist als bindendes Zusammenarbeitsdekret zu betrachten. Charakteristisch für diese Lieferant-Hersteller-Beziehung ist dabei das individuelle Streben beider Parteien nach

Nutzenmaximierung. Hierbei richtet der Tier1 seine Unternehmensstrategie nach den eigenen Produkten und Dienstleistungen aus. Der spezifisch einzelne Kunde wird dabei lediglich als ein Einflussparameter von vielen berücksichtigt.

M&A-Aktivitäten in der Automobilindustrie führen häufig zur Bildung neuer Tochtergesellschaften. Dieser Übernahmeprozess kann zum Zweck des Wissenstransfers, des Alleinzugriffes auf ein Unternehmen mit Zugang zu neuen Marktsegmenten sowie aufgrund von fehlenden Marktvergabekapazitäten erfolgen. (Bartelt, 2002) Meist werden diese Übernahmen, zum Zweck des direkten Zugriffs auf technologisches Know-how durchgeführt. (Zhang – Pearce, 2012) Diese vertikalen Integrationen beeinflussen den PMI-Prozess sehr stark, da sich die Marktpositionierung der übernommenen Unternehmung drastisch ändert.

Trotz der rechtlichen Selbstständigkeit sind Tochtergesellschaften nicht, beziehungsweise nur stark eingeschränkt am freien Markt tätig. Dieser Umstand führt zu einer starken Interdependenz vom Headquarter. Einerseits ist die Abhängigkeit der Tochtergesellschaft im Hinblick auf Auftragsvolumina, Kapazitätsauslastung bis hin zur Margengenerierung sehr hoch. Andererseits kann es aufgrund dessen zum Verlust der Wettbewerbsfähigkeit der Tochter am freien Markt kommen. Die Umgebung der Tochterunternehmung ist demnach nicht primär als Konkurrenzumwelt zu verstehen, vielmehr steht die Nutzenmaximierung des Gesamtkonzernprozesses im Vordergrund. Demnach ist das Umfeld durch die Parameter der Konzernumwelt geprägt, dabei erfolgt eine Konzentration auf das Endprodukt des OEM. Nach den Erfordernissen dessen wird auch die Unternehmensstrategie der Tochterunternehmung ausgerichtet, dabei sind in der Praxis strategische Rahmenvorgaben seitens der Zentrale (Top-Down Ansatz) üblich. Untersuchungen verdeutlichen, dass Käuferunternehmen bis zu 27% der übernommenen Unternehmung in den folgenden 3 Jahren verkaufen und weiterhin bis zu 19% der Anlagen dieser schließen. Allerdings zeigen sich Produktivitätssteigerungen nur bei den Übernahmen, bei denen Fertigungsprozesse integriert wurden und nicht bei denen, welche ganze Fertigungslinien verkauften oder stilllegten. (Maksimovic et al., 2011)

Die Herausforderungen an das Finanzmanagement sollen während der Phase der PMI untersucht werden. Die tatsächlichen Mittel Zu- und Abflüsse während der Transaktionsphase stehen somit nicht im Mittelpunkt dieser Untersuchung. Während der PMI ist primär die *Erhaltung der Liquidität* der neuen Tochtergesellschaft trotz umfassender, laufender Transformationen zu gewährleisten. (Perridon et al., 2017) Des Weiteren muss die zielführende Verschmelzung der beiden Finanzbereiche unter Aufrechterhaltung des operativen Unternehmensprozesses erfolgen. (Weber, 2007) Zur Näherung an den komplexen Betrachtungsgegenstand sollen zwei Sichtweisen der finanziellen Herausforderungen im PMI-Prozess unterschieden werden. Zum einen die „retrograde Perspektive“ und zum anderen die „prograde Perspektive“.

Die *„retrograde Perspektive“* umfasst all jene finanzwirtschaftlichen Herausforderungen zum Untersuchungsgegenstand welche aus zurückliegenden finanzwirtschaftlichen Prozessen, Entscheidungen und Situationen des Tier1 resultieren, allerdings im Rahmen der PMI zu beachten, zu steuern und zu klären sind. Erforderlich ist dabei die Prüfung, Änderung, Stornierung oder Aktualisierung von Verträgen, welche als Tier1-Unternehmung geschlossen wurden. Bei der retrograden Perspektive werden *„unternehmenszweckgebundene Prozesse“* und *„erweiterte Prozesse“* unterschieden.

Erstere beinhalten die finanzwirtschaftlichen Prozesse welche aus dem eigentlichen Zweck der Unternehmung resultieren. Diese sind unter anderen Leistungserstellungsverträge (Kundenaufträge), Garantieverträge, Gewährleistungsansprüche, Leiharbeitsverträge, Kooperationsverträge, Lieferantenrahmenvereinbarungen und Serviceverträge. Gerade Kooperationsverträge, strategische Allianzen oder Joint Venture können massiv durch eine Übernahme betroffen sein, da sich die Zielstellungen nach einer Transaktion, wie im Modell beschrieben, stark verändern können.

Zu den *„erweiterten Prozessen“* zählen bisher getroffene finanzwirtschaftliche Vereinbarungen die nicht direkt aus dem eigentlichen Zweck der Unternehmung resultieren. Zu diesen können beispielsweise geschlossene Sponsoring Verträge, Werbeverträge oder auch Vereinbarungen für soziales Engagement gehören.

Diese *Vertragsüberprüfungen* laufen jedoch keineswegs nur intern ab, auch Kundenunternehmen und Lieferanten analysieren die Bedeutung der Übernahme für ihre eigene strategische Planung. Ein umfassender Austauschprozess mit den Parteien sowie eine offene Kommunikation können sich positiv auf zukünftige Interaktionsprozesse mit diesen auswirken. Viele Informationen die im Rahmen der „retrograden Perspektive“ wichtig sind, wurden bereits in der Anbahnungsphase seitens des Käuferunternehmens abgefragt bzw. erhoben und stehen demnach bereits zur Verfügung. Die sequenzielle Aufschlüsselung der bisherigen Kapitalstruktur und Kapitalherkunft sowie der Verschuldungsgrad der Unternehmung sind ausschlaggebende Akquisitionsparameter. Ein Akquisitor sucht gezielt nach Unternehmen welche Synergiepotenziale bieten und einen niedrigen Verschuldungsgrad aufweisen. (Srbinoska, 2016; Koziol – Theis, 2011)

Die *„prograde Perspektive“* hingegen umfasst die finanziellen Aktivitäten die durch die PMI entstehen, beziehungsweise die finanziellen Handlungen die auf zukünftige Zielstellungen der Tochtergesellschaft und die Interaktion mit dem Headquarter ausgerichtet sind. Finanzwirtschaftlich von Bedeutung sind dabei unter anderem die Beachtung möglicher neuer Tarifverträge, der Abschluss neuer Arbeitsverträge, eventuell eine Rückzahlungsvereinbarung des Akquisitionspreises an den Headquarter, der Ablauf von internen und externen Revisionen nach Konzernvorgabe, zukünftige Investitionsvorhaben, die Integration des Rechnungswesens und des Controllings in Konzernumgebung, der Aufbau eines Financial Reporting an interne und externe Aufsichtsorgane, die Schaffung von informationstechnologischen Schnittstellen sowie eventuelle Gewinnabtretungsverträge. Weiterhin sind die direkten Aufwände durch die Umfirmierung zu beachten, hierzu zählen Aufwendungen für: neue Arbeitskleidung, das äußere Erscheinungsbild der Unternehmung, das Corporate Design des OEM sowie Aufwendung für Corporate Identity. Dabei spielt ebenfalls die Anpassung aller bisherigen Abläufe, in Bezug auf die Corporate Governance Vorgaben des neuen Eigentümers, eine wesentliche Rolle.

Diese äußerst komplexen Anforderungen müssen im Rahmen einer gezielten Finanzplanung berücksichtigt werden. Dabei ist sowohl eine zweckmäßige *Liquiditätsplanung* als auch eine zielgerichtete *Kapitalbedarfsplanung* kontinuierlich und aktiv durchzuführen.

Der Gesamtzusammenhang dieser finanzwirtschaftlichen Handlungsfelder einer Unternehmung während der Post-Merger-Integrationsphase wurde in der Abbildung 2 schematisch dargestellt.

Abbildung 2
Finanzwirtschaftliche Handlungsfelder einer Tochtergesellschaft während der PMI

Quelle: eigene Darstellung.

Eine Annäherung an den aktuellen Forschungsstand für diese Thematik erfolgte prozessual auf Grundlage des Interaktionsmodelles und finanzwissenschaftlich auf Basis der Modellierung der finanzwirtschaftlichen Herausforderungen einer Tochtergesellschaft während der PMI. Im Anschluss sollen aktuelle Forschungen analysiert und in den Themenzusammenhang eingebunden werden.

M&A-Aktivitäten gehören zu außerordentlichen finanztechnischen Aktivitäten und sind demnach von enormer Tragweite für die beteiligten Unternehmen. (Perridon et al., 2017) Das „Wertadditivitätstheorem" besagt, dass die isolierte Bewertung zweier Zahlungsströme addiert, denselben Kurs aufweist, wie die Bewertung des Gesamtzahlungsstroms. Interessant ist die Anwendung dieses Theorems auf eine Unternehmensübernahme. Demnach sind Übernahmen die auf reine Diversifikation ausgelegt sind nicht wertsteigernd. Nur diese Transaktionen die Synergieeffekte für den Leistungserstellungsprozess ermöglichen, steigern den Unternehmenswert. (Koziol – Theis, 2011) Für vertikale Integrationen, welche meist aus Synergieüberlegungen heraus durchgeführt werden, lassen sich demnach positive Wertentwicklungen vermuten. King et al. (2004) zeigen in ihrer Meta-Analyse, dass sich in den ersten drei Jahren nach einer Übernahme die finanziellen Positionen, sowohl des Akquisitors als auch der akquirierten Firma, nicht verbessern. Eine differenzierte Betrachtung dieser Aussage durch separate Untersuchung von vertikalen und horizontalen Übernahmen ist bei dieser Forschung allerdings ausstehend. Diese Lücke schließen Alhenawi und Krishnaswami (2015) mit ihrer Untersuchung des langfristigen Einflusses von Fusionen auf die Wertentwicklung von Unternehmen. Dabei fanden sie heraus, dass bei vertikalen Integrationen mit Synergiepotenzialen der Wert der Unternehmung jedes Jahr (fünf Jahre Betrachtungszeitraum) nach der Übernahme stetig gestiegen ist. Während Unternehmen bei Fusionen ohne erkennbare Synergien kontinuierlich Werteinbußen erlitten. Dabei empfehlen sie den Unternehmen nach dem Zusammenschluss einen fortlaufenden Technologie- und Innovationsaustausch. Dieser permeable Austausch fördert das Entstehen von positiven technologischen Effekten durch die Gewährleistung innovationsstarker Tochtergesellschaften. (Marin – Bell, 2010)

In der PMI-Phase hat der *Liquiditätssicherung* der Unternehmung besondere Beachtung zuzukommen. Langfristig steht dabei für das Management die Bewahrung des *finanziellen Gleichgewichts* an erster Stelle. Im Transformationsprozess ist besonderes die situative und die kurzfristige Liquiditätssicherung zu berücksichtigen. (Perridon et al., 2017) Es muss

gewährleistet werden, dass trotz enormer personeller, struktureller und prozessualer Veränderungen die jederzeitige Zahlungsfähigkeit des Unternehmens sichergestellt ist. In Change-Managementprozessen kommt der Liquidität ähnliche Bedeutung wie im Krisenfall zu, sie ist absoluter Erfolgsparameter. (Kansal – Chandani, 2014) Für die tägliche Kassendisposition können *Cash-Managementsysteme* Unterstützung bieten. Gerade bei der Übernahme eines Tier 1 und der Integration dieses Unternehmens in Konzernumgebung ist zu prüfen, ob ein konzerneigenes *„Netting"* des Cash-Managements vorhanden ist. Bei gegebener Systemstruktur empfiehlt sich, zur Reduktion des Illiquiditätsrisikos, eine schnellstmögliche EDV-gestützte Anbindung der neuen Tochtergesellschaft. Aufbauend auf dieser Vernetzung kann auch ein *Konzernclearing* vorteilhaft sein. Bei diesem findet ein finanzwirtschaftlicher Ausgleich von Liquiditätsdifferenzen zwischen der Zentrale und den Tochterunternehmungen statt. (Perridon et al., 2017)

Die Übergangsverhältnisse sollten seitens der verantwortlichen Konzernmitarbeiter in einem *langfristigen Strategieplanungs-* und *Realisationsprozess* berücksichtigt werden. (Kuckertz – Middelber, 2016) Kansal und Chandani (2014) stellen in ihrer Arbeit praktische Strategien zusammen, denen eine Unternehmung im PMI-Prozess folgen sollte. Sie definieren dabei sieben wesentliche Erfolgsparameter. Diese sind: eine klarer, strukturierter Integrationsplan, eine transparente und kommunizierte Vision, das Verständnis für die kulturellen Unterschiede der Unternehmen, die Einbeziehung aller beteiligten Mitarbeiter, die Fokussierung der Aktivitäten auf den Kundennutzen, die Restrukturierung der Organisation sowie eine, wenn notwendig, sozialverträgliche Schrumpfung von zukünftig nicht benötigten Leistungseinheiten. Diese Ergebnisse sind plausibel und bestechen durch ihre Einfachheit sowie durch ihre praktische Handhabbarkeit. Relativ zügig sollte die eigentliche Eingliederung der übernommenen Einheit geschehen. Die instabile Phase des Übergangs zur Tochtergesellschaft ist durch dramatische Veränderungsprozesse und ein hohes Unsicherheitsempfinden der Mitarbeiter geprägt und sollte deshalb möglichst schnell überwunden werden. (Macharzina – Wolf, 2015) Die finanzwirtschaftlichen Entscheidungen in der PMI müssen dabei hinsichtlich der *Kapitalaufbringung* und *Kapitalanlage* getroffen werden. Das kann im Rahmen der Einführung einer eigenständigen *Finanzplanung* erfolgen. (Perridon et al., 2017) Bei dieser sollte stets die strategische Gesamtplanung für die Tochterunternehmung Berücksichtigung finden. Die langfristige Planung der Tochter wird grundsätzlich meist von der Zentrale definiert (Topdown-Ansatz). Dieses Vorgehen scheint nachvollziehbar, denn während die Zielsetzungen eines Tier 1 weitestgehend auf den ökonomischen Erfolg der eigenen Unternehmung ausgerichtet sind, steht bei der Tochtergesellschaft in der Regel der *Beitrag zum Erfolg des Endproduktes der Zentrale* im Vordergrund. Somit müssen sich strategische Teilpläne für eine Tochterunternehmung auch aus dem zukünftigen Gesamtplan des Endproduktherstellers ableiten. Im Premiumautomobilbau liegt beispielsweise der produktspezifisch strategische Fokus auf ständiger Innovation, zunehmender Qualität und langfristiger Absatzsteigerung. (Dudenhöffer, 2014) Die im Rahmen der Strategieplanung definierten Anforderungen an die Tochtergesellschaft müssen vor allem im Übergangsprozess mit den gegebenen Voraussetzungen dieser abgeglichen werden. In diesen Vergleich sollten Parameter wie die derzeitigen Anlagekapazitäten, Personalbestände und Organisationsstrukturen einbezogen werden. Ist eine Differenz zwischen zukünftigen Anforderungsspektrum und derzeitigem Leistungsvermögen feststellbar, müssen Handlungsalternativen zur Beseitigung dieser erarbeitet werden. Während bei einer *Überdeckung* (z.B.: Anlagenkapazitätsüberdeckung) ein *Schrumpfungsprozess* (z.B. Liquidation von Anlagevermögen) eingeleitet werden kann, sollte bei *Unterdeckung eine Investitionsprogrammentscheidung* getroffen werden. (Perridon et al., 2017) Bei dieser muss, unter Berücksichtigung von Finanzierungsmöglichkeiten, eine *optimales Investitions- und Produktionsprogramm* erarbeitet werden. Dabei sollte seitens des Managements berücksichtigt

werden, dass diese Investitionen ein Unternehmen langfristig belasten. Das Management spielt demnach eine zentrale Rolle im Übergangsprozess. Bezogen auf das Management stellen Demirtas und Simsir (2016), bei der Wertentwicklungsanalyse von fusionierten Börsenunternehmen, jedoch fest, dass sich der Abgang des Vorstandes der Zielunternehmung positiv auf die langfristige finanzielle Leistungsfähigkeit auswirkt. Die Führungsfrage sollte deshalb schnellstmöglich und eindeutig nach der Übernahme geklärt werden.

Im Rahmen der Finanzplanung wir dabei das *Gesamtfinanzbudget* und die Kapitalbedarfsplanung für den Planungshorizont ermittelt. (Perridon et al., 2017) Dabei ist ein langfristiger Finanzplan auf der Grundlage einer *Standardplanung* (Vorgaberechnung) zu erarbeiten. In Bezug auf die PMI-Phase ist die Budgetbildung sehr diffizil, da aufgrund der komplexen Transformationsprozesse eine detaillierte Budgetplanung schwierig ist. Die finanziellen Restriktionen und Zielsetzungen sollten unter Berücksichtigung des Übergangsprozesses so bestimmt werden, dass ein Abwehrverhalten und eine Demotivation der neuen Konzernmitglieder vermieden wird. Eine *partizipative Bestimmung der Budgetgrößen* im PMI-Prozess könnte dieses Risikopotenzial voraussichtlich senken. Die Ableitung von Teilbudgets auf die einzelnen Verantwortungszentren (Budget Center) erfordert eine ständige Überprüfung der Organisationsstruktur.

Besonders laufende *Reorganisationsprozesse,* im Rahmen der Post-Merger-Integration, führen hierbei zu Problemen. Tochtergesellschaften sind in der Regel eigenständige Unternehmen. Vor allem bei der Übernahme eines Tier 1-Lieferanten haben sich über Jahre eigenständige Organisationsstrukturen entwickelt. Diese gewachsenen Strukturen können nicht sofort nach einer Übernahme angeglichen werden. Eine kulturelle und regulative Distanz zwischen HQ und Tochterunternehmen verbessert dabei sogar deren Beziehung. (Li – Jiang – Shen, 2016)

Allerdings sind im Rahmen der PMI *Umstrukturierungsprozesse* unumgänglich, (Patel – Michelin, 2009) da sich die Marktpositionierung sowie die Priorisierung der Unternehmung stark verändert (vgl. Abbildung 1). Die Tier 1-Unternehmung musste zur Auftragsgenerierung aktiv am Markt auf sich aufmerksam machen. Dafür waren ausgeprägte Marketingstrukturen im Unternehmen notwendig. Die Kontaktpflege und Betreuung von Großkunden erforderte weiterhin eine ausgeprägte Vertriebsstruktur. Hierbei sollen die komplexen Erfordernisse an die Angebotserarbeitung und die Kalkulation exemplarisch genannt werden, da aufgrund der Wettbewerbslage am freien Markt in der Industrie Angebotsumwandlungsraten von 15-25% üblich sind. Wird dieser so strukturiere Tier 1 nun Tochter eines Endproduktherstellers im vertikalen Verhältnis und hauptsächlich durch diesen ausgelastet, so ist kein umfangreiches Marketing für sein Leistungsportfolio erforderlich. Aufgrund der Auftragszuteilung seitens des HQ sind ebenfalls nur noch flache Vertriebsstrukturen notwendig. Weiterhin denkbar ist, zur Nutzung von Synergiepotenzialen, eine *Zentralisation* von ganzen Struktureinheiten beim HQ (z.B. Einkauf, Controlling). Während der Post-Merger-Integrationsphase ist demnach auch aufgrund von finanzwirtschaftlichen Erfordernissen eine *Anpassung der Organisations- und Prozessstrukturen* an neue Rahmenbedingung erforderlich. (Patel – Michelin, 2009) Eine ganzheitliche Anpassung von Strukturprozessen ist nur durch multidimensionale Vorgehensweisen möglich. Es müssen der Prozess der beabsichtigten Mehrwertgenerierung des Käufers, die prozessorientierte Integration des übernommenen Unternehmens, die individuellen Bedürfnisse der prozessbeteiligten Mitarbeiter sowie die externen Umweltparameter berücksichtigt werden. (Lucks – Meckl, 2015)

Eine *kontinuierliche Kontrolle*, der im Rahmen der Finanzplanung getroffenen Entscheidungen, ist zielführend durchzuführen. Aus diesen festgestellten Abweichungen beim fortlaufenden Soll-Ist-Vergleich müssen *ständige Planrevisionen* abgeleitet werden. Dieser Prozess erhöht die Planungsgenauigkeit zukünftiger Perioden.

4. Diskussion

Nach der Erläuterung der aktuellen wissenschaftlichen Forschungslandschaft, durch eine Annäherung über das Interaktionsmodell und die weitere Modellierung der finanzwirtschaftlichen Herausforderungen einer im PMI-Prozess befindlichen Unternehmung, werden die Hauptergebnisse nachfolgend zu Handlungsempfehlungen konkretisiert. Im Anschluss daran werden Potenziale für weitere Forschungsarbeiten aufgezeigt.

Verschiedene Forschungsstudien zeigen, dass sich vor allem die Nutzung von Synergiepotenzialen wertsteigernd auswirkt. (Srbinoska, 2016; Tarsalewska, 2015) Demnach sollten finanzwirtschaftliche, organisationale, prozessuale und personelle Entscheidungen auf die maximale *Ausnutzung von Synergien* ausgerichtet sein. Dieser Prozess kann durch einen *kontinuierlichen Technologie- und Innovationsaustausch* effizienzsteigernd unterstützt werden. Unternehmen sollten in der transformationellen PMI-Phase primär die *Liquiditätssicherung* gewährleisten. Sowohl die komplexen Finanzstrukturen der retrograden als auch der prograden Perspektive müssen im Rahmen des Transformationsprozesses berücksichtigt werden.

Die strategische Planung der Tochtergesellschaft muss aus der Gesamtplanung des Endproduktherstellers abgeleitet werden. Auf Grundlage dessen, muss eine *zielführende* Liquiditätsplanung und Investitionsplanung erarbeitet werden. Ein detaillierter Finanzplan unterstützt dabei die *Feststellung des Kapitalbedarfes*. Anschließend sollten *Handlungsalternativen* zur Deckung der Bedarfe entwickelt und bewertet werden. Darauffolgend müssen *konkrete Maßnahmenbündel als Realisationsvorgehensweisen* definiert werden.

Während der PMI-Phase ist eine *zügige Restrukturierung der Tochtergesellschaft*, im Hinblick auf Struktur- und Prozessanforderungen, angebracht. Erst im Anschluss sollte die strukturspezifische (Teil-) Budgetierung auf Basis eines *partizipativen Budgetfindungsprozesses* vollzogen werden.

Aus finanzwirtschaftlicher Sicht der Unternehmung ist weiterhin die *zielführende Integration der EDV-Prozesse* in die Konzernumgebung erfolgsversprechend. Im Sinne der Liquiditätssicherung sollte der Einsatz von *Cash-Managementsystemen* geprüft werden. Konzernspezifischer Abhängigkeit unterliegen dabei Effizienzpotenziale wie beispielsweise die Nutzung von *Konzernclearing-Systemen*.

Jegliche finanzwirtschaftlichen Prozesse sollten *aktiv gesteuert* und *kontinuierlich* auf ihre Zweckmäßigkeit hin *überprüft* werden. Daraus leitet sich eine ständige Planungsrevision, auf Grundlage festgestellter Abweichungen, ab. Ein finanzwirtschaftliches, organisationales, prozessuales, personalorientiertes und auf den jeweiligen PMI-Prozess zugeschnittenes *Change-Management* wirkt sich positiv auf Integrationserfolg und zukünftige Leistungsfähigkeit des Unternehmens aus. (Kansal – Chandani, 2014)

Bei der Analyse der Literatur fällt auf, dass finanzielle Bewertungen von Post-Merger-Prozessen fast ausschließlich anhand von fusionierten Börsenunternehmen untersucht wurden. (Di Giuli, 2007; Esmer, 2010) Ausstehend sind differenzierte Untersuchungen von außerbörslichen, vertikalen Integrationen auf mikroökonomischer und prozessorientierter Ebene. Weiterhin sollten die Parameter für die Erfolgsmessung dieser PMI-Prozesse nicht nur auf Kurswerte und Wertentwicklungen nach dem Shareholder-Value-Ansatz bezogen werden. Vielmehr gilt es ein Gesamtbewertungsspektrum zu entwickeln, welches den langfristigen Gesamtnutzen der Übernahme nach dem Stakeholder-Nutzen untersucht. Die Schwierigkeit liegt hierbei besonders auf der Variablenauswahl sowie auf der Operationalisierbarkeit dieser Einflussparameter.

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The Influence of Economic Process on Venture Capital Financing in the Visegrad Group (V4) Countries

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Abstract
Financial theory & practice have attended to possibilities of acquisition and managing of venture capital especially as one of the alternatives of small and medium-sized enterprises (SMEs) funding for a few years. Venture capital funding can be attractive for the enterprises especially within the period of financial crisis, which makes significantly difficult conditions to acquire capital for them by some standard forms of financing business such as debt regards to small and medium-sized enterprises (SMEs). We aim at analysis of venture capital funding in the Visegrad Four countries (Slovakia, Hungary, Poland and Czech Republic) in our contribution. We examine if the economic cycle would affect the volume of venture capital funding by means of regression analysis. We analyze some factors of under-utilization of this form of enterprises funding at the same time.

Keywords*: venture capital, financial crisis, Visegrad Group (V4) countries.*
JEL classification*: G 24, G 30, G 34.*

1. Introduction

Venture capital can be categorized to alternative sources of funding using sources of finance. There are many definitions of this type of capital from various authors. *Fetisovová et al.* (2012) relate that venture capital is *"the capital provided by venture capitalists in small and medium-sized enterprises (SMEs) that are deemed to have high growth potential and they take on the risk of financing the risky start-up of the purpose for equity-an ownership stake-in the enterprise they invest in."* European Private Equity and Venture Capital Association (EVCA) states venture capital like *"financial sources focus on investments to start-up enterprises, which have high potential, as well as the certain level of risk* (EVCA)."

We meet with different concept content of venture capital in foreign literature. *Srpová* and *Řehoř* (2010) shares that venture capital *"is concerned in private high potential enterprises funding by raising their basic capital. It is the partnership between entrepreneur and venture capitalist." Kleinschmidt* (2007) relates venture capital as the type of capital applied to raise the private enterprises funding within the certain period of time, whereby venture capital funding is also a part of providing a non-financial support for the enterprise. According to him, there are four characteristic attributes of venture capital such as collective investment fund, medium-term investment, orientation on growth companies and active investing. *Kislingerová* (2008) writes about *"financing of private business entities, who have high growth potential and they could play an important role in a country´ economy in the future." Nývltová* and *Režňáková* (2007) relate that venture capital is *"the capital invested in projects, which certainty of success is unknown nevertheless brings up high evaluation in best case scenario." Coyle* (2000) states that venture capital like an investment invested in private small and medium-sized enterprises to fund the seed, growth or maturity stage of enterprise. According to him, the risk of the capital is caused by following facts:

- the probability of the enterprise´s failure is high,
- the investment is not liquid even in the case of successful business. Because stocks of small private enterprises are sold very difficult and their prices are significantly lower than in the case of companies listed on exchange.

Based on definitions above we can conclude that venture capital is called risky not because of the level of risk it brings itself, but start-ups funding bearing higher risk than the other sources of finance.

1.1 The present condition of problem statement

Groh and *Liechtenstien* (2010) analyzed determinants of venture capital allocation in CEE countries. The authors examined the influence of 6 main determinations vie survey - country's economic activity, capital market, tax treatment, protection of property rights, social environment and enterprise activity. The results of research point out, that investors are satisfied with opportunities for entrepreneurs, problems of venture capital investments regard mainly to protection of creditor´s rights as well as low level of capital market´s development. *Soloma* (2013) went into influence of capital market´s development on venture capital financing in Poland. The author found out, that even if venture capital investments as a percentage of GDP is almost equal to others CEE countries, Poland is more attractive for investors as the other countries, because of high developed Warsaw Stock Exchange (approx. 40% value of initial public offer in Europe was in Warsaw in 2012). *Bedu* and *Montalban* (2014) examined the role of institutions supporting a development of venture capital in 18 countries of Europe. The result of study point to large correlation between the growth of capital market´s volume and growth of venture capital investment, which confirms author Soloma´s previous foundations. The foundations emphasize the importance of country regards to development of venture capital investments.

Grzegorczyk (2013) discusses about influence of crisis on venture capital funding. According to author, small and medium-sized enterprises can overcome the gap of financing mainly through venture capital funding. According to foundations, venture capital funding is at very low level in CEE countries compared to the other countries of the world. The problem is that the most of venture capital investments in these countries come from domestic investors, these countries are not able to attract the attention of foreign investors. It caused decline of venture capital funding mainly because of low belief and insufficient openness to foreign investors within the period of crisis. *Block* and *Sandner* (2009) examined the effect of financial crisis on venture capital funding as well. The results of study of the authors noted above point to the fact, that financial crisis causes decline of sources of finance´s volume which are provided to investors from venture capital funding mainly if there is a need of further funds for these enterprises. According to authors, the start-ups, which already acquired financial means and need more funds on development of the products, marketing and other activities, have lot of troubles in the process of additional capital acquisition. *DeVries* and *Block* (2011) examined the tendencies of enterprise´s venture capital association under the impression of various economic conditions. The goal of the research of the authors was to find out if the crisis from 2000 to 2001 and from 2008 to 2009 had influence on enterprise´s venture capital association. The results point to interesting facts – enterprises venture capital have lower tendency to associate their investments, in general these associations are smaller within the period of crises. These tendencies manifest mainly in later stage financing (developing venture capital) then in early stage financing. These facts are explained by the fact that venture capital enterprises have bigger problems to acquire additional volume of external sources of finance for starts-up within the period of crisis.

Based on the domestic and foreign literature search, the main goal of our contribution is to analyze, evaluate and appreciate venture capital funding in the Visegrad Four countries in relation to development of economic environment, where these enterprises operate in. In order to catch advancement of venture capital´s investments regards to influence of economic cycle, we analyze the relevant framework for the decade 2005 – 2015, whereas there were phases of strong economic growth alternating to period of crisis during this term.

1.2 Research design

Information resources are mainly gained from Central and Eastern Europe Statistics from 2005 to 2015, there are information about the volume of venture capital funding in particular CEE countries and database - Eurostat (data of GDP growth rate in Visegrad Four countries).

As the main method of research we choose the method of regression analysis. A dependent variable is the volume of venture capital funding in particular Visegrad Four counties and an independent variable is an economic performance measured by the indicator of GDP, about which we presume that has an impact on the level of venture capital funding in particular countries examined.

The formula of the main regression model in our research:

$$Y=\beta_0+\beta_1 X, \quad (1)$$

where X is called independent variable or predictor and Y is called dependent variable or response.

According to Korajaczyk, Levy (2001); Bhaird, Lucey (2010), we assess statistical significance of regression coefficients consistent with the standards used in foreign researches.

Research process requires besides application of regression analysis also application of the other methodologies of research including generalized (logic) regression methodology as well as methods for exact regression (in forms of statistical methods and method comparison regression). Two of the logic regression methodologies – analysis and synthesis are applicable mainly in theoretical framework of research. We achieve knowledge analyzing initial data. Method comparison regression is another method, we use in our contribution. This method is applicable in theoretical framework of research (comparison of author´s divergent opinions on venture capital funding), as well as in practical framework of research (venture capital funding in CEE countries in comparison with Europe as a whole, but mainly comparison of venture capital funding in particular Visegrad Four countries. The results are presented in tables and charts.

1.3 Results of research

Intensity of venture capital funding is different in particular countries of Europe. In the long-term we can observe low level of enterprises ´s funding by this form of capital in CEE countries in general. Table 1 represents the comparison of different types of venture capital funding between CEE countries and Europe as a whole in 2015.

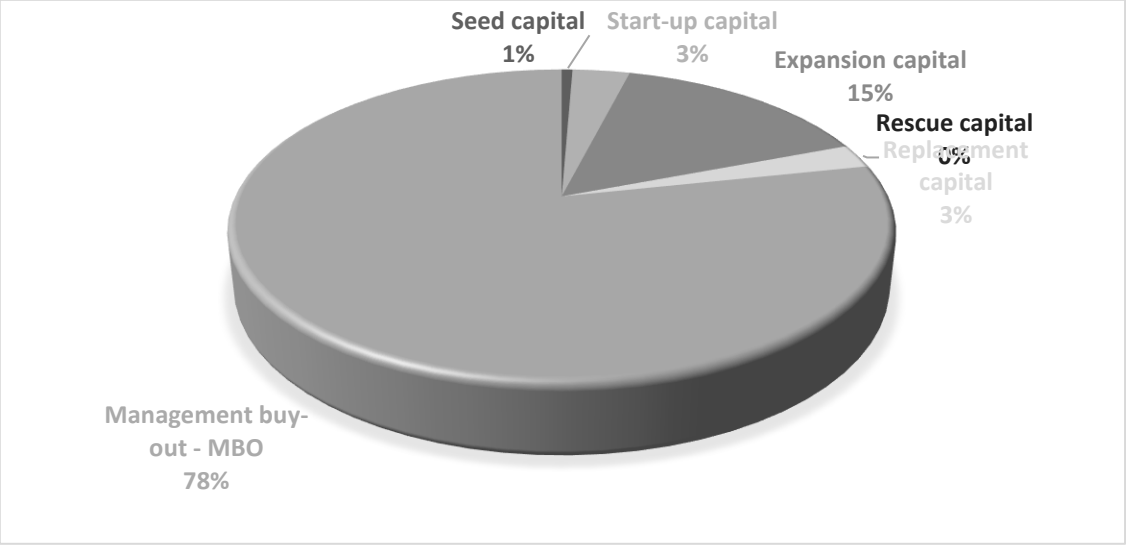
Table 1
The value of venture capital investments according to particular types of venture capital in CEE countries and Europe.

Type of investments	Value of investment in CEE countries		Value of investment in Europe		CEE countries´ s investments ratio to Europe as a whole
	EUR Thousand	%	EUR Thousand	%	
Seed capital	10 287	0,63%	117 233	0,25%	8,77%
Start-up capital	54 655	3,35%	2 009 506	4,24%	2,72%
Expansion capital	248 306	15,22%	8 153 698	17,19%	3,05%
Rescue capital	-	0,00%	255 071	0,54%	0,00%
Replacement capital	40 225	2,47%	586 237	1,24%	6,86%
Management buy-out - MBO	1 277 662	78,33%	36 317 141	76,56%	3,52%
Total 2015	**1 631 135**	100,00%	**47 438 886**	100,00%	3,44%
Total 2014	1 317 384	-	41 788 056	-	3,15%

Source: own elaboration based on the obtained data from Central and Eastern Europe Statistics, from 2005 to 2015

From Table 1 we can see that the ratio of venture capital investments in CEE countries to its total volume in Europe is only 3, 44% in 2015 and 3, 15% in 2014 (this is a 0,29-increase compared with the previous year). Both values of investments are almost the same concerning the structure of different types of venture capital funding. Management buy-outs – MBO prevail over types of venture capital, it represents more than 75% of its total volume of venture capital funding in CEE countries as well as in Europe as a whole. Expansion capital is the second commonly used type of venture capital funding (15,22% of its total volume in CEE countries, 17,19% of its total volume in Europe as a whole).

Figure 1
Types of venture capital investments in CEE countries in 2015



Source: own elaboration based on the obtained data from Central and Eastern Europe Statistics, from 2005 to 2015

On the contrary, the seed capital and rescue capital are least, long-acting used types of venture capital funding, which its percentage is lower than 1% (there was no rescue capital

funding at all in 2015). These types of capital bearing the highest risk and that is the reason of the lowest interest in investments provided by venture capitalists.

How to explain such a high percentage of management buy-outs – MBO to the total volume of venture capital investments? *Fetisovová et al.* (2012) think that dominant percentage of management buy-outs – MBO may be interpreted through these facts:

- transactions cost of these special types of acquisition have usually higher value than in the case of business expansion,
- bigger successful companies' sources of finance bearing lower risk than in the case of small and medium-sized enterprises funding,
- the effectivity of these investments is caused by property of enterprise´s buy out that could be provided like a loan guarantee to fund the part of transaction cost.

CEE countries are part of Visegrad Four countries such as Slovakia, Hungary, Poland and Czech Republic. The tendencies of alternative funding sources (except of Poland, where is relative high developed venture capital market) are very low. From Table 2 we can see the review of the volume of venture capital funding in Visegrad Four countries from 2005 to 2015.

Table 2

Venture capital investments in Visegrad Four countries (EUR Million) from 2005 to 2015

Country/Year	Before crisis				During and after financial crisis						
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Czech Republic	109	354	170	441	1358	229	144	106	134	299	14
Poland	108	304	684	628	275	653	678	473	380	251	887
Hungary	147	734	491	478	214	65	195	103	56	170	158
Slovakia	19	19	23	31	0	15	9	98	2	12	12
Total V4	**383**	**1 411**	**1 368**	**1 578**	**1 847**	**962**	**1 026**	**780**	**572**	**732**	**1 071**
Total CEE	**508**	**1 667**	**3 005**	**2 456**	**2 432**	**1 336**	**1 247**	**1 005**	**789**	**1 311**	**1631**
Visegrad Four´s percentage on a total CEE countries	75,39	84,64	45,52	64,25	75,95	72,01	82,28	77,61	72,50	55,84	65,67

Source: own elaboration based on the obtained data from Central and Eastern Europe Statistics, from 2005 to 2015

Development of the venture capital funding in all V4 countries is fluctuating during the tracking period. As we can see, the percentage of investments in Visegrad Four counties on the total volume of venture capital investments is fluctuating as well. The biggest portion of Visegrad Four countries´ s aggregation was recorded before crises in 2006, which represents 84,64%. There were significant venture capital investments realized in Poland as well as in Hungary and Czech Republic within this period. On the contrary, the lowest portion of Visegrad Four countries´ s aggregation was in 2007, which represents 45,52%. This portion oscillated around 75% during the period of crisis. There was moderate decline of venture capital investments in Visegrad Four counties on investments in CEE countries in the last two years.

We can say that the biggest volume of venture capital funding within the frame of counties as above in general is provided in Poland since 2007. The volume of venture capital funding achieved the highest values in Poland in 2007 and 2008. There was very fast decline when the crisis has started in 2009 (628 million EUR in 2008 declines to 275 million EUR in 2009). Venture capital investments were changing over the next years – the volume of venture capital funding increased in 2010 and 2011 and then it was gradual decrease in the following years. There was significant increase in 2015 (this is a 353 million EUR increase compared with the previous year). Venture capital investments in Poland represent more than 50% of its total venture capital investments´ s volume in CEE countries in this year. Management buy-outs – MBO comprise the significant part of venture capital funding (84,33%). According to *Soloma´*

s research (2013) mentioned above, Poland is more attractive for the investors than the other countries mainly because of high developed Warsaw Stock Exchange (around 40% of all new securities issued on primary market in Europe were in Warsaw in 2012, Poland acquired the fifth post of the highest developed capital markets in Europe) regards to the total value of all new securities issued on primary market. Internationalization of the capital markets, GDP growth and need for diversification of risk belong to the other factors having impact on development of capital markets. There are some barriers as well, which hinders even higher development of venture capital funding in Poland in spite of all advantages mentioned above. These barriers to development include:

- backing for R&D is insufficient,
- Poland does not offer motivation programs to support young innovative companies – there is a lack of legislative standards, which should support these companies,
- lack of corporate culture,
- start and closing a business is problematic, there is red tape, for example registration takes around 3 months to start your business - which is three times longer and regards to per capita income it is 4 times more expensive in comparison to an average country of OECD (EVCA, 2010).

As regards venture capital development in Hungary, there was a period of the biggest volumes of these types of investments before crisis, from 2006 to 2008. The volume of venture capital funding declines very fast after financial crisis has started and it does not peak the values before the crisis to this very day. *Karsai et al.* (1998) stated that, the main barriers have legislative form to hinder the development of venture capital funding in this country.

From table 2 we can observe, that Slovakia belongs to CEE countries at the lowest level of venture capital funding in the long-term. There are the reasons why venture capital funding is at such a low level of providing. *Marková* and *Balcová* (2011) divide barriers to venture capital funding of small and medium-sized enterprises in barriers affected venture capital demand and venture capital support.

Development of venture capital funding is very fluctuating. Interestingly, the biggest volume was recorded in 2009, which represents as many as 1 358 million EUR. Czech Republic has a number of assumptions in general, which could support venture capital funding positively – such as high level of education attainment in country, large number of small and medium-sized enterprises which theirs undercapitalization and little economic structure represent good assumptions for venture capital funding in this country (Doláková, 2009). In spite of assumptions mentioned above, there is relatively low level of venture capital funding in Czech Republic. *Rajchlová et al.* (2011) refer the barriers of venture capital funding in Czech Republic mainly to insufficient support of seed and development venture capital enterprises in the sphere of tax preferences, non-existence of venture capital funding´s support and insufficient knowledge and misunderstanding of this form of financing by entrepreneurs.

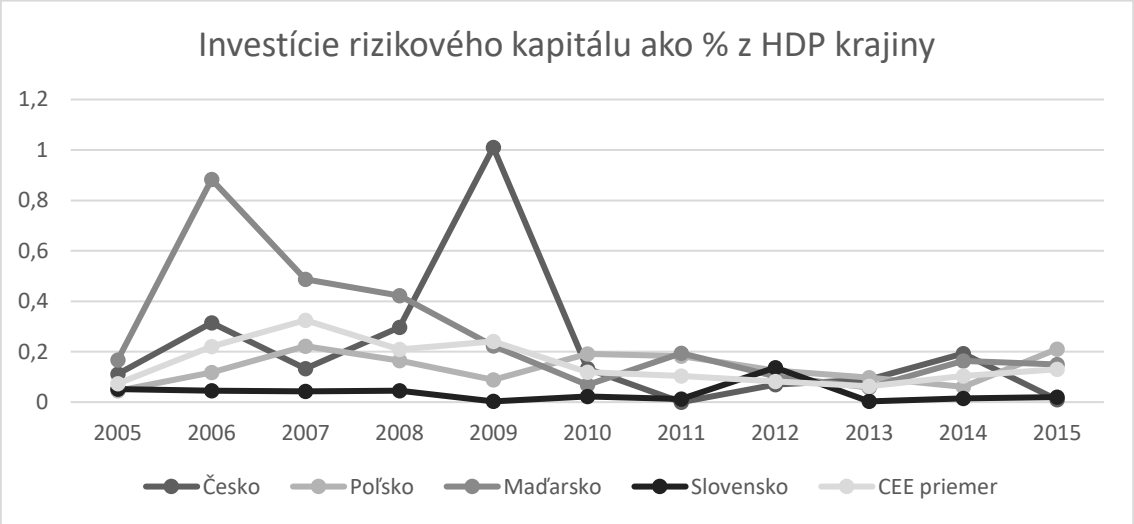
Table 3
Barriers to development of venture capital funding in Slovakia

Barriers affect venture capital support	Barriers affect venture capital demand
- the lack of information and transparency regards to venture capital enterprises, - insufficient supply of seed capital and start-up capital from private venture capital companies, - enterprises are not well-informed about existing supplies of venture capital, whereas this low level of information relates mainly to insufficient promotion of this form of capital.	- business plans of small and medium-sized enterprises are not very attractive for investors in the result of barriers to innovation amongst these enterprises, - unwillingness of small and medium-sized enterprise to share with venture capitalists percentages of ownership of the enterprise, - the weaknesses of small and medium-sized enterprises are management and marketing skills.

Source: MARKOVÁ, V. – BALCOVÁ, P. 2011. Elimination of barriers to venture capital funding by Slovak small and medium-sized enterprises. In *Economics and society*. ISSN 1335-7069, vol. 12, no. 1, p. 67-75.

Given that size of the countries ´s economies is different in Visegrad Four countries, we do not consider absolutely right to compare only absolute values of volume its venture capital investments in these countries. In table 2 we can see the portions of venture capital investments as a percentage of the country´ s GDP from 2005 to 2015.

Figure 2
Venture capital investments as a percentage of the country´s GDP (Visegrad Four countries in 2015)



Source: own elaboration based on the obtained data from Central and Eastern Europe Statistics, from 2005 to 2015

Using a deeper analysis (comparison) of venture capital funding as a percentage of the country´s GDP we find, that significant differences amongst Visegrad Four countries are mainly observed before financial crisis has started. From figure 2 we can see, that Hungary has the highest percentages of venture capital investments on GDP before financial crisis nevertheless the absolute values of volume its venture capital investments is provided in Poland. Visegrad Four countries has quite similar percentage of venture capital investments on GDP since 2010 in despite of the volume its absolute values, these differences in venture capital investments are minimal taking into account the size of the countries' economies.

From table 4 we can see the development of Visegrad Four countries´ s GDP from 2005 to 2015. The crisis became evident in many observed countries in 2009, when it was very fast decline of theirs economic performance, except Poland. Past 10 years of V4 GDP growth acts as exploring interdependence between economic performance and volume of its venture capital funding.

Table 4
GDP growth rate in V4 country as a percentage from 2005 to 2015

Year/Country	Czech Republic	Hungary	Poland	Slovakia
2005	6,4	4,4	3,5	6,4
2006	6,9	3,8	6,2	8,5
2007	5,5	0,4	7	10,8
2008	2,7	0,8	4,2	5,7
2009	-4,8	-6,6	2,8	-5,5
2010	2,3	0,7	3,6	5,1
2011	2	1,8	5	2,8
2012	-0,8	-1,7	1,6	1,5
2013	-0,5	1,9	1,3	1,4
2014	2,7	3,7	3,3	2,5
2015	4,5	2,9	3,6	3,6

Source: Available on the Internet: <http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Real_GDP_growth,_2005%E2%80%932015_(%C2%B9)_(%25_change_compared_with_the_previous_year;_%25_per_annum)_YB16.png.

From table 5, we can see the results of regression analysis, β – coefficients represent direction and intensity of GDP influence on venture capital funding, p-value represents statistics significance of given coefficient.

Table 5
The results of regression analysis

	Czech Republic	Poland	Hungary	Slovakia
R Square	0,3787	0,0711	0,0189	0,0711
β - coefficient	-65,4993	36,7613	9,5215	0,5405
p-value	0,0438	0,428	0,6872	0,8006

Source: own elaboration

On the basis of the results of regression analysis we can point out, that statistical significance of economic cycle influences venture capital investments only in the case of Czech Republic. GDP growth rate can explain 37,87% of variation of the dependent variable therefore volume of venture capital investments and 62,13 % left of variation of the dependent variable is the result of the other factors. The relationship between economic cycle and venture capital investments is inversely proportional, that means when the GDP increases at the same rate that the venture capital investments decrease and vice-versa. We do not find any statistics significance between economic performance and venture capital investments in the case of the other countries.

2. Conclusions and policy implications

We were concerned with development of venture capital investments in CEE countries and Visegrad Four countries for more detail and the influence of the crisis on venture capital funding in our article. We found out that there is very low level of venture capital funding in CEE countries in comparison to venture capital investments within the frame of Europe as a whole. Interestingly, the essential part of the investments in CEE countries represents venture capital investments of Visegrad Four countries. More than a half of the venture capital investments within the frame of V4 countries are provided in Poland, which is the most attractive country from the venture capitalists´ s point of view, on the contrary, the lowest level of venture capital funding is in Slovakia. We found out that higher volumes of venture capital investments were provided in period before crisis, during and after the crisis the volume declined, unfortunately we did not manage to verify the influence of economic cycle on venture capital funding, except the Czech Republic in the identification of influence over economic performance of Visegrad Four countries on venture capital funding. However lower levels of venture capital investments in Visegrad Four countries do not have to be only the impact of financial crisis´s influence after the crisis. We meet with thoughts more often that market of venture capital is on the decrease and it has many long-term problems. Magazine editor of Venture capital devotes to this problem since 2011. Big volume of venture capital was gradually decreasing the earnings of investors, what caused lower interest of venture capitalists about another funding of enterprises. This risk of lower level of venture capital funding could slow down the growth of scientific and technical progress and innovation because venture capital is very often provided mainly as an innovation source for financing.

Acknowledgement

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Management Skills in Working with Information

Vladimír Bolek

Abstract
Current practice requires appropriate digital literate managers. ICT development leaves significant scope for education. Managers are trained in hardware, operating software, application software and legislation. We must not forget the training in working with information and means of communication. New information and communication technologies are changing the method and principles of communication. Increasing amounts of data, creation of big data requires knowledge of such software solutions that help a manager better navigate between them. Information is the basis for a general manager. The paper presents the results of research in the field of digital literacy managers in working with information and communication.

Keywords*: digital literacy, information and communication technologies, managers*
JEL classification*: M15*

1. Introduction

Business economics is characterised by a large proportion of managers and other employees using ICT to perform their job tasks. This is confirmed by the fact that there is huge interest in ICT literate graduates in the labour market. According to the most recent surveys, they are classified as the most desirable employees for employers. Each organisation has a tendency to achieve progress, development and prosperity. This direction is effective when meeting organisations' conditions that the managers with knowledge and technical literacy will control and make decisions in the organisations. Regarding complexity and increasing acceleration of changes in the information society, a growing demand for managers with the high quality and effective use of knowledge and skills. The ICT sector changes qualifying requirements to recruit management and workers's positions, i.e. to strengthen human capital. The enterprises, organisations are demanding people who handle changing situations, unexpected changes and know how to cope with them quickly.

Information and ICT, which represent essential parts of a business infrastructure, are driving forces of the current modern society. Their development influences economic environment by a substantial degree and ranks among factors of business prosperity and competitiveness. Nowadays, it is not possible to manage enterprises, organisation and take professional decisions without information and the use of ICT. Managers of various organisations need relevant information for effective management. Such information is essential for correct decision–making. In all organisations of the public, cooperative or private sector, the managers are active in these categories: operational, tactical and top managers. They all have an important mission – to affect the organisations and their results.

Information is the growth potential of an enterprise. The need for comprehensive and systematic access to information throughout the enterprise is still increasing. The access to information cannot be achieved without using new ICT, which is represented by technical, software and organisational tools of information processing. Information literacy deals with the human capability to work effectively in the information society. Efforts to introduce a general, accurate and conceptual definition of the information literacy are subjected to extensive academic and research discussions. The following comments are examples of concepts in various social contexts. Molnár (2001) with his team of authors associates the concept of

information literacy with computer literacy in the book „Enterprise Information System.“ He defines the term as „the unconditional part of competencies of each manager, who wants to promote and achieve success. It is not just computer skills, but mainly the ability to constantly require valuable information and realise its value. The manager must be able to choose from a large number of information technology and decide which technology is an asset for an enterprise.“„Information literacy is the ability to recognise the need for information, to identify and to locate appropriate information sources, to access information contained in the sources, to evaluate the quality of data, to identify data and to use information effectively“ (Doyle, 1994). „Information literacy is the ability of a human to locate, evaluate and use information in order to become stand-alone, independent and a longlife learning individual“ (Ranaweera, 2000). Moreover, „information literacy involves knowledge in the field of information needs and interests. It is the ability to identify, search, assess, organise and effectively create information. It is one of the conditions for effective inclusion in the information society“ (Baradol & Gopakumar, 2000). Results of the analysis of the different authors' definitions show that information literacy is perceived as the ability to work with information, when the awareness phase of the need, identification and obtaining information is preceded. The Institute for Public Affairs (Velšic, 2013) does not perceive „the ability to understand information and to use it in a variety of formats from various sources presented by modern information and communication technologies„ as the information literacy, but as the digital literacy. This concept is used when interpreting results of the institute. The most frequently presented definition was published by the Association of College & Research Libraries (2000): „Information literacy is a set of abilities requiring individuals to recognise when information is needed and has the ability to locate, evaluate, and use effectively the needed information.“ The Czech authors Dombrovská, Landová and Tichá (2004) define information literacy as an equation: „Information literacy = Functional literacy + ICT literacy“. The functional literacy consists of literary, documentary, numerical and linguistic literacy. After introduction of the individual views, the term of information literacy is defined as follows (Bolek et al., 2016): Information literacy is the ability to identify the need for information; to search, access and process information by available and suitable tools of information and communication technology; to evaluate information; and to use information in the most effective way. Generally, the information literacy includes the ability to understand information and to use it in a variety of formats from various sources presented by modern ICT. The information literacy is related to the entire population. We agree with a statement in the Prague Declaration of 2003 (2004) and the Dombrovská's (2004) appendix that „the information literacy is a process that applies to all. It does not involve a dichotomy of literacy versus illiteracy, but a question of the extent within the continuum.“

2. Model and Data

The intention of the research was to include Slovak managers in the survey. The main objective is to show the level of digital literacy of managers at work information and communication. Identify important determinants that significantly effect the digital literacy of analyzed groups .A target group of the survey were managers at different levels and sectors: public, cooperative and private sector, manufacturing and non-manufacturing sectors; without dividing organisations according to organisational and legal forms. The questionnaires were distributed to 200 managers using electronic communication. The questions included in the questionnaire were both opened and closed.

The process of designing the questionnaire was based on the analysis of individual problem areas and the justified construct, content and criteria validity. Reliability and accuracy of the questionnaire was determined by the following factors: frequency of items, homogeneity and complexity of the tasks. In the accompanying letter, the addressed managers were assured of

compliance with ethical principles: confidentiality of information and anonymity. The questionnaires were distributed in September 2015 to the managers at all levels of management covering the entire Slovak Republic. The data collection was completed in June 2016. The return of the questionnaires amounted to 180 respondents, which formed a base for the partial quantitative analysis. The respondents replied to listed questions and recorded the literacy rate at each of the analysed instruments. The structure of the respondents' sample is presented in the following tables.

Table 1
Structure of respondents by legal forms and business activities

Legal form	**Business activity**		∑
	Non manufacture	**Manufacture**	
Cooperative	1,11%	1,11%	2,22%
Commercial enterprise	53,33%	26,67%	80,00%
Trade license	1,11%	0,00%	1,11%
Others	10,56%	6,11%	16,67%
∑	**66,11%**	**33,89%**	**100,00%**

Source: own processing

The survey covered the managers of enterprises and organisations. 66,11 % were the managers of the non-manufacturing and 33,89 % of the manufacturing enterprises and organisations. The businesses with a legal form of the commercial enterprise were represented the most – 80,00 %.

Table 2
Structure of respondents by job and the level of education

Job position	**The highest level of education**				∑
	Secondary with a school-leaving exam	**Bachelor's degree**	**Master's degree**	**Doctoral degree**	
1 - Operational managers	10,00%	2,78%	19,44%	0,00%	32,22%
2 - Tactical managers	6,11%	1,11%	33,33%	2,22%	42,78%
3 - Top managers	5,56%	1,11%	16,67%	1,67%	25,00%
∑	**21,67%**	**5,00%**	**69,44%**	**3,89%**	**100,00%**

Source: own processing

The managers of individual enterprises were segmented into three groups according to their job position: 1 – Operational managers – 32,22 %; 2 – Tactical managers – 42,78 %; 3 – Top managers – 25,00 %. This criterion was often used in various statistical analyses. The managers most often achieved the Master's degree – 69,44 %.

Table 3
Structure of respondents by age and the field of education

Age Group	Degree					∑
	Economics, management	Informatics	Natural Science	Health service	Other	
1.	1,67%	1,67%	0,00%	0,00%	2,22%	5,56%
2.	20,00%	7,22%	0,56%	0,00%	9,44%	37,22%
3.	14,44%	3,89%	2,78%	0,00%	6,11%	27,22%
4.	9,44%	3,33%	4,44%	1,11%	7,78%	26,11%
5.	2,78%	0,00%	0,00%	0,00%	1,11%	3,89%
∑	**48,33%**	**16,11%**	**7,78%**	**1,11%**	**26,67%**	**100,00%**

Source: own processing

The managers were divided into five age groups. The first group: 18 – 25 years – 5,56 %; the second group: 26 – 35 years – 37,22 %; the third group: 36 – 45 years – 27,22 %; the fourth group: 46 – 55 years – 26,11 %; and the fifth group: 56 – 65 years – 3,89 %. The age group was compared with the field of education. The managers' most common field of education was economics, management and business – 48,33 %.

3. Results and Discussion

The index of working with information literacy is at the level of 54,99 points, the standard deviation – 23,44 points. The managers actively work with information; they know how to use and search for it; their knowledge is intermediate. They achieve the literacy level of 86,56 points with the standard deviation of 15,46 points. The managers reach the lowest literacy level of EDI – 25,27 points, the standard deviation – 34,32 points. The basic level of this indicator results in the low percentage of the managers' use of EDI in the analysed enterprises. Only 9,44 % of respondents use EDI. The managers are at the intermediate level of literacy in the e-classifieds and data mining from data warehouses. However, the use in their jobs oscillates at 30% of the penetration in the enterprises. The knowledge of relevant legislation achieves the important position of 69,80 points, the standard deviation of 24,96 points; and its use in jobs represents 60,56 %.

The managers achieve the intermediate level of communication literacy using ICT – 57,82 points, the standard deviation – 22,39 points. A tool that is used the most is e-mail – 96,11 %. The managers are the most literate using this tool – 93,03 points, the standard deviation – 10,97 points. Their work is active, independent and at the advanced level. The results of the analysed part of communication using the ICT tools shows that all studied tools are used by the managers at the intermediate up to advanced level. The lowest knowledge level in the communication part is reached in the discussion groups – 54,00 points, the standard deviation – 38,05 points, which is due to the fact that this method of communication is not preferred by the managers and is not often used during work. The discussion groups are used only by 23,89 % of the respondents.

3.1 Statistical significance's verification of differences in digital literacy for men and women

Digital literacy in working with information is best when searching for information on the Internet 86,56 points and in e-mail communication 93,03 points.

Table 4
Digital literacy by gender

Indicators		Digital literacy		
		Men	**Women**	**Summary**
Working with information	C1-Searching for information on the Internet	85,90	88,02	86,56
	C2-Data mining, data warehousing	50,02	50,24	50,07
	C3-Working with Internet Banking	78,58	90,85	82,48
	C4-EDI	25,61	24,33	25,27
	C5-Downloading and uploading files	72,16	72,70	72,32
	C6-Purchases using e-shops	76,35	74,31	75,68
	C7-E-Classifieds	53,66	71,92	59,45
	C8-Working with electronic documents, forms	76,46	79,67	77,46
	C9-Knowledge of laws - The Copyright Act	67,50	74,52	69,80
Communication	D1-E-mail communication	92,84	93,46	93,03
	D2-Video calls	68,38	74,19	69,95
	D3-Chat	72,20	78,79	74,14
	D4-D4-Newsgroups	53,31	56,18	54,00
	D5-Social networking	59,91	66,67	61,75
	D6-SMS, MMS	84,90	88,22	85,94
	D7-Videoconferencing	59,80	95,20	77,50

Source: own processing

The best results achieved men in working with searching for information on the Internet 85,90 points and e-mail communication 92,84 points. Women achieve the best results when working with Internet Banking 90,85 points and videoconferencing 95,20 points.

From the results of testing the statistical significance of the index differences in digital literacy and between the gender differences (the male and female managers), we conclude that there are not significant differences in ICT knowledge and skills between the male and female managers, as the statistical significance is not proven ($p > 0,05$).

The Levene's test is also used to confirm the normal distribution of the data when testing the partial indicators. Not all the data of the individual indicators are normally distributed. For those, which meet this condition, the Independent Samples T-test is applied. The significant difference between the gender is recorded for the variable C7 – E-Classifieds, since the value (of $p < 0,05$) $p = 0,037$.

The literacy level of the female managers considering the E-Classifieds is higher – 71,92 points with the standard deviation of 35,41 points, than the literacy level of the male managers – 53,67 points.

The indicators: C8 - Working with electronic documents, forms; D3 - Chat; and D6 - SMS, MMS did not fulfil the condition of the parametric test. We tested the statistical significance of these indicators by the non-parametric Mann-Whitney U test. The statistical significance is not demonstrated ($p > 0,05$): C8 – Working with electronic documents $p = 0,835$, D3 – Chat $p = 0,618$, D6 – SMS, MMS $p = 0,924$.

3. 2 Statistical significance's verification of differences in digital literacy for the age groups

The managers were divided into five age groups. The first group: 18 – 25 years, the second group: 26 – 35 years, the third group: 36 – 45 years, the fourth group: 46 – 55 years, and the fifth group: 56 – 65 years.

Table 5
Digital literacy by age groups

Indicators	Digital literacy					
	1	2	3	4	5	Summary
WORKING WITH INFORMATION						
C1-Searching for information on the Internet	98,38	86,72	87,18	83,59	87,14	86,56
C2-Data mining, data warehousing	67,40	41,28	59,88	44,57	66,67	50,07
C3-Working with Internet Banking	90,00	79,28	86,74	81,92	76,00	82,48
C4-EDI	0,00	24,04	34,93	16,71	40,00	25,27
C5-Downloading and uploading files	89,83	79,24	67,00	62,94	83,33	72,32
C6-Purchases using e-shops	95,00	79,50	72,17	74,38	60,00	76,21
C7-E-Classifieds	87,50	60,17	59,57	57,50	15,00	59,45
C8-Working with electronic documents, forms	89,83	80,52	78,03	71,23	75,71	77,46
C9-Knowledge of laws - The Copyright Act	82,25	68,19	69,27	69,32	77,86	69,80
COMMUNICATION						
D1-E-mail communication	92,38	94,37	93,22	91,17	92,14	93,03
D2-Video calls	93,80	74,88	72,30	57,39	63,33	69,95
D3-Chat	93,80	80,78	77,40	54,20	66,67	74,14
D4-D4-Newsgroups	93,33	62,32	52,84	36,39	50,00	54,00
D5-Social networking	92,25	67,54	58,10	46,80	70,00	61,75
D6-SMS, MMS	95,57	86,38	84,63	84,88	87,14	85,94
D7-Videoconferencing	95,00	67,54	68,91	46,72	40,00	63,02

Source: own processing

Best results are achieved by younger age groups. It is interesting to EDI that knowledge increases with age (the second group 24,04 points., fifth group 40,00 points).

Considering the analysed indicators above, we have discovered that there has been a significant difference of digital literacy ($p < 0,05$) related to the managers' age groups in the following indicators: C5 – Downloading and uploading files; D3 – Chat; D7 – Videoconferencing. The p-value of the D2 – Video calls variable approaches 0,05. In the following table, the digital literacy levels of the individual age groups depending on the analysed indicators that have shown the statistical significance are listed.

Table 6
Testing digital literacy differences by the age group

Indicator		Chi-Square	df	Asymp. Sig.
C4	EDI	3,350	4	,501
C5	Downloading and uploading files	10,512	4	**,033**
C8	Working with electronic documents	4,076	4	,396
D2	Video calls	9,463	4	,051
D3	Chat	10,304	4	**,036**
D4	Newsgroups	8,302	4	,081
D7	Videoconferencing	10,977	4	**,027**

Source: own processing

We claim that the same development compared to the previous testing confirms once again. Better results are achieved by the age groups 1 and 2. However, a slower downward rate can be

observed in the C5 – Downloading and uploading files indicator, but there is the increase of the literacy level in the last age group.

3. 3 Statistical significance's verification of differences in digital literacy depending on the job position

Digital literacy managers were evaluated based job position – operational managers, tactical managers and top managers.

Table 7
Digital literacy by job position

Indicators	Digital literacy			
	Operational managers	**Tactical managers**	**Top managers**	**Summary**
WORKING WITH INFORMATION				
C1-Searching for information on the Internet	88,04	86,60	84,46	86,56
C2-Data mining, data warehousing	39,38	56,64	45,12	50,07
C3-Working with Internet Banking	79,69	81,98	86,17	82,48
C4-EDI	17,47	25,54	33,69	25,27
C5-Downloading and uploading files	78,03	70,25	68,97	72,32
C6-Purchases using e-shops	83,62	72,40	73,55	75,68
C7-E-Classifieds	61,43	61,25	54,05	59,45
C8-Working with electronic documents, forms	84,83	76,97	69,97	77,46
C9-Knowledge of laws - The Copyright Act	69,24	71,52	67,21	69,80
COMMUNICATION				
D1-E-mail communication	92,98	93,14	92,91	93,03
D2-Video calls	75,83	66,91	69,82	69,95
D3-Chat	80,94	70,73	73,00	74,14
D4-D4-Newsgroups	60,79	54,19	44,93	54,00
D5-Social networking	62,46	61,03	62,13	61,75
D6-SMS, MMS	87,26	84,76	86,63	85,94
D7-Videoconferencing	67,82	83,33	52,65	71,69

Source: own processing

The significant difference between the job position is only recorded for the variable C8 – Working with electronic documents, since the value (of $p < 0,05$) $p = 0,020$. According to the indicator C8 – Working with electronic documents, the most literate managers are the operative managers (the level of 84,83 points), the tactical managers reach 76,97 points. The least literate managers are the top managers – 69,97 points.

3. 4 Statistical significance's verification of differences in digital literacy depending on the education level

The last variable under examination, the level of digital literacy managers based on education level – secondary with a school leaving exam, bachelor`s degree, master`s degree, doctoral degree.

Table 8
Digital literacy by education level

Indicators	Digital literacy				
	Secondary with a school-leaving exam	Bachelor's degree	Master's degree	Doctoral degree	Summary
WORKING WITH INFORMATION					
C1-Searching for information on the Internet	90,26	86,88	84,87	94,29	86,56
C2-Data mining, data warehousing	43,95	65,00	49,25	80,00	50,07
C3-Working with Internet Banking	85,65	91,43	79,11	100,00	82,48
C4-EDI	19,23	0,00	27,31	50,00	25,27
C5-Downloading and uploading files	76,11	65,00	70,21	88,57	72,32
C6-Purchases using e-shops	82,14	70,00	72,32	87,14	75,68
C7-E-Classifieds	67,14	62,50	53,75	84,00	59,45
C8-Working with electronic documents, forms	78,97	85,00	75,41	95,00	77,46
C9-Knowledge of laws - The Copyright Act	74,00	76,67	66,80	90,00	69,80
COMMUNICATION					
D1-E-mail communication	94,84	95,00	91,94	100,00	93,03
D2-Video calls	70,63	79,29	68,30	82,50	69,95
D3-Chat	71,00	80,71	74,11	80,00	74,14
D4-D4-Newsgroups	50,88	90,00	52,84	66,67	54,00
D5-Social networking	60,00	78,33	61,32	50,00	61,75
D6-SMS, MMS	90,67	76,00	84,26	97,14	85,94
D7-Videoconferencing	60,00	50,00	75,11	90,00	71,69

Source: own processing

The managers are segmented into the four groups based on the highest education achieved: 1. – secondary education with a school-leaving exam; 2. – Bachelor's degree; 3. – Master's degree; and 4. – Doctoral degree. We tested the statistical significance of the highest education achieved by the managers on both the aggregate indices and the partial digital literacy indices. The Levene's test was used to test normal distribution of the data. The following table shows the results of the test.

By applying the parametric test using the correction, we have discovered that the highest education of the managers has a significant effect on the digital literacy level in the area of information ($p = 0,01$).

Managers' education has a significant effect on the digital literacy level in the area of: D1 – E-mail communication. Considering the indicators: C9 – Knowledge of laws (Law on the personal data protection, Copyright Act), the p-value is close to 0,05.

Digital literacy managers is a highly topical issue. The practice requires skilled managers who are able to process information and are capable of online communication. According to the European Commission's "Agenda for new skills and jobs" document published in 2008, it is necessary to foresee labour market needs and skills requirements and their alignment as the highest EU's priority. In the "Strategic framework – Education & Training 2020", the attention was mainly focused on lifelong learning and skills development of citizens of all ages. It is estimated that by 2020 the number of highly qualified jobs will increase by 16 million and the

number of low-skilled jobs will decrease by 12 million. By the end of 2015, the Europe will be missing from 384 000 to 700 000 experts in the field of ICT, which will endanger not just the field itself, but also the ICT dissemination in all other economy sectors. Too many people do not have qualifications required by the current labour market. Therefore, their employment opportunities are reduced as most jobs already require e-skills (Commission, 2010). Currently not enough just to train for work with different hardware and software but also in the field of information security, as he says Korček (2016): The period of information and communication technology development has brought many new information security threats that affect information assets of enterprises. Risks that arise from the combination of threats´ likelihood and the asset value and vulnerability cause significant damages to enterprises regardless of their size and business focus. Even if technological controls are trying hard to keep up with the threats, the organisational controls are still to be improved in any organisation or enterprise. The key element is human who deals with sensitive or confidential information directly, therefore needs to be thoroughly trained in information safeguards against the information security threats.

4. Conclusions

In the knowledge-based society, it is not possible to take decisions effectively without being able to search, access and process information. Information literacy is crucial for many management positions. Therefore, current requirements on the information literacy represent an integral part of managers' qualifications at various levels of management. The information literacy, among other things, reduces the level of risk and other negative phenomena because proper evaluation of information leads to their early elimination. Managers get the best skills in finding information on the Internet, e-mail communication. The lowest level of digital literacy in all the e-data interchange (EDI). This fact is evaluated very negatively, because skills in this field are desirable. EDI is still the most widely used data format for electronic business transactions in the world. It is an important component of process automation.

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PRÍSPEVKY DO DISKUSIE

CONTRIBUTIONS TO THE DISCUSSION

Difúzne modely plánovania nových produktov na trhu nedokonalej konkurencie
Diffusion Models for New-Product Planning in Imperfect Competition

Nora Grisáková

Abstract
In presented paper we formulate and solve dynamic optimization models of firms in the field of imperfect competition. From the market structure of imperfect competition we choose monopoly with dynamic price and dynamic production and duopoly with simultaneous equilibrium. The paper through these models solves connection of profit maximization, diffusion of new product on the market and advertising expenditures in the time through optimal control theory.

Keywords*: imperfect competition, dynamic models, diffusion process*
JEL classification*: C22, O33, D42, D43*

1. Úvod

V predkladanom článku sú formulované a riešené modely dynamickej optimalizácie firiem v prostredí nedokonalej konkurencie. Z trhových štruktúr nedokonalej konkurencie boli zvolené modely monopolu, v ktorých sa uvažuje s dynamickými cenami a dynamickou produkciou monopolu a modely oligopolu, v ktorých uvažujeme simultánne riešenie. Článok prostredníctvom uvedených modelov rieši spojenie maximalizácie zisku, šírenia nového produktu trhom a optimalizáciu reklamných výdavkov firiem v čase pomocou teórie optimálneho riadenia.

V posledných rokoch nastala veľká snaha v oblasti optimalizácie reklamných výdavkov vzhľadom k efektívnejšiemu rozdeleniu rozpočtu firmy. Najvšeobecnejšia mikroekonomická špecifikácia týkajúca sa reklamy u a predaja x sa opiera o input-output sústavu pre agregáciu odozvy spotrebiteľov. V diskrétnom čase je táto sústava definovaná ako $x_{t+\tau} - x_t = \tau g(u, x)$, kde τ predstavuje zmenu v čase a g je funkciou reklamy a predaja. S takýmto modelom uvažovali ,Bass a Clarke (Bass, F. M, Clarke, D. G., 1972). V prípadoch, kedy sa jednotlivec môže rozhodnúť o kúpe ponúkaného produktu v hocijakom časovom intervale – teda keď uvažujeme so spojitým časom a autonómnym systémom – je sústava definovaná pomocou diferenciálnych rovníc v tvare $x' = g(x,u)$, kde $x' = dx/dt$. Feinberg (Feinberg, F. M., 1992) vo svojej práci uvažuje s modelom, v ktorom chce firma maximalizovať diskontovaný tok zisku, ktorý po vhodnej úprave môže byť vyjadrený ako rozdiel medzi trhovým podielom a mierou výdavkov na reklamu pri diskontnej miere r.

Prvým všeobecne známym modelom tohto typu je Vidale – Wolfeho model (Vidale, M. L., Wolfe, H. B., 1957). Zaujímavou črtou uvedeného modelu je tvar jeho funkcie reakcie x'. V súlade s tradičnou ekonomickou interpretáciou zápornej druhej parciálnej derivácie, lineárnosť funkcie $g = \rho u(1-x) - \delta x = x'$ v x a u sa týka konštantnej hraničnej návratnosti. Vidale – Wolfeho model slúžil od svojho vzniku ako základňa pre mnohé modely, ktoré sa odlišovali iba vo formulácii dynamickej rovnice x'.

Celkovú analýzu Vidale – Wolfeho modelu realizoval Sethi (Sethi, S. P., 1973). Ukázal v nej, že model je optimálny v dlhodobom časovom období pre stavovú premennú x. Sasieni (Sasieni, M. W., 1971) vo svojej práci ukázal, že ak pre funkciu g platia určité podmienky, potom optimálny dlhodobý postup má za dôsledok konštantný trhový podiel x a mieru výdavkov na reklamu u.

Sasienim predpokladané podmienky pre funkciu $g(x, u)$ sú:

$g_u > 0$ vplyv na trhový podiel bude vyšší, ak bude vyššia miera výdavkov na reklamu,

$g_x > 0$ vplyv na trhový podiel bude vyšší, ak bude pôvodný trhový podiel nižší,

$g_{uu} \leq 0$ vplyv na trhový podiel vykazuje klesajúcu návratnosť pri zvyšovaní miery výdavkov na reklamu (funkcia *g* je v parametri *u* konkávna).

Posledná uvedená podmienka je vzhľadom na funkciu *g* často iba odhadovaná a doplnená empirickými pozorovaniami. Predpokladá sa, že funkcia *g* by mohla mať tvar písmena S „*S-shaped*" v parametri *u*. Z uvedeného vyplýva, že hraničná návratnosť reklamy v určitom období rastie a potom klesá. Takže vhodnejšia formulácia poslednej podmienky by bola, že funkcia *g* je konvexná v parametri *u*, kým platí $u < u_{\inf}$ (kde inf znamená inflexný bod) a za týmto bodom je konkávna. (Eastlack, J. O., Rao, A., 1986)

Ďalej budeme vychádzať z určitých predpokladov modelu, ktoré boli v literatúre už formulované (napríklad (Dockner, E., Jorgensen, S., 1988), neskôr ich uvádzajú vo svojej práci aj (Chandarsekaran, D., Tellis, G. J., 2005)) a ktoré budeme ďalej v práci rozvíjať. Uvažujeme pritom s

- prvým nákupom produktov dlhodobej spotreby na monopolistickom trhu (ďalej v práci rozvinieme tento predpoklad aj na duopolistický trh),
- monopolistickou firmou, ktorá na vopred definovanom časovom intervale, $t_0 \leq t \leq t_1$, mení iba výdavky na reklamu (neskôr pridáme aj predpoklad zmeny ceny produktu na definovanom časovom intervale). Model prenikania (difúzie) nového produktu na trh je daný:

$$x' = x'(t) = g(x,u), \qquad x(0) = x_0 \geq 0 \tag{1}$$

kde

$x = x(t)$ kumulatívny trhový podiel firmy do času *t*,

$u = u(t)$ miera výdavkov firmy na reklamu do času *t*,

$x' = x'(t)$ predstavuje súčasný trhový podiel firmy.

Podľa diferenciálnej rovnice s počiatočnou podmienkou (1) je súčasný trhový podiel tvorený súčtom trhových podielov, ktoré boli dosiahnuté v minulosti a súčasnou mierou výdavkov na reklamu. Predpokladáme, že funkcia *g* je dvakrát diferencovateľná a platia pre ňu už spomenuté podmienky. Trhový podiel je nezáporný a je konkávne rastúcou funkciou miery výdavkov na reklamu. Táto podmienka konkávnosti zabezpečuje, že optimálna miera výdavkov na reklamu sa nikdy nebude neobmedzene zvyšovať. (Little, J. D. C, 1979)

Dockner a Jorgensen (Dockner, E., Jorgensen, S., 1988) vo svojej práci uvádzajú logistickú krivku *„learning curve"* nákladov produkcie. Predpokladajú, že hraničné náklady $c(x)$ závisia od kumulovaného trhového podielu a s nárastom kumulovaného outputu (trhového podielu) hraničné náklady produkcie klesajú, pričom tieto náklady môžu byť aj konštantné. Autori uvažujú s konštantnou cenou produktu *p* počas plánovaného obdobia $t_0 \leq t \leq t_1$. Pritom vzťah medzi optimálnou cenou a optimálnou mierou výdavkov na reklamu môže byť citlivý na funkčný tvar difúzneho modelu. V diferenciálnej rovnici (1) zníženie ceny môže byť nahradené zvýšením miery výdavkov na reklamu za účelom nárastu okamžitého trhového podielu. Zisk firmy autori definujú ako $\pi(x,u) = (p - c(x))g(x,u) - u)$. Gould (Gould, J. P., 1970) definuje výraz $-h(u)$, kde funkcia *h* je konvexná, pri predpoklade $g_{uu} = 0$, čo znamená, že trhový podiel lineárne rastie s mierou výdavkov na reklamu.

Reklamnú politiku firmy môžeme definovať ako maximalizáciu celkového diskontovaného zisku na určitom časovom intervale pri ohraničení (1).

$$\max J(x,u) = \int_{t_0}^{t_1} e^{-rt}[(p - c(x))g(x,u) - u]dt$$

$$x' = g(x,u), \qquad x(t_0) = x_0 \tag{2}$$

Ako prípustný vektor kontroly (miery reklamných výdavkov) $u = u(t)$ vyberáme ten vektor, ktorý je dvakrát diferencovateľný v čase t a spĺňa podmienku $u(t) \geq 0$ pre všetky t.[1]

Na riešenie modelu (2) použijeme Pontrijaginovský princíp maxima a definujeme súčasnú hodnotu Hamiltoniánu

$$\mathcal{H} = \mathcal{H}(x,u,\lambda) = ((p - c(x))g(x,u) - u) + \lambda g(x,u) \qquad (3)$$

kde $\lambda = \lambda(t)$ je súčasná hodnota multiplikátora (tieňová cena), ktorá spĺňa diferenciálnu rovnicu[2] $\lambda' = r\lambda = g_x[p - c + \lambda] + c'g$ a podmienku transverzality v $t = t_1$, $\lambda(t_1) = 0$.

Pre maximalizáciu Hamiltoniánu platí (Arrow, K. J., Kurz, M., 1970)

- nutná podmienka prvého rádu - $\mathcal{H}_u \leq 0 \Rightarrow g_u[p - c + \lambda] \geq 1$,
- nutná podmienka druhého rádu - $\mathcal{H}_{uu} < 0 \Rightarrow g_{uu}[p - c + \lambda] < 0$,
- postačujúca podmienka - maximalizovaný Hamiltonián je v x konkávny.

V prípade úloh teórie optimálneho riadenia má multiplikátor λ takú ekonomickú interpretáciu, že predstavuje eurovú hodnotu (v čase t) hraničného nárastu kumulatívneho trhového podielu. Multiplikátor λ sa v čase mení a závisí od troch dynamických faktorov:

- od difúzneho efektu na strane ponuky,
- od logistickej krivky nákladov a
- od diskontnej miery.

<u>Veta 1</u>

Ak je trhový podiel daný rovnicou (1), logistickou krivkou nákladov produkcie, ale bez diskontovania, potom optimálny plán miery marketingových výdavkov je charakterizovaný ako

u je v čase rastúce, ak $g_x > 0$ a $g_{ux} < 0$, pre všetky t,

u je v čase klesajúce, ak $g_x < 0$ a $g_{ux} > 0$, pre všetky t.

Dôkaz uvedenej vety uvádzajú Dockner a Jorgensen (Dockner, E., Jorgensen, S., 1988) na strane 128.

Na základe vety 1 uvádzajú autori tieto ekonomické interpretácie:

1. Pokles (nárast) u je globálny. To znamená, že u klesá (rastie) počas celého časového intervalu a reklamná trajektória je monotónna.
2. Optimálny marketingový plán je nezávislý od logistickej krivky nákladov, pokiaľ predpoklad $r = 0$ odstráni efekt multiplikátora λ.
3. Podmienky $g_x > 0$ a $g_u < 0$ znamenajú, že miera trhového podielu (dopytu) bude rásť spolu s prenikaním produktu na trh. Nárast v súčasnom trhovom podiele je nižší pre vyššiu úroveň reklamy.
4. Podmienky $g_x < 0$ a $g_{ux} > 0$ znamenajú, že miera trhového podielu (dopytu) bude klesať spolu s prenikaním produktu na trh. Tento pokles je nižší pre vyššie úrovne reklamy.
5. Aj napriek tomu, že nulová diskontná miera sa zdá byť nerealistická, uvedené závery môžu byť použité ako aproximácie skutočností, kedy je diskontná miera nízka. Diskontná miera znamená, že firmy sú indiferentné voči tomu, či získajú niečo teraz, alebo niekedy v budúcnosti.

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1 Predpoklad diferencovateľnosti sa môže zdať až veľmi silný. Napriek tomu, ak je Hamiltonián konkávny v u, potom nutné podmienky optimálnosti jednoznačne definujú optimálne $u = u^*$. Ak platí podmienka konkávnosti, to znamená, že z nutných podmienok určené stavové premenné a multiplikátory sú spojité a aj u^* je diferencovateľná, potom určené riešenie je vnútorným riešením (Kalish, S., 1983).

2 Dolné indexy pri jednotlivých funkciách určujú deriváciu funkcie podľa uvedenej premennej. Napríklad $g_x = \partial g / \partial x$.

2. Špecifikácia východiskových funkčných tvarov modelov

Uvažujme podobnú formuláciu dopytovej funkcie ako ju formuloval Bass (Bass, F. M., 1969) vo svojom difúznom modeli s parametrami závisiacimi od miery reklamných výdavkov. Nami uvažovaná dopytová funkcia (súčasná miera predaja), $Q'(t) = Q'$, bude mať tvar:

$$Q' = g(Q,u) = [\alpha + \beta u + (\gamma + \delta u)Q](M - Q) \tag{4}$$

Všetky parametre sú nezáporné, v čase konštantné, pričom:

α je koeficient inovácie, β je koeficient súvisiaci s efektívnosťou reklamy vzhľadom k inovátorom, γ je koeficient imitácie, δ je koeficient súvisiaci s efektívnosťou reklamy smerom k imitátorom, M je saturačná úroveň dopytu, $Q = Q(t)$ miera predaja firmy, u je miera reklamy.

Inovátori sú jednotlivci, ktorí akceptujú nový produkt nezávisle od rozhodnutia ostatných. *Imitátori* sú jednotlivci, ktorí kúpia nový produkt iba na základe odporúčania tých, ktorí produkt už vyskúšali.

Vo formulácii dopytovej funkcie (4) vieme rozlíšiť štyri komponenty difúzneho procesu (Dockner, E., Jorgensen, S., 1988):

$\alpha(M - Q)$ Osvojenie nového produktu bez pôsobenia spotrebiteľov, ktorí si už produkt zakúpili a bez vplyvu reklamy. Tento výraz je totožný s výrazom v Bassovom modeli (Bass, F. M., 1969).

$\beta u(M - Q)$ Osvojenie nového produktu bez vplyvu spotrebiteľov, ktorí si už produkt osvojili, ale pod pôsobením reklamy. Tento výraz je podobný výrazu z Vidale – Wolfeho modelu (Vidale, M. L., Wolfe, H. B., 1957) a reprezentuje vplyv reklamy na inovátorov.

$\gamma x(M - Q)$ Osvojenie nového produktu pod vplyvom spotrebiteľov, ktorí si už produkt osvojili, ale bez pôsobenia reklamy. Tento výraz je opäť podobný výrazu v Bassovom modeli (Bass, F. M., 1969).

$\delta ux(M - Q)$ Osvojenie nového produktu pod vplyvom spotrebiteľov, ktorí si už produkt osvojili, pri súčasnom pôsobení reklamy. Výraz je podobný výrazu z Ozgovho modelu (Ozga, S., 1960) a reprezentuje vplyv reklamy na imitátorov.

Budeme predpokladať, podobne ako už uviedli Hirschmann (Hirschmann, W. P., 1964), Dockner, Jorgensen (Dockner, E., Jorgensen, S., 1988), Dockner, Fruchter (Dockner, E., Fruchter, G. E., 2004) a iní, s logistickou funkciou produkčných nákladov v tom zmysle, že náklady produkcie klesajú s rastom produkcie. Hirschmann (Hirschmann, W. P., 1964) vo svojom výskume ukázal, že jednotka produkčných nákladov (v peňažnom vyjadrení) nového produktu klesá v intervale od 10% do 50% v každom časovom okamihu, keď sa akumulovaná produkcia zdvojnásobí. Autor uvádza, že ak by sme nakreslili produkciu a náklady v *log-log* priestore, graf uvedených funkcií by bol približne priamka s negatívnym sklonom – z. Matematicky tento fakt môžeme zapísať ako

$$C(Q) = c_0\left(Q_0 / Q(t)\right)^z \tag{5}$$

kde

$C(Q)$ je jednotka nákladov produkcie v čase t,

c_0 počiatočné náklady produkcie v čase začatia projektu t,

Q_0 sú počiatočnými hodnotami nákladov produkcie a predaja a z, je konštanta z intervalu[3] $0{,}1 \le z \le 0{,}5$.

Ďalej predpokladáme kvadratickú mieru výdavkov na reklamu $A(u)$ v tvare

[3] Uvedený interval vychádza z Hirschmannovho (1964) výskumu (Hirschmann, W. P., 1964).

$$A(u) = a^{\circ} + b^{\circ}u(t) + c^{\circ}u(t)^2 \tag{6}$$

kde a°, b° a c° sú nezáporné konštanty. Konštanta a° predstavuje fixné reklamné náklady, ktorými môže byť napríklad zavedenie nového produktu do katalógu. Konštanta b° predstavuje sklon firmy k reklame. A znamienko pri konštante c° udáva, či sú výdavky na reklamu najprv klesajúce a neskôr rastúce, alebo naopak.

2.1 Model monopolu s dynamickými cenami

V tomto modeli si monopolná firma kladie za cieľ maximalizáciu zisku z predaja nového produktu, očisteného o výdavky na reklamu pri difúznom ohraničení pri predpoklade dynamických cien. Cena produkcie bude riadiacou premennou, to znamená, že jej zmena tak, ako zmena výdavkov na reklamu, vplýva na výšku trhového podielu firmy. Budeme uvažovať s nasledovnou cenovou funkciou

$$f(p) = e^{-dp(t)} \tag{7}$$

Uvedený tvar cenovej funkcie navrhli Robinson a Lakhani (Robinson, B., Lakhani, C., 1975). Autori uvádzajú že parameter d je kladný a že predstavuje citlivosť dopytu na zmenu ceny (price sensitivity). Predtým, ako budeme meniť jednotlivé parametre tohto modelu, nájdeme interval pre zmenu parametra d, ktorý je vhodný pre model.

$$\max J = \int_{t_0}^{t_1} e^{-rt}\left[(p(t) - c_0 - [x_0/x]^z)x' - (a + bu + cu^2)\right]dt$$

$$x' = g(x,u) = \left[\alpha + \beta u + (\gamma + \delta u)x\right](1 - x)e^{-dp(t)}$$

$$x(t_0) = x_0 \tag{8}$$

kde ceny, meniace sa v čase, ovplyvňujú zisk monopolistickej firmy a cenová funkcia $f(p)$ ovplyvňuje veľkosť trhového podielu firmy,

u miera reklamy, miera reklamného úsilia (kontrolná premenná),

x dosiahnutý trhový podiel (stavová premenná),

p konštantná cena,

$(a + bu + cu^2) = A$ kvadratická miera výdavkov na reklamu, a, b, c nezáporné konštanty,

r diskontná miera,

z miera poklesu nákladov produkcie,

c_0 konštantné náklady produkcie,

x_0 počiatočný trhový podiel firmy,

α koeficient inovácie,

β koeficient súvisiaci s efektívnosťou reklamy smerom k inovátorom,

γ koeficient imitácie,

δ koeficient súvisiaci s efektívnosťou reklamy smerom k imitátorom.

Na výpočet uvedeného problému teórie optimálneho riadenia použijeme algoritmus Tenga a Thompsona (Teng, J. T., Thompson, G. L., 1988), ktorý v tomto prípade musíme rozšíriť o druhú riadiacu premennú p, nakoľko autori uvažovali iba s jednou riadiacou premennou.

2.2 Simultánne riešenie modelu oligopolu s konštantnými cenami

Reklama, ale aj ostatné reklamné aktivity neexistujú iba v prostredí monopolných firiem. Nie je reálne uvažovať iba s reklamnými aktivitami jednej firmy, pokiaľ je na trhu viacero výrobcov vyrábajúcich podobné tovary, nakoľko reklamné aktivity jej konkurentov majú podstatný význam pri objeme jej predaja.

Skúmaný model oligopolu vychádza takisto ako model monopolu z Bassovho difúzneho modelu (Bass, F. M., 1969), pričom Bass vo svojom modeli neuvažoval ani s reklamnou premennou, ani s dynamickými cenami. Prvý, kto uvažoval s rozšírením uvedeného modelu pre oligopolistický trh bol Ericsson (1983), Uvedený model rozširujú o dynamické ceny vo svojej práci MacDonald, Anderson, Rasmussen (MacDonald, L. T., Anderson, CH. K., Rasmussen, H., 2006) a o predpoklad stochastického dopytu ho rozšírili Raman a Chatterjee (Raman, K., Chatterjee, R., 1995).

Na opísanie duopolistického modelu použijeme tieto zápisy, pričom $i = 1, 2$

r_i diskontná miera i – teho hráča (firmy),

x_i trhový podiel dosiahnutý i – tou firmou do času t,

$x = \sum_{i=1}^{n} x_i$ celkový trhový podiel dosiahnutý všetkými firmami na trhu do času t, $0 \le x \le 1$,

$c_{i0}\left(\frac{x_{i0}}{x_i}\right)^{z_i}$ náklady produkcie i – teho hráča v čase t, c_{i0}, x_{i0}, z_i sú kladné známe konštanty,

u_i miera reklamy i – teho hráča,

$a + bu_i + cu_i^2$ miera reklamných výdavkov i- tej firmy, a, b, c sú dané konštanty a pre a a b predpokladáme, že sú kladné,

p_i konštantná cena i – tej firmy.

Stavová rovnica pre i – tú firmu je

$$x_i' = (\alpha_i + \beta_i u_i + (\gamma_i + \delta_i u_i)x_i)(1 - x) \tag{9}$$

V tomto modeli prijímame predpoklad, že celkový objem reklamy na trhu neovplyvní množstvo potenciálnych spotrebiteľov. Oligopolistické firmy tak, ako už uvádzaný monopol, chcú maximalizovať svoj zisk

$$\max J_i = \int_{t_0}^{t_1} e^{-r_i t}\left[\left(p_i - c_{i0}\left(\frac{x_{i0}}{x_i}\right)^{z_i}\right)x_i' - \left(a_i + b_i u_i + c_i u_i^2\right)\right] dt \tag{10}$$

pri ohraničení (9). J_i predstavuje maximalizovanú účelovú funkciu i – tej firmy.

Simultánna maximalizácia všetkých n funkcií J_i nie je vo všeobecnosti nemožná, ale je možné nájsť tzv. Nashovo *open loop* riešenie (Teng, J. T., Thompson, G. L., 1988). Formálnu definíciu uvedeného riešenia uvádza napríklad Deal (Deal, K. R., 1979), Xepapadeas, Zeeuw a Mäler (Xeapapadeas, A., De Zeeuw, A., Mäler, K.-G., 2002). Cellini a Lambertini (Cellini, R., Lambertini, L., 2005) vo svojej práci uvádzajú Nashovo *„open"* aj *„closed-loop"*[4] riešenie

4 Napriek tomu, že sa v tejto práci nezaoberáme teóriou hier, uvedieme aspoň základné myšlienky stratégií v prípade diferenciálnych hier:
Open-loop stratégia zodpovedá rozhodovaciemu pravidlu, kedy sa firmy na začiatku sledovaného obdobia zaviažu, že počas vopred stanoveného časového intervalu nebudú meniť svoje rozhodnutia. *Open-loop Nashova rovnováha* je potom množina open-loop stratégií, teda takých, že každá firma si zvolí na začiatku hry stratégiu, ktorá je pre ňu najlepšia, vzhľadom na rozhodnutie ostatných firiem.
Closed-loop stratégia, je definovaná ako rozhodovacie pravidlo, ktoré predpisuje rozhodnutie ako funkciu času a stavovej premennej (t.j. v každom časovom okamihu každý hráč sleduje vývoj stavovej premennej v čase a môže podľa nej upravovať svoje rozhodnutie). *Closed-loop Nashova* rovnováha je potom množina takých

pre dopytovú funkciu, ktorá spĺňa podmienky lineárnosti, konkávnosti a konvexnosti. Definícia Nashovho *„open-loop"* riešenia je v plnom rozsahu uvádzaná v predchádzajúcich prácach a uvádza ju vo svojej knihe aj Friedman (Friedman, J. W., 1977).

Pre nami uvažovaný model môžeme opísať *open-loop Nashovu rovnováhu* ako vektor kontrolných premenných $u_i(t)$, pre $i = 1, 2, \ldots, n$ takých, ktoré maximalizujú účelovú funkciu J_i pri predpoklade, že všetky ostatné kontrolné premenné ostanú nezmenené $u_j(t) = 1,2,\ldots,i-1,i+1,\ldots,n$. (Teng, J. T., Thompson, G. L., 1988)[5]

Aj v tomto prípade budeme vychádzať z maximalizácie Hamiltonovskej funkcie každej firmy. Pri uvedených funkciách predpokladáme rovnaký časový horizont plánovanej reklamnej kampane všetkých firiem a maximalizáciu zisku všetkých oligopolistov, pričom firmy si volia svoju stratégiu nezávisle od svojho konkurenta:

$$\max J_i = \int_{t_0}^{t_1} e^{-rt}\left[\left(p_i - c_0\left(\frac{x_{i0}}{x_i}\right)\right)x_i - \left(a_i + b_i u_i + c_i u_i^{\,2}\right)\right] dt$$

$$x_i' = (\alpha_i + \beta_i u_i + (\gamma_i + \delta_i u_i)x_i)(1 - x), \qquad x_i(0) = x_{i0} \tag{11}$$

3. Diskusia

V analýzach **monopolu s dynamickými cenami** sme vychádzali zo zvolených počiatočných hodnôt parametrov, ktoré boli neskôr menené pri podmienkach *ceteris paribus*. Východiskové hodnoty parametrov sme zvolili na základe viacerých simulácií tak, aby boli ich zmeny dobre viditeľné.

Východiskové hodnoty parametrov sú tieto:

- diskontná miera $r = 0{,}005$,
- konštantná cena nového produktu $p = 100$,
- miera poklesu produkčných nákladov $z = 0{,}1$,
- konštantné náklady produkcie $c_0 = 70$,
- počiatočný trhový podiel firmy $x_0 = 0{,}4$,
- koeficienty funkcie reklamných nákladov $a = 0$, $b = 0{,}07$, $c = 0{,}04$,
- koeficient inovácie $\alpha = 0{,}005$,
- koeficient súvisiaci s efektívnosťou reklamy smerom k inovátorom $\beta = 0{,}006$,
- koeficient imitácie $\gamma = 0{,}003$,
- koeficient súvisiaci s efektívnosťou reklamy smerom i imitátorom $\delta = 0{,}007$,
- časový interval zavedenia nového produktu $0 \le t \le 31$ (firma uvažuje s 31 – týždennou reklamnou kampaňou zavedenia nového produktu).

V parametroch uvádzame počiatočný trhový podiel monopolistickej firmy. Je to preto, lebo nepredpokladáme, že monopol pokryje celý trh okamžite. Monopol je síce na trhu jediným výrobcom novinky, ale aj napriek tomu, pri jej zavedení na trh sa predpokladá, že novinku si v prvých okamihoch kúpi iba určitý podiel z celkového počtu potenciálnych spotrebiteľov. Trhový podiel monopolu (a následne oligopolu) predstavuje tú časť potenciálnych spotrebiteľov, ktorí si produkt už zakúpili z celkového množstva potenciálnych spotrebiteľov. Pri výpočtoch nás zaujíma vplyv zmeny jednotlivých parametrov na premenné modelu a samozrejme na hodnotu účelovej funkcie.

V skúmanom modeli monopolu je 14 parametrov a jedna stavová premenná – trhový podiel firmy a dve riadiace premenné – cena produktu a miera reklamy. Na základe postupných zmien parametra *d* prijímame predpoklad, že jeho hodnoty by mali byť väčšie ako 0 a menšie ako

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closed-loop stratégií firiem, ktoré odpovedajú na počiatočné podmienky stratégií ostatných firiem v každom časovom okamihu hry (Montet, Ch., Serra, D., 2003).

5 Pre jednoduchosť budeme nazývať riešenie *open-loop* Nashovej rovnováhy iba Nashove riešenie alebo riešenie.

0,01, $0 < d \leq 0{,}01$. Ak by bol parameter d väčší, trhový podiel firmy by sa v čase takmer nemenil. Ako východiskovú hodnotu uvedeného parametra budeme uvažovať hodnotu d = 0,005.

V prípade **modelu duopolu** každý z duopolistov maximalizuje svoj zisk nezávisle od svojho konkurenta a bude vyberať tú stratégiu, ktorá bude preňho najlepšia. Predpokladáme, že obaja duopolisti majú na trhu rovnaké postavenie a uvažujú s rovnako dlhým časovým obdobím zavádzania novinky na trh.

Pre duopolistické firmy boli menené jednotlivé parametre a sledovali sme zmeny v správaní sa kontrolnej premennej – miery reklamy u, stavovej premennej – dosiahnutého trhového podielu x a v zmene účelovej funkcie J. Pre tento model sme realizovali 52 simulácií, pomocou ktorých sme chceli nájsť zákonitosti správania sa duopolistických premenných pri zmene parametrov niektorej z firiem. V modeli duopolu je 26 parametrov, takže aj na základe uvedených simulácií je komplikované predpovedať všeobecné závery o vplyve ich zmeny na premenné modelu. Napriek tomu pri zmene jedného z parametrov, vieme vysloviť závery, ktoré uvádzame v závere práce v tabuľke 3.

Uveďme aspoň niekoľko príkladov zmeny parametrov duopolistického modelu a hodnôt účelových funkcií duopolistov.

Tabuľka 1

Hodnoty parametrov pre zvolené príklady simultánneho modelu duopolu[6]

Pr. Č.	Firma	Parametre												
		r_i	p_i	z_i	c_{i0}	x_{i0}	a_i	b_i	c_i	α_i	β_i	γ_i	δ_i	t_1
S1	1	0,001	80	0,3	60	0,15	0	0,01	0,02	0,007	0,005	0,007	0,003	31
	2	-‖-	-‖-	0,1	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-
S2	1	0,001	80	0,3	60	0,15	0	0,01	0,02	0,007	0,005	0,007	0,003	31
	2	-‖-	-‖-	0,1	40	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-
S3	1	0,001	80	0,3	60	0,15	0	0,01	0,02	0,007	0,005	0,007	0,003	31
	2	-‖-	-‖-	0,1	40	0,4	0,03	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-
S4	1	0,001	80	0,3	60	0,15	0	0,01	0,02	0,007	0,005	0,007	0,003	31
	2	-‖-	100	0,1	40	0,25	0,03	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-	-‖-

Zdroj: Vlastné spracovanie

Tabuľka 2

Hodnoty účelových funkcií duopolistov a ich trhového podielu

Pr. č.	Hodnota účelovej funkcie		Trhový podiel	
	J_1	J_2	x_1	x_2
S1	10,6505	7,4458	0,3795	0,3385
S2	9,4017	17,0161	0,3569	0,4012
S3	4,7117	9,1360	0,2581	0,5578
S4	4,3990	16,5674	0,2517	0,5828

Zdroj: Vlastné spracovanie

V prvom príklade (S1) uvažujeme, že obaja duopolisti majú rovnaké hodnoty všetkých parametrov, okrem koeficientu funkcie produkčných nákladov z_i, ktorý je nižší pre druhú firmu. Miera reklamy pre prvú firmu je vyššia ako pre druhú firmu a taktiež vidíme, že táto firma dosiahla vyšší trhový podiel a zisk. Napriek tomu, že firmy začínajú pri predpoklade rovnakého počiatočného trhového podielu x_{i0} = 15%, druhá firma dosiahne na konci sledovaného obdobia nižší trhový podiel. Trhový podiel, ktorý obe firmy spoločne pokrývajú je 71,8% a spoločný zisk duopolistov je 18,0963. V tomto prípade je prvá firma efektívnejšia ako druhá.

[6] Výraz -‖- znamená, že uvedené hodnoty parametrov sú pre oboch hráčov rovnaké

V príklade S2 uvažujeme s rovnakou zmenou koeficientu funkcie produkčných nákladov z_2, ako v príklade S1 s tým, že ako zmenu voči východiskovému modelu S1 znížime hodnotu konštantných nákladov produkcie c_{20} druhej firmy. Po znížení konštantných nákladov produkcie druhej firmy $c_{20} = 40$, druhá firma dosiahne na konci sledovaného obdobia vyšší trhový podiel aj mieru zisku ako prvá firma. Miera výdavkov na reklamu druhej firmy je vyššia pre druhú firmu. Trhový podiel druhej firmy sa z pôvodných 15% zvýši na 40,12%. Duopolisti na konci sledovaného obdobia pokryjú 75,81% trhu a dosiahnu spoločný zisk 26,4178. Oproti modelu S1 duopolisti spoločne dosiahnu o 4,01% vyšší trhový podiel, pričom trhový podiel prvej firmy sa oproti modelu S1 zníži a druhej firmy sa naopak zvýši. Z tabuľky 2 môžeme vidieť, že druhá firma dosahuje takmer dvojnásobok miery zisku prvej firmy.

V treťom prípade (S3) opäť ponechávame zmeny z prípadu S2 a pridávame k nej ďalšiu zmenu parametra. V tomto prípade zvyšujeme hodnotu fixných výdavkov na reklamu druhej firmy a_2 a jej počiatočný trhový podiel x_{20}. Keďže zvyšujeme konštantné výdavky na reklamu druhej firmy, zvýši sa aj hodnota nákladov na reklamu druhej firmy a jej trhový podiel začína na vyššej úrovni. Tak, ako v predchádzajúcom prípade, je miera výdavkov na reklamu druhej firmy a_2 vyššia ako prvej firmy. Po zavedení konštantných výdavkov na reklamu pre druhú firmu sa zvýši aj jej miera výdavkov na reklamu, pričom jej sklon sa oproti prípadu S2 nezmení (zmení sa iba jej počiatočná hodnota). Druhá firma dosiahne na konci sledovaného obdobia trhový podiel 55,78%, čo je v porovnaní s predchádzajúcimi prípadmi zatiaľ najvyšší trhový podiel dosiahnutý touto firmou. Trhový podiel prvej firmy oproti predchádzajúcim prípadom klesol. Uvedená firma dosiahla na konci sledovaného obdobia v tomto prípade trhový podiel 25,81% a taktiež jej zisk je v porovnaní s predchádzajúcimi prípadmi nižší. Firmy spoločne dosiahli trhový podiel 81,35%.

V poslednom príklade (S4) pridávame k už uvedeným zmenám aj zvýšenie ceny produkcie druhej firmy. V tomto prípade je opäť miera výdavkov na reklamu druhej firmy vyššia ako prvej a je vyššia aj v porovnaní s predchádzajúcim prípadom S3. Počiatočný trhový podiel druhej firmy sme opäť predpokladali vyšší ako prvej a preto jej pokrytie začína od vyššej hodnoty. Napriek tomuto vyššiemu odhadu v čase jej trhový podiel neklesá, ale rastie. Druhá firma na konci sledovaného obdobia dosiahla trhový podiel 58,28%, čo je zvýšenie oproti východiskovej hodnote (40%) o 18,28%. Prvá firma dosiahla na konci sledovaného obdobia trhový podiel 25,47%, čo je nárast oproti východiskovej hodnote o 15,47%. Duopolisti spoločne dosiahnu trhový podiel 83,45%. Miera zisku druhej spoločnosti sa oproti prípadu S3 podstatne zvýšila, ale maximálnu mieru zisku dosiahla uvedená firma v prípade S2. Miera zisku prvej spoločnosti dosiahla v tomto prípade svoje minimum zo všetkých uvedených prípadov. Maximálnu hodnotu dosahovala miera zisku prvej spoločnosti pre prípad S1.

4. Záver

V predloženom článku boli formulované a riešené modely dynamickej optimalizácie firiem v prostredí nedokonalej konkurencie. Z trhových štruktúr nedokonalej konkurencie bol zvolený model monopolu s dynamickými cenami produkcie a simultánne riešenie modelu duopolu

Pre model monopolu s dynamickými cenami bolo vytvorených dvadsaťšesť zmien parametrov, z ktorých môžeme vysloviť nasledovné závery:

- smer zmeny miery reklamy u a miery reklamných výdavkov A rovnaký pre všetky skúmané zmeny parametrov,
- pre zvýšenie miery poklesu nákladov produkcie z vykazujú všetky sledované parametre modelu okrem ceny nárast (cena produkcie v tomto prípade klesá),
- zavedenie miery konštantných reklamných nákladov a má vplyv iba na mieru zisku firmy a na mieru reklamných výdavkov, jej zavedenie má za dôsledok zvýšenie uvedených premenných,

- zmena diskontnej miery má za dôsledok rovnakú zmenu trhového podielu monopolu, všetky ostatné premenné modelu vykazujú opačnú zmenu ako je zmena diskontnej miery,
- zmena citlivosti dopytu na zmenu ceny *d* má za dôsledok opačnú zmenu všetkých sledovaných premenných modelu,
- pri zmene konštantných nákladov produkcie vykazuje rovnaký smer zmeny iba cena produkcie, všetky ostatné premenné vykazujú opačný smer zmeny,
- zmena počiatočného trhového podielu má za dôsledok rovnakú zmenu dvoch premenných modelu a to ceny a dosiahnutého trhového podielu,
- zmeny v koeficientoch inovácie α a imitácie γ majú za dôsledok zmenu hodnoty účelovej funkcie, trhového podielu a priemernej ceny v rovnakom smere, ostatné premenné sa menia opačným smerom,
- pri zmene koeficientov vplyvu reklamy na inovátorov β a imitátorov δ vykazujú všetky premenné modelu rovnaký smer zmeny.

Pre modely duopolu boli v práci menené parametre jedného z duopolistov a sledoval sa vplyv uvedenej zmeny na smer zmeny premenných obidvoch firiem. Výsledky pre zmenu parametrov pre simultánne riešenie modelu duopolu sú uvedené v nasledujúcej tabuľke.

Tabuľka 3
Vplyv zmeny parametrov na premenné modelu duopolu

Zvýšenie parametra *i*-tej firmy	**Smer zmeny kontrolnej premennej – miera reklamy *i*-tej firmy**	**Smer zmeny riadiacej premennej – trhový podiel *i*-tej firmy**	**Smer zmeny hodnoty účelovej funkcie *i*-tej firmy**
r_i	Pokles	Nárast	Pokles
p_i	Nárast	Nárast	Nárast
z_i	Nárast	Nárast	Nárast
x_{i0}	Pokles	Nárast	Pokles
c_{i0}	Pokles	Pokles	Pokles
$A_i=(a_i+b_iu_i+c_iu_i^2)$	Pokles	Pokles	Pokles
α_i	Nárast	Nárast	Nárast
β_i	Nárast	Nárast	Nárast
γ_i	Pokles	Nárast	Nárast
δ_i	Nárast	Nárast	Nárast

Zdroj: Vlastné výpočty

Poznámka

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The occurrence of anxiety disorders amongst managers working in the field of personnel marketing

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Abstract
The contemporary world gives rise to many economic, social and ethical problems that affect psychological condition of employees and managers in particular. It can be said that these problems have a significant influence on their psychological balance and personal integrity and change their psychological condition. One of the reactions to mentioned problems in organizations and multinational corporations is the occurrence of anxiety disorders amongst managers. This paper is concerned with anxiety disorders that a specific group of managers – the managers working in the field of personnel marketing in companies registered in Slovakia – suffer from. Using the basic methods, it monitors basic competencies of managers and anxiety disorders associated with performance of managerial jobs. What is more, the paper presents education as a means of limiting or overcoming anxiety states. The authors aim to provide basic information about these issues and emphasize the need to study anxiety states and disorders that managers suffer from.

Key words: *anxiety disorders, manager, competencies*
JEL classification: *I12, M12*

1. Introduction

Anxiety Disorders are among the most prevalent psychiatric disorders in spite of cultural variations in rates. Most anxiety disorders first appear during childhood and adolescence (WHO, 2004). According to the International Statistical Classification of Diseases and Related Health Problems 10th revision (NCZI, 2016) anxiety disorders are quite common since about 10 to 25% of the population have suffered from an anxiety disorder sometime in their lives. The prevailing symptom of anxiety disorders is anxiety which has psychical symptoms (distress, concentration problems, attention disorders, hypervigility, insomnia – typical difficulties falling asleep, depersonalisation, derealisation, intrapsychic tension, inability to relax) and somatic symptoms (tachycardia, unpleasant sensation in the chest, dry mouth, nausea, abdominal discomfort, flatulence, diarrhoea, subjective experience of breathing discomfort, tremor, increased muscle tension, dizziness, hot or cold flushes, frequent urination, loss of libido, erectile dysfunction, sweating, skin hyperemia, muscle pain) (Moťovský, 2006).

According to the research study conducted by Heretik et al. (2013), anxiety as a personality trait is much more prevalent in Slovak women than Slovak men. Furthermore, it significantly distinguishes healthy individuals from participants with anxiety disorders. Examples of populations at risk include children of anxious parents; victims of child abuse, accidents, violence, war, disasters or other traumas; refugees; and professionals at risk of being robbed or treating trauma victims. Malleable anxiety-specific or generic risk and protective factors for anxiety disorders include traumatizing events, learning processes during childhood, feelings of lack of control, and low self-efficacy, coping strategies and social support. Early adverse life events create a neurobiological vulnerability that predispose to affective and anxiety disorders in adulthood through long-lived alterations in neurological stress response systems (WHO, 2004).

2. Definitions and treatment of anxiety disorders

One of the groups of anxiety disorders we are going to define is the group of phobic anxiety disorders. Phobic anxiety disorders (NCZI, 2016) are characterized by anxiety which patients feel only or mostly in well-defined situations that are usually not dangerous. Individuals with these disorders avoid such situations or experience them with panic. Phobia is an unjustified, inadequate and intense fear of something the insubstantiality of which individuals are able to realize. Phobias can be of different intensity. People with phobias try to avoid specific situations or objects. Specific phobic disorders are preferably treated by psychotherapy – exposure therapy (Moťovský, 2006). Agoraphobia is most commonly (as much as 80 %) caused by panic disorder. Its typical symptoms are the fears of open areas and spaces and crowded places. The feeling of anxiety is evoked by the presence of a phobic stimulus as well as moving away from a safe place. Agoraphobia is treated by psychotherapy and medication (Praško et. al., 2010).

Social anxiety disorder is an excessive fear of situations in which a person becomes the centre of attention and is worried about being criticized by others. A person with social anxiety disorder is extremely shy in common social situations. These situations cause intensive physical symptoms (tremor, blushing, sweating, stutter, shaking voice). People suffering from social anxiety disorder may be markedly limited due to their avoidance behaviour (Moťovský, 2006). There is some evidence that genetic factors are involved. Social phobia is often accompanied by other anxiety disorders or depression. Social phobia is generally treated with psychotherapy, medication, or both. Cognitive behavior therapy is especially useful for treating social phobia. It teaches a person different ways of thinking, behaving, and reacting to situations that help him or her feel less anxious and fearful. It can also help people learn and practice social skills (NIH, 2016).

Panic Disorder is characterized by repeated anxiety attacks accompanied by physical symptoms. These attacks begin unexpectedly, sometimes after a particular trigger. Anxiety attacks reach maximum intensity within a few minutes and they also last a couple of minutes. Typical symptoms include tachycardia, sweating, tremor, dry mouth, unpleasant sensation in the chest, abdominal discomfort, dizziness, fear of losing control and consciousness, chills or hot flashes, fear of changes in the surrounding world or oneself and one's own experience. Panic disorder is characterized by repeated panic attacks – occurring several times a month, a week or a day. It is often accompanied by anticipatory anxiety and avoidance behaviour. Effective treatment includes psychotherapy and pharmacotherapy (Moťovský, 2006). The tendency to develop panic attacks appears to be inherited (NIH, 2016).

Generalized Anxiety Disorder is characterized by permanent anxiety that is not associated only with particular situations or objects. The worries and fears change and often relate to each other in the course of time (even within one day). Intensity of anxiety is excessive in relation to real threats or completely unreasonable (in comparison to worries that healthy people have in these situations). The most frequent problems include anxiety, different worries, insomnia and difficulty falling asleep, difficulty concentrating, trembling, upset stomach, dizziness, irritability, increased muscle tension and other anxiety physical symptoms. Generalized anxiety disorder is treated by psychotherapy, SSRI and other medication (Moťovský, 2006).

The main symptoms of Obsessive-Compulsive Disorder are repetitive obsessive thoughts and compulsive behaviours. Obsessive thoughts are ideas, images and impulses that recur in the person's mind as a stereotype. They are almost always disturbing and a person often tries to stop them unsuccessfully. Compulsive behaviours or rituals are stereotype acts that are repeated over again. This disorder can significantly disrupt professional, family and social life of people who suffer from it. Obsessive-compulsive disorder usually has a chronic course and it can be treated by psychotherapy and medication.

Another category of anxiety disorders includes stress reaction and adjustment disorder. This category differs from others since it includes disorders that can be identified not only on the basis of symptoms and their course but also on one of the two casual effects: an extremely

stressful event that provokes acute stress reaction or a significant change that causes persistent unfavourable conditions, which lead to an adjustment disorder.

Anxiety disorders are treatable. One of using strategies according to WHO (2004) that has proven to be effective focuses on strengthening the emotional resilience and cognitive skills needed to avoid the development of anxiety disorders. Another promising results have been found with the use of cognitive–behavioural therapy as an early intervention method to prevent posttraumatic stress disorder. This method comprises education about trauma reactions, relaxation training, imaginal exposure to traumatic memories, cognitive restructuring of fear-related beliefs and in vivo exposure to avoided situations. Several controlled studies have shown that five weekly sessions of one and a half hours can lower the six months incidence of posttraumatic stress disorder from 67% to around 15% (Bryant et al., 1998 in WHO, 2004). Psychotherapy uses various approaches. The most common and applied approaches are dynamic psychotherapy and psychoanalysis, group psychotherapy and cognitive behavioural therapy (Praško, Laňková, 2006). With proper treatment, many people with anxiety disorders can lead normal, fulfilling lives. It is advisable to seek help from professionals who have particular expertise in diagnosing and treating anxiety.

We have defined a group of psychological anxiety disorders, their causes and treatment options. The causes of anxiety disorders include genetic factors and anxious personality, especially high stress levels in the work environment of a person - manager. Analysis of anxiety disorders associated with the job of the manager and their causes brought us to a conclusion that one of the most significant causes is the manager's competencies, e. i. the manager's ability to perform his/her everyday duties also with regard to strategic goals of the company.

3. Manager's competency requirements as one of the causes of anxiety disorders

In the first phase of our research, we focused on identification of the manager's and personnel manager's competencies in the field of personnel marketing and how managers understand these competencies. We also aimed at finding out whether their understanding might or might not be the cause of anxiety disorders. In present, there is a big interest of more scientific disciplines in defining the content of the term "competency", which offer a range of theories, approaches and definitions of the mentioned term. In behavioral, psychological and economic sciences competency is generally defined as a "result of the individual's personality development in a certain moment, which enables him/her to give certain performance" (Novák, 2012), while it is valid that competencies cannot be worn out, on the other hand, their usage means their development. Competency "can be also understood as a certain capability", (Compare: Collis, Montgomery, 1997) "dynamic ability", (Augier, Teece, 2007) which is the key for success (Zich, 2010) and if it is competitively unique and brings the company certain value, it can be perceived as a source for competition advantage, which is a result of the fact, that "competencies cannot be imitated or substituted by competitors", furthermore, they are a source of performance differences between companies, which dispose with equal resources.

"Competencies develop the resources" potential and enable the company to adapt itself promptly and not accidentally to the requirements of the market. Competencies take into consideration the flow of assets/property and activities, what can be explained by the relationship between resources and company's performance" (In detail: Freiling, 2004). From the perspective of content competency, as a static phenomenon, is investigated mainly in connection with cognitive and decision making process, taking into account the responsibilities for the effects and consequences of the taken decisions. Additionally, it is analyzed in connection with motivation and recently also with attitudes and interests of individuals, what is reflected also in the basic definitions. These match in two main parameters, which characterize the competency itself or are substantial for it: 1. parameter of qualification, what is an "expert translation of performing a certain activity" (Jarošová, Buzássiová et al., 2011) and 2. parameter

of competences, which is expressed by a "group of competences and obligations entrusted by legal standards" to an individual/employee or to the whole company, which at the same time defines the range of his/her scope or activity (Šaling, Ivanová-Šalingová, Maníková, 2003).

In the theory of management and theory of human resources management, personal marketing competencies are mentioned for the first time in the period of excess job vacancy supply and lack of proper labor force on the labor market. This is reflected in their definition, which is in the theory of management connected with the application of marketing methods and procedures focused on proper occupation of job vacancies with the objective of human capital creation. As a result, a narrower connection of the "competency" definition is with the problemacy of intellectual, mainly human capital.

"Human capital, which represents a subset of intellectual capital" (In detail: Koubek, 2007) is "created by a group of competencies in the context of knowledge and skills, including psychological and social aspects" (Tureckiová, 2008). In personal marketing, within which the manager performs specific/marketing functions and roles of a personal manager, the level of his/her competencies is one of the direct factors of creation and maintenance of qualified intellectual company capital, just like a source for a competitive advantage of the company.

The content of manager competencies in personal marketing, according to R. M. Grant (2008), is created by hierarchically ordered capabilities "…capabilities going through functions, capabilities broadly developed within one function, capabilities linked to one activity, specialized capabilities linked to a specific part of activities and capabilities linked to a certain act" (Grant, 2008). Each function, thus a function in the area of personal marketing, its incorporation into the company's organization structure contains a group of competencies, from which one is basic, determined for the performance of a certain function. The basic competency can be a competency linked to the organization's capabilities (e.g. management of the brand, PR, organization's reputation, feedback on the trends) as well as a personal competency, linked to individual capabilities (knowledge, skills to use marketing tools, experience). It follows the definition of competency, which is in the theory of management generally defined as a "capability of an individual to act and behave in a way which corresponds to work requirements in the parameters set by the environment of the company and thereby achieving desirable results" (Boyatzis, 1982 in Armstrong, 1999 p.194).

"It is an ability to manage production and the people in production in a way that, the set objectives of the company/organization would be achieved" (Armstrong, 2005), while both definitions are based on standard conditions, i.e. the company disposes with proper employees and carries out proper personal policy focused on the achievement of strategic objectives of the company. Referring to this, more attention is dedicated in the theory of management to the definition of the term manager competency, which is in principle defined as a "group of assumptions, on which the performance of the manager in each task/work depends, however with the difference to what extent and in what ratio" (Szarková et al., 2013). Employee/manager acquires the manager competency by personalizing theoretical and practical experience and knowledge (Matulčíková, 2013) and what more, by application of these into the working stereotype together with the key competency, which is from the content perspective defined as a "result of a lifetime, individual process forming part of the personality development process" (Belz, Siegrist, 2001).

Analytical approaches agree on the basis of the term competency, which is formed by two components. The content of these are linked to specific functions, which are carried out by the manager in the area of personal marketing. Specifically, in the theory of personal marketing and personal management the term competency is used in the context of performing individual, specific functions which form their content background.

4. Manager competencies in personal marketing and their perception by the companies' managements in Slovakia (results of the research)

As demonstrated by the analysis of secondary sources, in the current theory the complex view on the manager's competencies in the area of personal marketing is basically missing. Starting from the analysis of individual theoretical approaches to the definition of the personal managers/managers in personal marketing competencies' content the main objective of the research was set as following: to find out how the competencies relating to the area of personal marketing, or stemming from the functions of personal marketing are perceived by the managements of the companies operating in Slovakia. As for partial objectives, it was set to find out what forms the content of personal marketing competencies according to the companies' managements and which competencies are perceived and classified as basic manager competencies for the area of personal marketing.

The sample of the respondents was represented by 145 personal managers and managers of middle and big companies operating in Slovakia, who carry out activities and tasks stemming from the functions of personal marketing and at the same time they are members of the companies' managements. For the collection of data, exploration methods were used in the primary research – a questionnaire method and a method of semi-structural interview. The questionnaire contained 30 combined questions, 5 characteristics of personal marketing competencies and 5 characteristics of personal management competencies with an included 5 grade scale of potential answers and was distributed to the respondents by e-mail. As a supplementary method, the method of semi-structural interview by phone was used. For data processing gained from the semi-structural interview, the methods of content analysis, methods of sorting, classification, comparing and generalization were used. For complex evaluation of the gained data and information, standard mathematic-statistical methods were used. The research ran in two phases: in the first one, the respondents in the questionnaire had to mark the personal marketing competencies and competencies of personal management. In the second phase, the respondents had to associate in the same questionnaire the pre-marked contents to individual competencies. The research took place in the periods of February-March 2015 and October-November 2016.

The outcome within the research focused on the definition of managers' competencies in the area of personal marketing was following. The analysis of the respondents' answers oriented on the perception of personal managers/managers in the area of personal marketing competencies demonstrated that, personal managers/managers actually don't differentiate between the competencies of personal marketing and competencies of personal management. Only 6 respondents exactly distinguished the competencies of personal manager/manager related to the area of personal marketing, the rest of the managers perceived all stated competencies in the questionnaire as competencies of personal management. One third of the respondents perceived the competencies related to the area of personal marketing as specific competencies of personal management. All respondents negatively answered the question, whether it is possible to distinguish the type to which each competence belongs to.

The second partial objective of the research was to find out, what forms the content of manager's competencies in the area of personal marketing according to the companies' managements. The base of the starting point was the theoretical knowledge gained from the secondary research, according to which the content of the basic competencies is formed by the following components: knowledge, experience, findings, capabilities, skills and personality characteristics. These components were sorted and presented to the respondents together with situations, which required using some of the listed competencies of personal marketing in order to solve the situation. The respondents were asked to associate individual components to the pre-marked contents of individual personal marketing competencies. With the exception of two, all respondents in different order associated the components to the pre-marked contents of

individual personal marketing components and agreed that skills form the basis of the components in the area of personal marketing (30%). Knowledge and findings were listed on the second place (26%) and experience was listed on the third place by most respondents (22%). Capabilities were listed on the last place by majority of the respondents (9%). Personality characteristics, as a significant component of the personal manager/manager in the area of personal marketing competencies, were not marked by any of the respondents.

The gained results in principle correspond with the authors, who examined the content of competencies in general and also specifically in personal marketing. A minimum difference is in the first component, because some authors W. Meier, (1991), J. A. Freiling (2004), R. M. Grant (2008) consider knowledge, findings and information for the most significant component of the competencies' content, while our respondents listed this component on the second place. In connection with the content of the competencies, we have explored which capabilities and skills are perceived by our respondents and belong to the content of personal marketing competencies according to them. From the skills, the respondents listed effective communication on the first place (96% of respondents). From the capabilities, the ability to motivate people, the ability to manage and evaluate people are listed on the first places. As an important ability, the respondents considered also stress resistance, skill of activity and workflow planning, ability to make decisions independently, ability to face responsibility for the decisions and actions taken. Among various capabilities and skills there were only slight differences, while the respondents in the semi-structural interview often linked these capabilities together and made them mutually dependent one on another.

Another objective of the research was to find out particular competencies that anxiety disorders are associated with. The results show that managers have most worries about their knowledge (63 %), then capabilities (26,5%), skills (13%) and least concerns about their experience (8,3 %). These results prove that knowledge is changing rapidly and it is spread quickly through information technologies without being deeply verified in practice. As a result, some respondents feel that they are not able to obtain, process and apply new knowledge and information in practice. This feeling is getting more common especially with young managers who are used to processing new information flexibly. What is more, several respondents have been diagnosed with information fatigue syndrome and a few of them (12,5%) with information hunger syndrome that we did not study in more detail. However, we can assume that the information fatigue syndrome is mainly caused by a lowered ability to classify information and knowledge.

Analysis of how managers and personnel managers perceive their competencies in the field of personnel marketing also shows that the main cause of managers' anxiety disorders is connected with their ability to demonstrate specific competencies. The respondents claim that their knowledge and other skills are at a required level, but in certain situations they face a "psychological barrier" which prevents them from using these skills and knowledge in resolving particular issues. They regard this worry as "the fear of failure" or "the fear of applying wrong procedures or methods". These worries bring about changes in their mental condition that can be, according to their description, regarded as "anxiety disorders."

The respondents listed seven major symptoms they experienced and were aware of: intrusive thoughts – they constantly kept on asking whether they have used appropriate procedures and methods, being worried whether they have used appropriate procedures and methods, anticipation of failure, re-evaluating decisions and wanting to change them, insomnia and overall increased mental activity, psychological stress, decreased ability to concentrate on specific problems, overall restlessness, uneasiness and worries. Several respondents have already seen a psychologist to get advice on how to improve their mental condition. They think that their condition prevents them from demonstrating their competencies fully on the behalf of their own career and in favour of the objectives of their company.

5. Development of competencies

Nowadays, development of competencies is the subject of theoretical discussion in two basic levels. Firstly, it is a discussion about development of basic components of competencies with regard to effective performance of managerial duties. Secondly, the discussion focuses on development of managerial competencies and their basic components in terms of reduction or elimination of one of the major causes of anxiety disorders that managers suffer from at the present time. The majority of authors deal with knowledge, which they regard as the fundamental and, according to the results of some studies, also the main cause of anxiety disorders and other psychological disorders that managers suffer from. This is based on the fact that insufficient knowledge associated with managerial competencies and unsatisfactory quality of knowledge and information may cause worries and intrapersonal conflicts that can later develop into mental disorders, including the most common anxiety disorders.

What is more, insufficient knowledge has an impact on other components of managerial competencies. Managerial knowledge is based on individual's mental capabilities and psychological potential. This fact is emphasized also by J. Kubeš (2004) and other authors who, on the basis of the pyramid competency model, claim that performance of individual competencies is affected by all individual's inherited and acquired traits concentrated also in the quality of his/her cognitive processes. This finding is significant for determination of procedures and methods aimed at competency development.

Cognitive processes can develop on the basis of individual's inherited traits along with his/her attitudes, interests and ambitions acquired in social interaction and classified in the workplace behaviour categories. In each stage of competency development, it is important to describe the difference between behaviour associated with the lower and higher levels of competency the structure of which affects this behaviour or defects in a knowledge component. Competency development focused on knowledge aims to change employee's/manager's behaviour, which becomes a measurable parameter, and to limit or eliminate the causes of anxiety disorders managers suffer from. The more precise and explicit the description of a knowledge component of managerial competencies is, the more effective its development can be. Furthermore, the clear definition can also limit anxiety disorders caused by the knowledge component.

The approach based on acquisition and development of competencies, which first emerged in the late 20th century in Northern America, is defined by Veteška (2008) as the competency based approach in education (hereinafter referred to as CBA). The CBA is the system in which education and learning are organized according to which competencies and components should be developed. Educators are tasked not to pass information and knowledge on, but rather to indirectly optimize and facilitate the process of competency acquisition and development.

The goal of the competency-based education is to teach learners to effectively handle situations and tasks they will perform and to become gradually independent in achievement of their personal and social goals. In management training and education, educational goals are usually connected with the situations and tasks the performance of which is defined and standardized, for example in competency models of individual organizations or in the national occupational standards. As a result, it is necessary to develop an optimal competency model before launching educational and training programmes for managers. This model should be a basis for an adequate development plan for managers whose competencies need to be developed or whose anxiety disorders, which limit performance of their job, need to be eliminated. Kubeš et al. (2004) presents the results of the study conducted by Jonathan and Ruth Winterton who tried to define the impact that managerial competency development programmes have on managers, companies and the business itself.

In companies and organizations, in which individual performance has improved, such programmes contributed to higher confidence levels, increased awareness of one's own potential and ongoing competency development. Strategic conclusions of this study are very interesting. The first is the fact that the most reliable performance indicator related to managerial competencies, which are the basis for development of managers, is their individual performance and results of the organization as a whole. The strategic conclusion is that the development of managers based on competencies contributes to overall success of the company/organization as well as to good mental health of managers. As a result, it should be supported in companies and organizations. If the competency based approach is connected with the company's strategy or directly results from it, investment in managers will boost.

If the company currently does not employ a sufficient number of employees and managers with required competencies, it has two options: 1. to obtain managers on the labour market; however, there is a risk that the company will pay high costs for these managers from the beginning (for example costly headhunting and high salary from the very beginning) and a possibility that the company will lose them as they can quickly change their employer and take away important information; 2. to invest in development and train its own managers, e. i. to let loyal employees acquire and improve their competencies that they will need for performance of their managerial jobs. According to J. Kubeš et al. (2004), targeted development of employees' competencies will have a direct impact on higher performance of the company/organization and reduction in a number of anxiety disorders that occur in relation to performance of managerial jobs.

6. Conclusion

Nowadays, anxiety disorders associated with manager and personnel manager jobs are quite common. Despite this fact, not enough attention has been paid to this issue in scientific literature. The aim of this paper was to define fundamentals of anxiety disorders in general and in connection to managerial jobs, especially within the contemporary theory of occupational psychology. The primary research was concerned with determining the causes of anxiety disorders amongst managers dealing with personnel marketing and working in companies registered in the Slovak Republic. Considering the sample of the respondents, applied methods and incorporation of this issue into a complex of research problems, we consider the presented results to be the basis for further research. Nevertheless, it can be said that managers suffer from anxiety disorders, that they realize changes in their mental health that cause these disorders and that they try to resolve their psychological problems in cooperation with specialists - psychologists. And this is a positive trend. On the other hand, the research has indicated that occupational psychology has to pay much more attention to anxiety disorders. This is caused mainly by changes in managerial jobs and their competencies. As a result, requirements for training and education of managers have changed as well. Furthermore, the contemporary world gives rise to a number of new problems associated with managerial jobs, which results in an increased number of anxiety disorders and their symptoms as well as new requirements for their diagnosis, prevention and therapy.

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Uplatňovanie podnikového foresightu na Slovensku
The application of corporate foresight in Slovakia

Klaudia Gubová, Brigita Boorová

Abstract
Foresight regarded as one of improving forecasting and strategic planning. On the corporate level continues to systematize and test innovative with proven expertise - forming the basis for successful decision-making. Foresight is a means of enabling prioritize objectives, processes, strategies, investments. One of the best solutions is to create so called. programming mix, which consists of foresight, forecasting and strategic planning. The intention of this paper is to bring foresight methodology to be used as a means of creating the future strategies of the company in Slovakia.

Keywords*: corporate foresight, strategic planning, innovations*
JEL classification*: O2, O31, O32*

1. Úvod

Rozvoj inovácií sa v Európe stáva základným faktorom ekonomického rastu regiónov. Príkladom sú úspešné napredovania regiónov vo Švédsku, Nemecku, Írsku, Fínsku. Postupným zameraním sa jednotlivých regiónov na inovatívne podnikania, ktoré boli podporované zhora (regionálnou vládou) a takisto reštrukturalizáciou tradičných odvetví, sa vytvorili podmienky na ekonomický rozvoj regiónu.

Cieľom stratégie regiónov je založený na rozvoji inovácií, ktoré majú podporiť a zvýšiť rozmach a konkurencieschopnosť firiem na domácom i zahraničnom trhu. Stimuly rozvoja regiónov sú určené a prispôsobené požiadavkami podnikateľov. Konkurencieschopnosť regiónov je silný činiteľ pri budúcom pôsobení a rozvoji podnikateľov. Čím je rozmach regiónov značnejší, tým sa zvyšuje aj úspešnosť domácich i európskych projektov, čím dochádza k rozvoju regionálnej ekonomiky.

Prognózovanie v oblasti vedy a techniky na Slovensku má určitú tradíciu. Ide o súhrnné prognózy Slovenska v druhej polovici 80. rokov, ktorá zahŕňala i časť zameranú na prognózu vedy a techniky, spracovanú Slovenskou akadémiou vied. Pri vypracovávaní uvedenej prognózy sa využívalo široké spektrum expertného zázemia a prieskumy Delphi.

Začiatkom 90. Rokov sa realizoval projekt Slovensko – kroky k Európskej únii – Scenáre sociálno-politického rozvoja, ekonomická stratégia a rozvoj vysokého školstva a vzdelávania do roku 2005, v rámci medzinárodného projektu Stredná a východná Európa v roku 2005.

Projekty v oblasti systémových a vecných aspektov rozvoja vedy a techniky boli spracované inštitúciami Centra vedecko-technických informácií a Zväzom slovenských vedecko-technických spoločností.

V roku 2002 bola spracovaná Vízia vývoja Slovenskej republiky do roku 2020 vo dvoch variantoch. Prvý variant bol vypracovaný autorských kolektívom koordinovaných Inštitútom pre verejné otázky a druhý kolektív Prognostický ústav slovenskej akadémie vied a tím spolupracujúcich expertov.

Najnovšie boli spracované vízie rozvoja ekonomiky do roku 2005 – Ústavom slovenskej a svetovej ekonomiky SAV ako aj do roku 2015 – Prognostickým ústavom SAV, pričom posledne citovaná zahrnovala variantnú prognózu výskumu a vývoja. (Šarmír, 2003)

Z najnovšieho obdobia môžeme spomenúť vo vzťahu Technology Foresight, dva materiály prognostického charakteru týkajúce sa dlhodobého výhľadu priemyselného výskumu na Slovensku:

1. Determinanty formovania priemyselnej politiky v podmienkach globalizácie a integrácie
2. Dlhodobá prognóza priemyselného výskumu a vývoja do roku 2020

V oboch prípadoch sú aj identifikované žiaduce vecné smerovanie výskumného úsilia v technologickej oblasti.

Foresight je nástroj, ktorý je užitočný iba pre určitý typ podnikov. Na základe výskumu realizovaného expertmi v oblasti foresightov bolo zistené, že kým na type podniku záleží pri využívaní nástroja tak na veľkosti podniku naopak nezáleží. (Tyukodi, Hideg, 2016)

Výskum preukázal dôležitosť externých a interných požiadaviek, trhových aspektov, ktoré sú dôležité pri využívaní foresightov v podnikovej praxi. Ako najpodstatnejšie uviedli účastníci prieskumu rýchlo sa meniace prostredie, zložitosť trhu, veľkosť podniku, otvorená myseľ zamestnancov, komunikačné schopnosti. (Sacio Szymanska, 2016).

1.1 Východiská predmetnej problematiky

Cieľom predkladanej stratégie Trenčianskym samosprávnym krajom bolo naštartovanie rozvoja regiónu na báze inovácií.

Trenčiansky kraj sa rozprestiera v západnej časti Slovenska. Hraničí na severe so Žilinským krajom, na východe s Banskobystrickým, na juhovýchode s Nitrianskym, na juhozápade s Trnavským krajom a na západe s Českou republikou.

Trenčiansky samosprávny kraj má vďaka blízkosti k hraniciam Českej republiky, vďaka polohe na hlavnom dopravnom ťahu v smere sever – juh a zároveň polohe medzi Bratislavou a Žilinou strategickú geografickú polohu.

Trenčiansky kraj je jedným z ekonomicky najsilnejších regiónov Slovenska a po Bratislavskom kraji aj najpriemyselnejší. Dlhoročnú tradíciu tu má priemysel odevný a textilný (Merina Trenčín, Ozeta Trenčín, Makyta Púchov), potravinársky (Nestlé Food Prievidza, Milex Nové Mesto nad Váhom), ale aj strojársky, chemický (NCHZ Nováky), gumárenský (Matador Púchov, Ve-gum Dolné Vestenice), sklársky (LR Crystal Lednické Rovne) a ťažobný priemysel (Hornonitri-anske bane Prievidza). Strojárska výroba bola v minulosti orientovaná najmä na zbrojné účely, a preto je dodnes v procese značnej reštrukturalizácie. Pre región ako celok je charakteristická tradičná rozvetvenosť priemyselnej základne. Z priemyselných odvetví je v regióne zastúpený najmä priemysel strojársky, gumárenský, elektro-technicky, textilný, odevný, sklársky, banský, drevospracujúci, chemický, kožiarsky, potravinársky, výroba stavebných hmôt a výroba elektrickej energie. V súčasnosti je útlmom postihnuté najmä baníctvo, výroba špeciálnej (zbrojárskej) techniky, textilný a obuvnícky priemysel. Dokument regionálnej inovačnej stratégie vznikol na základe viac než dvojročného úsilia celého konzorcia riešiteľov projektu RIS INSTIT.

Metodiku a metodológiu regionálnej inovačnej stratégie tvorili analytické štúdie, technologické audity, dotazníkové prieskumy a osobné stretnutia členov riešiteľského tímu s relevantnými subjektmi. Pri tvorbe regionálnej stratégie Trenčianskoho samosprávneho kraja sa brali do úvahy názory a pripomienky podnikateľov regiónu a zohľadnili sa ich požiadavky pre úspešnejšiu implementáciu stratégie do vtedajších podmienok. Predmetom analýz sa stala súčasná inovačná štruktúra v regióne, podpora inovácií z národnej a európskej úrovne, analýza ekonomického potenciálu regiónu a ďalšie. (Slabeycius, 2012)

Analýzy využité v prvom kroku realizácie stratégie boli základom pre vytvorenie budúceho rozvoja regiónu metódou foresight. Na uvedenej metóde sa podieľali experti z rôznych oblastí, ktorí využívali rozličné metódy a techniky pri formulovaní vízií budúcnosti. Experti pri vypracovaní záverov stanovili 4 scenáre, ktoré mali vlastné špecifiká a charakteristiky.

Prvým bol zotrvačný scenár, ktorý bol charakterizovaný ako scenár zachovávajúci trendy, ktoré sú evidentné v poslednom období 2 – 5 rokov. Charakteristikou je neexistencia jednotnej regionálnej inovačnej stratégie, samovoľný vznik inštitúcií, resp. aktivít, ktoré sú skôr dôsledkom iniciatívy centrálnych štátnych orgánov, zahraničných a nadnárodných organizácií. Horizontálna PR27/60 Regionálna inovačná stratégia pre trenčiansky región Projekt RIS INSTIT je kofinancovaný zo zdrojov 6. Rámcového programu Európskej únie. Spolupráca inštitúcií je minimálna. Expertný tím nazval tento scenár *„čiernou dierou“,* pretože mnohé vzniknuté zámery a projekty nemajú trvalú udržateľnosť a po čase zanikajú.

Zotrvačný scenár „čierna diera“ bol trendovým pokračovaním súčasného stavu, ktorý by sme charakterizovali ako „neriadený vývoj zdola“, resp. vznik náhodných aktivít na podporu inovácií. Riešiteľský tím zaujal k „zotrvačnému scenáru“ stanovisko, že je neprípustný, nakoľko znamená mnohé riziká pre región, avšak napriek tomu ho nemožno úplne vylúčiť.

Výskyt aktivít sa dá predikovať extrapoláciou trendov doteraz prebiehajúcich. Je to proces lineárny a scenár vystihuje stav v roku 2015. Zotrvačný scenár neprinášal novú kvalitu a nevedie k novej pridanej hodnote v oblasti podpory inovačného diania v Trenčianskom kraji.

Po druhé je to rozvojový scenár, ktorý bol definovaný ako scenár vychádzajúci z podmienok, ktoré vytvára okolie (Európska komisia a vláda SR) a región pružne reaguje a využíva možnosti na rozvoj inovácií. Experti nazvali rozvojový scenár – „zornička a večernica“ pretože región má jasné smerovanie v oblasti inovácií, má vytvorenú regionálnu inovačnú stratégiu, ktorá sa postupne implementuje a región pružne reaguje na podnety z národnej a európskej úrovne. Rozvojový scenár slúžil na základe odporúčania expertného panelu a diskusie v regióne ako základ pre spracovanie regionálnej inovačnej stratégie.

Rozvojový scenár je možné zrealizovať za predpokladu, že sa príjme komplexná stratégia (definovaná v RIS), ktorá bude obsahovať systémové opatrenia vedúce k zásadným zmenám v Trenčianskom kraji.(Slabeycius, 2012)

V súčasnosti, v čase rozvoja znalostnej ekonomiky sa pri foresightoch kladie dôraz na vedecko-výskumný rozvoj, čo tvorí pevné zázemie pre transfer technológií a techniky, prenos intelektuálnych práv ako know-how, dizajnu, obchodného tajomstva, patentov. Môžeme skonštatovať, že rozvojom priemyselných práv a zvýšením povedomia o intelektuálnom kapitále v regiónoch rastie atraktivita uvedených práv i transferov týchto práv, čím sa jednotlivé regióny stavajú konkurencieschopnejšie.

Výsledky foresightu následne dali základnú podobu návrhu regionálnej inovačnej stratégie pre trenčiansky región.

Dokument regionálnej inovačnej stratégie vznikol v rámci projektu, ktorý bol podporený z finančných prostriedkov 6. rámcového programu Európskej únie. Na jeho vzniku sa spolu s Trenčianskou univerzitou Alexandra Dubčeka ako koordinátorom podieľali ďalší 3 slovenský partneri a dvaja zahraničný partneri, ktorých cieľom bol transfer poznatkov, know – how a skúseností.

Konzorcium riešiteľov projektu RIS INSTIT bolo nasledovné:

- Trenčianska Univerzita Alexandra Dubčeka v Trenčíne - koordinátor projektu,
- Trenčianska regionálna komora SOPK- partner projektu,
- Rozvojová agentúra Trenčianskeho samosprávneho kraja - partner projektu,
- BIC group s.r.o. Bratislava - partner projektu,
- Zentrum für Innovation und Technik in NordRheinWestfallen- zahraničný partner projektu (Nemecko),
- Instituto Tecnológico de Aragón, Zaragoza.

Z predchádzajúcich analýz bol riešiteľským tímom použitím metódy foresight zostavený budúci obraz Trenčianskeho regiónu v oblasti inovácií do roku 2015. Pri definovaní možných alternatív stavu v roku 2015 je možné zvoliť širokú paletu možností. Na základe

predchádzajúceho vývoja boli definované 2 základné scenáre, ktoré definoval expertný panel. Pravdepodobnosť ich výskytu je vysoká a zároveň sa dajú veľmi ľahko porovnávať a interpretovať ich dopady na regionálnu ekonomiku.

Tieto akcie možno označiť za míľniky, ktorých cieľom je postupne napĺňať dlhodobé ciele a priority RIS. Krátkodobé ciele alebo míľniky možno definovať nasledovne:

1. Inovačný rozvoj regiónu sa bude uskutočňovať na základe regionálnej inovačnej stratégie, ktorá bude súčasťou rozvojových dokumentov Trenčianskeho kraja.
2. Inštitúcie a organizácie trenčianskeho regiónu sa budú zapájať do inovačných projektov a programov a zvýši sa absorpčná kapacita regiónu na 80 percent z hľadiska domácich a európskych programov a projektov.
3. Vzdelávací systém v Trenčianskom kraji bude reagovať na požiadavky hospodárskej praxe.
4. Väčšina podnikov Trenčianskeho kraja bude kontinuálne inovovať výrobný proces, produkty alebo služby.
5. Výrazne sa zvýši konkurencieschopnosť podnikov regiónu a zabezpečí sa rozšírenie ich trhov aj mimo región a do zahraničia.
6. V roku 2015 bude plne dobudovaná inštitucionálna regionálna inovačná štruktúra.
7. Región sa stane špičkovým slovenským regiónom v oblasti inovácií.

Projektom technologického foresightu bol projekt 6. rámcového projektu FUTURE FOOD „Healthy and Safe Food for the Future“ . Zámerom projektu bolo zistiť, ako bude vyzerať dopyt a ponuka na potravinovom trhu v roku 2020 v Bulharsku, Českej republike, Chorvátsku, Maďarsku, Rumunsku a Slovensku – teda v krajinách strednej a východnej Európy. Počas analýzy experti uvažovali o ekonomickom, technologickom, sociálnom stave danej a na základe toho stanovili komplexné faktory ovplyvňujúci foresight.

Hlavným zámerom projektu bolo napomôcť potravinovým reťazcom v krajinách severnej a východnej Európy, aby dosiahli medzinárodnú úroveň v oblasti kvality a bezpečnosti potravín a aby sa stali konkurenčným faktorom v európskom a celosvetovom trhu. Partnermi v implementácii a realizácii boli štáty Bulharsko, Česká republika, Chorvátsko, Maďarsko, Rumunsko a Slovensko.

Hlavným cieľom projektu bolo podporiť prienik novej rozhodovacej kultúry medzi manažérov a politikov za účelom toho, aby sa otázky kvality a bezpečnosti stali centrom pozornosti v sú časnosti ako i v procese budúcich zmien; identifikovať budúce kľúčové technológie a nové podnikateľské modely za účelom podpory požiadaviek na kvalitné a bezpečné potraviny v krajinách severnej a východnej Európy.

Obsahom projektu bol zameraný na:

- Celú potravinová reťaz, princíp od „farmy“ po „vidličku“ – (from „farm“ to „fork“).
- Kľúčové technológie, ktoré by mohli ovplyvniť budúcnosť sektoru – ako biotechnológia, konzervácia, balenie, čisté technológie, a ICT.
- Spoločenské požiadavky, ktoré predstavujú kľúčový faktor ovplyvňujúci budúcnosť potravín.

Za metodológiu projektu bol zvolený technology foresight. V rámci metodológie bola pomocou identifikácie a systematickej analýzy budúceho stavu príležitostí a hrozieb odhadovaná orientácia na budúcnosť, pričom sa zobrali do úvahy sociálne, technologické, ekonomické, environmentálne a politické faktory ako i systémové hodnoty pre stakeholderov.

Na projekte sa angažovalo veľké množstvo odborníkov a stakeholderov s rôznymi oblasťami znalostí, odbornosti a naakumulovaných skúseností – obchodníkov, konzumentov, technologických expertov, výskumníkov, politikov a neziskových organizácii. Intenzívnou komunikáciou medzi uvedenými účastníkmi projektu sa vytvoril konsenzus o faktoroch, ktoré najviac ovplyvnili budúci stav. Základom technology foresight je konať v súlade so

vyplývajúcimi závermi a vytváranie nových prepojení, najmä medzi výskumom a výrobou, dopad ich spolupráce na vytváranie nových štandardov, zákonov a postupov vo vzťahu k politikom.(Šarmír, 2003)

Na základe zrealizovaných prieskumov z roku 2009 v rámci rôznych krajín sveta bolo zistené, že v rámci Slovenska boli najčastejšie využívané metódy foresightu v podiele 10% písanie esejí, 24% megatrendová analýza, 98% prieskum odbornej literatúry. Podľa názoru slovenských expertov najčastejšie využívaná metóda v slovenských podmienkach foresightu boli použíté metódy dotazníkového prieskumu v podiele 21% a v podiele 23% metóda Delphi. (Jemala, 2012)

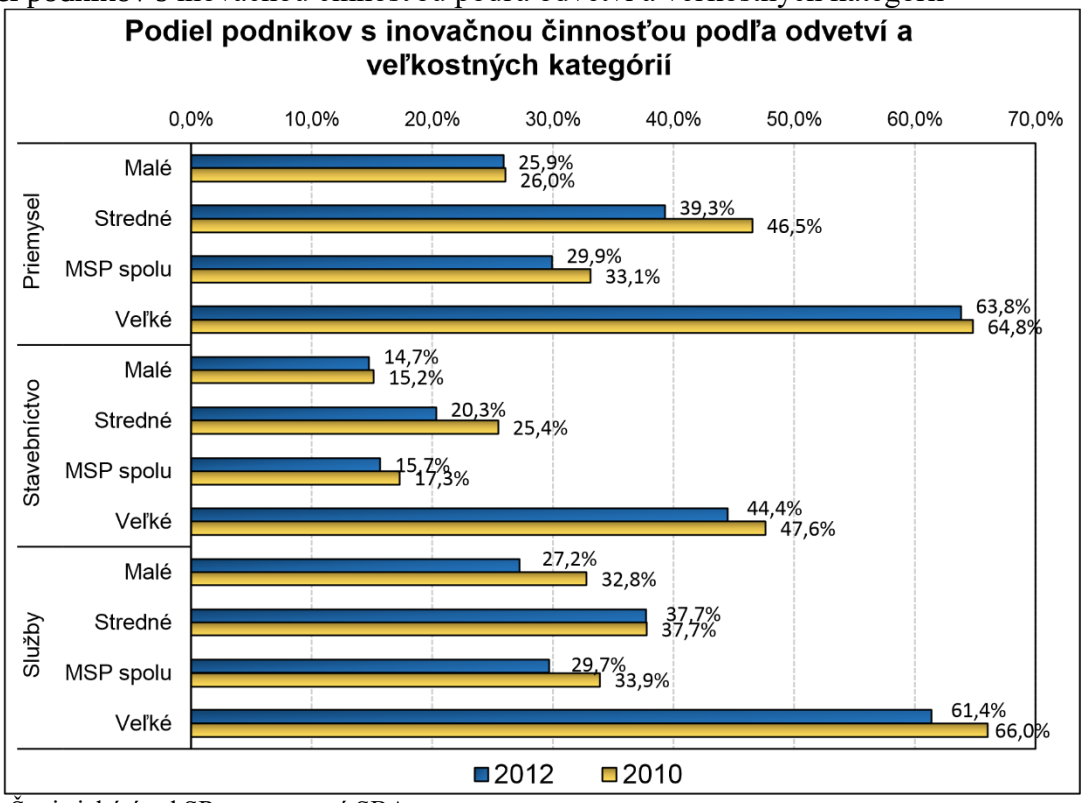
Na projektoch technology foresighte na Slovensku sa podieľalo cca. 160 ľudí, ktorí boli rozdelení do 14 skupín. Program prebiehal na štátnej, regionálnej úrovni. Využívanými metódami boli dotazníkový prieskum a názory expertov t.j. metóda Delphi. Výstupmi boli parametre a scenáre rozvoja pre rok 2015. Výsledky posudzovali a odsúhlasovali „národné autority“ ako samospráva, štátne inštitúcie, ministerstvá.

2. Využívanie foresightového nástroja v podmienkach SR

V súčasnosti sa foresight stiahol do úzadia v podmienkach SR. Tento stav v čase turbulentných zmien a rýchleho technického rozvoja stáva problémom. Hlavným problémom je nízka podpora vedy a výskumu SR, vysoká nezamestnanosť, nízka spolupráca univerzít s podnikateľskou sférou a veľmi špecifická klasifikácia zamestnanosti podľa odvetví. Ako sme uvádzali v horeuvedenom texte na Slovensku je špecifická skupina živnostenského podnikania, čo vytvára veľmi nezvyčajný jav v makroekonomických ukazovateľov. Uvedená skupina zamestnanosti patrí medzi malé a mikropodniky, ktoré nemajú dostatočné finančné prostriedky na zapojenie sa do vedecko-technických projektov.

Na základe analýzy sa korporatívny foresight využíva hlavne vo veľkých firmách (približne 10% anglických a dánskych podnikov) (D. Güemes-Castorena, G. R. Rivera, A.V.González, 2013), ktoré sú vystavené intenzívnejším globálnym rizikám a tiež hlavne vo výrobných podnikoch, ktoré sú výrazne ovplyvnené technickým a technologickým pokrokom. Približne 40% priorít identifikovaných vo foresightoch sa premietne do aj strategických plánov firiem (R. Rohrbeck, N. Thom, 2008). Foresight v MSP sa používa predovšetkým pre strategické plánovanie (1,7 % nemeckých firiem) a identifikovanie nových oblastí inovácií (2%). Tieto informácie sa považujú za užitočné pre zlepšenie výrobku (2,2 %) a pre plánovanie nových obchodných modelov (2,3 %), pre investičné rozhodnutia a riadenie rizík (2.4 %) (U. Pillkahn, 2008). Veľké a stredné spoločnosti v podmienkach Slovenska sú dcérskymi spoločnosťami zahraničných spoločností, ktoré majú výskumno-vývojové oddelenia v materskej krajine, tým výskum a vývoj klesá v celoslovenskom meradle.

Graf 1
Podiel podnikov s inovačnou činnosťou podľa odvetví a veľkostných kategórií



Zdroj: Štatistický úrad SR, spracované SBA

Uvedený graf 1 znázorňuje podiel podnikov s inovačnými činnosťami, podľa odvetví (priemysel, stavebníctvo, služby) a veľkostných kategórií (malé, stredné, malé a stredné dokopy a veľké) na Slovensku za roky 2010 a 2012. Môžeme si všimnúť, že inovačná aktivita podnikov sa nezlepšuje, ale naopak klesá, čo vyplynulo aj z prieskumu Community Innovation Survey 2012, ktorý realizoval Eurostat. (Eurostat)

V odvetví priemyslu najvyššiu inovačnú aktivitu za rok 2012 dosahujú veľké podniky 63,8% aj napriek poklesu 1% oproti roku 2010. Odvetvie posilňuje automobilový priemysel, ktorý je hlavný ťahúň slovenskej ekonomiky. Na Slovensku máme tri veľké automobilky: KIA Motors Žilina, PSA Peugeot Citroën Trnava, VW Bratislava a štvrtá práve prichádza na náš trh – Jaguar Land Rower Nitra. Spustenie výstavby nového automobilového závodu bolo zahájené 13.09.2016 a očakáva sa nárast našej ekonomiky o 3,4 %. Spoločnosť má v pláne preinvestovať v najbližších troch rokoch 1,18 miliardy eur a ďalších 225 miliónov eur v nasledujúcich dvoch rokov. Ročná kapacita je naplánovaná na 150 tisíc automobilov a prvý by mal byť vyrobený do dvoch rokov.

V stavebníctve bola zaznamenaná najnižšia úroveň inovácií, iba 14,7 % pri malých podnikoch. Ako v každom z uvedených odvetví, aj v tomto najvyššiu inovačnú aktivitu vyvíjajú veľké podniky, až 44,4%.

K poslednému odvetviu z pomedzi analyzovaných odvetví patrí službám. Terciárny sektor zahŕňa všetky odvetvia ľudskej činnosti, ktorých podstatou je poskytovanie služieb, teda poskytovanie práce, vedomostí, finančných prostriedkov, infraštruktúry, výrobkov, logistiky alebo ich vzájomná kombinácia. Aj v tomto prípade sú na čele veľké podniky. Slovensko sa aj vďaka automobilovému priemyslu, FMCG (*Fast-moving consumer goods),* CPG (*Consumer packaged goods)* ale najmä pre svoju výbornú polohu v srdci Európy, politickej stabilite, kvalifikovanej pracovnej sile stáva veľmi atraktívnou krajinou pre logistické podniky, ktoré

prispievajú svojimi inovačnými činnosťami v oblasti služieb. Najnižšiu aktivitu za rok 2012 dosahujú opäť malé podniky 27,2%, čo tvorí pokles 5,6 % oproti roku 2010.

Tabuľka 1
Podiel MSP s inovačnou činnosťou v krajinách V4 v roku 2012

Krajiny V4	Podiel MSP s inovačnou činnosťou v %
Slovenská republika	**32,3%**
Česká republika	**42,0%**
Maďarsko	**31,1%**
Poľsko	**21,3%**

Zdroj: Vlastné spracovanie podľa Eurostat.

V rámci porovnania inovačnej aktivity medzi krajinami V4 za rok 2012 sme na druhom mieste s 32,3%. Prvé miesto patrí Českej republike 42%, tretie miesto obsadilo Maďarsko s 31,1% a posledné je Poľsko 21,3%. Aj napriek uvedenému, Slovensko sa zaraďuje medzi krajiny s podpriemernými inovačnými činnosťami MSP v rámci krajín EÚ.

Tabuľka 2
Zamestnanosť v SR za roky 2002 – 2014 podľa veľkosti podnikov

Podniky v SR podľa počtu zamestnancov	Zamestnanosť v % za jednotlivé roky												
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SZČO	25,39	28,57	30,1	30,66	37,2	36,6	36,4	37,3	36,7	35,93	35,99	35,98	35,5
Malé podniky (0-49)	18,59	19,06	20,4	20,45	18,8	19,6	20,4	19,4	20,5	21,26	21,87	21,99	22,7
Stredné podniky (50-249)	18,02	18,35	18,9	19,66	15,5	15,2	14,8	15	15,1	15,04	13,98	13,8	14,5
Veľké podniky (250+)	38	34,02	30,6	29,23	28,5	28,7	28,4	28,3	27,8	27,77	28,16	28,23	27,3
Spolu % (všetky podniky + SZČO v SR)	100	100	100	100	100	100	100	100	100	100	100	100	100

Zdroj: Vlastné spracovanie

Na Slovensku sa podniky podľa veľkosti delia na malé podniky (do 49 zamestnancov), stredné podniky (od 50 do 249 zamestnancov) a veľké podniky (nad 250 zamestnancov). Podľa údajov Slovak Business Agency na Slovensku tvoria malé a stredné podniky (MSP) až 99,9 % z celkového počtu podnikateľských subjektov, poskytujú pracovné príležitosti pre takmer 75 % aktívnej pracovnej sily a podieľajú sa na hrubej produkcii a tvorbe pridanej hodnoty viac ako 50 %. (SBA, 2014)

Špecifickou črtou zamestnanosti pre Slovenskú republiku je živnosť. Živnosť je forma podnikania, je to sústavná činnosť prevádzkovaná samostatne, vo vlastnom mene, na vlastnú zodpovednosť, za účelom dosiahnutia zisku. Živnostenské podnikanie môže prevádzkovať fyzická osoba aj právnická osoba. Podmienky prevádzkovania živnosti upravuje zákon č. 455/1991 Zb. Zákon o živnostenskom podnikaní (živnostenský zákon) v znení neskorších predpisov. (Živnostenský zákon č. 455/1991 Zb.)

Z uvedenej tabuľky vyplýva, že iba dve kategórie podnikov zaznamenali nárast zamestnancov od roku 2002 do roku 2014, a to malé podniky a živnostníci. Zamestnanosť v malých podnikoch sa za pozorované obdobie jemne navýšila z počiatočných 18,59% v roku 2002 na 22,07%. Pri stredných a veľkých podnikoch môžeme pozorovať pokles zamestnanosti.

Pokles zamestnanosti v podnikoch a zvyšujúci nárast živnostníkov na Slovensku spolu úzko súvisia. Zamestnávatelia musia za svojich zamestnancov platiť vysoké odvody do sociálnej a zdravotnej poisťovne. Každý podnik hľadá cestu ako znížiť svoje náklady, najmä mzdové. Využívanie na rovnakú prácu živnostníka a nie kmeňového zamestnanca má pre podnik obrovskú výhodu. Na živnostníka sa nevzťahujú už spomínané odvody do sociálnej a zdravotnej poisťovni, ale ani pracovnoprávny vzťah zamestnávateľ – zamestnanec a pod. Vzťah je zmluvný, formou dohody, resp. objednávky a živnostník vystaví podniku za uskutočnenú prácu faktúru, ktorú podnik uhradí a maximálne zaplatí DPH 20%. Živnostník si platí odvody do sociálnej a zdravotnej poisťovni sám za seba.

Príklad: priemerná mesačná mzda za rok 2015 bola na Slovensku 883,- eur brutto. Zamestnanec zaplatí na odvodoch 13,4% z hrubej mzdy a zamestnávateľ ešte musí zaplatiť za zamestnanca odvody vo výške 35,2%. Keď má ale na uvedenú prácu najatých živnostníkov, uhradí iba vystavenú faktúru a zaplatí nanajvýš DPH, ktoré je na Slovensku 20%, čo predstavuje rozdiel cca 15,2% na mzdové náklady na osobu.

Práve foresighty by mali byť hlavným nástrojom pri riešení uvedených problémov a formulácie vízie Slovenskej republiky i vedecko-výskumnej politiky ako napríklad iniciovať výskumné procesy, investície smerujúce do oblasti vedy a techniky, určovať smerovanie trendov a aplikovanie metód, ktorými by sa dosiahli hlavné strategické ciele. Veda a výskum je silno závislá na príjmoch zo štátneho rozpočtu krajiny. Práve z toho dôvodu je primárnym účelom foresightov napomáhanie pri strategických rozhodovaniach verejných inštitúcií.

Po analýze situácie corporate foresightov na Slovensku sme dospeli k niekoľkým nedostatkom, ktoré po nápravných opatrenia a riešením pomocou technology foresight môžu prispieť k fungovaniu corporate foresightov vo firemnej sfére. Spomínanými nedostatkami sú malá koordinácia SME pri realizácií výskumno-vývojových projektoch, nedostatočná synergia medzi národnými a európskymi programami, nedostatok motivačných nástrojov pre výskumno-vývojové aktivity zo strany štátu, nedostatočný záujem o výsledky a výstupy z V a V zo strán podnikov.

3. Záver

Na základe výskumu foresightov na Slovensku môžeme skonštatovať, že v súčasnosti narastá potreba využitia Technology foresightu nielen v rámci ministerstiev, vládnych agentúr, inštitúcií, ale potreba v rámci súkromných firiem, korporácií, automobilovom priemysle, univerzít. Práve tu vzniká priestor pre novodobé smerovanie a kooperáciu základných inštitúcií na Slovensku. Ako pozitívny príklad regionálneho foresightu môžeme uviesť technology foresighty v trenčianskom, žilinskom, banskobystrickom a košickom regióne, ktoré boli zamerané na štúdiá o súčasnej úrovni inovačnej štruktúry v danom regióne, aktuálnu situáciu v MSP a prekážky obmedzujúce ich ďalší rast, (Forum statisticum Slovacum, 2012), Technologické audity a osobné pohovory vo firmách v regióne, Monitorovanie postojov k inováciám v danom regióne. Práve v týchto projektoch je možné poukázať na úspešnú spoluprácu medzi rôznymi inštitúciami, ktorá viedla k úspešnému dosiahnutiu strategických cieľov na úrovni regiónov.

Zámerom uvedeného článku je zvýšenie povedomia a zainteresovanosti využívania podnikov korporatívneho foresightu, ktorý integruje vedecký, konkurenčný, zákaznícky či produktový foresight.

Poznámka

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