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## **A SOCIAL SCIENCES**



AA	PHILOSOPHY AND RELIGION
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AQ	SAFETY AND HEALTH PROTECTION, SAFETY IN OPERATING MACHINERY

# THE CONTROL IN MUNICIPALITY SELF-GOVERNMENT OF THE SLOVAK REPUBLIC

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**Abstract:** The control system of the public administration of the Slovak Republic is regulated by several laws, on top of which stands the very Constitution of the Slovak Republic. The control activity is carried out by the authorities that are delegated to carry out checks directly from the Act, whose objective is to determine the objective status of the facts, and the management of financial management and other means of public investment. The main objective of the article was to analyze and present effectivity and function of internal control system in the individual municipality size categories in the Slovak Republic.

**Keywords:** public administration, municipality, internal control system, chief auditor, legislation on municipality control system

## 1 Supreme Audit Office of the Slovak Republic

The most significant change extending and significantly enhancing the control competence of Supreme Audit Office of the Slovak Republic also to public resources until then excluded from the competence of Supreme Audit Office of the Slovak Republic, was gained by the amendment of the Constitution of the Slovak Republic that came into force on January 1st, 2006. The constitutional Act No.463/2005 Coll. extended the control competence of Supreme Audit Office of the Slovak Republic to control local self-government refer to property management, property rights, funds, obligations and claims in the municipality, upper-territorial units, legal entities with capital participation of municipalities, legal entities with capital participation of upper-territorial units, legal entities established by municipalities or legal entities established by upper-territorial units or upper-territorial units. However, in order to enable that Supreme Audit Office of the Slovak Republic can within the given competence plan audit of bodies of the local self-government, amending of the Supreme Audit Office of the Slovak Republic Act was necessary. This amending defined the scope and method of audit execution within the municipalities and upper-territorial units or legal entities established by the local self-government and their capital participation.<sup>1</sup>

Amendment of the Act No. 39/1993 Coll. on the Supreme Audit Office of the Slovak Republic as amended by provisions of the Act No. 261/2006 Coll., that came into force on May 13th 2006, significantly strengthened the subject and personal auditing competence of Supreme Audit Office of the Slovak Republic in relation to local self-government.

Supreme Audit Office of the Slovak Republic audit activities pursuant to Article 2 of the Act No. 39/1993 Coll. on the Supreme Audit Office of the Slovak Republic in relation to local self-government refer to property management, property rights, funds, obligations and claims in the municipality, upper-territorial units, legal entities with capital participation of municipalities, legal entities with capital participation of upper-territorial units, legal entities established by municipalities or legal entities established by upper-territorial units, the methods of levying and recovering taxes, custom duties, payments of contributions, charges and fines forming revenues of the budgets of municipalities and upper-territorial units.

Pursuant to Article 4 of the Act No. 39/1993 Coll. on the Supreme Audit Office of the Slovak Republic, the auditing competence applies to municipalities and upper-territorial units, legal entities established by municipalities, legal entities established by upper-territorial units, legal entities with capital participation of municipalities and legal entities with capital participation of upper-territorial units.

After amending of the Act No. 39/1993 Coll. on the Supreme Audit Office of the Slovak Republic, the auditing competence refers to all public funds of local self-government and property, not only to the audit of funds the self-government received for the settlement of costs for transferred competencies of state administration bodies, allocations from the national budget and funds received within development programmes or due to other similar reasons from abroad. The auditing competence has been extended also to all legal entities established by municipalities and legal entities established by upper-territorial units, as well as to legal entities established by local self-government in order to run business.

The reform of public administration and a new system of its financing was the reason for extending the Supreme Audit Office of the Slovak Republic auditing competence. The volume of financial sources was transferred to the field of self-government, what meant that the state could not release from its responsibility for effective functioning of public administration and effective management of public finances. Internal audit on the level of local self-government was insufficient, as some municipalities did not have and still do not have the main auditor, where if this position is established, there is dependence on a municipality authority, which elects, dismisses, determines salary and working hours of the chief auditor. By extending the auditing competence of Supreme Audit Office of the Slovak Republic to all public finances, i.e. to the own income of municipalities and upper-territorial units, on which the respective administration authorities of these entities decide independently, the absence of independent audit of municipalities and upper-territorial units in full scope was eliminated. At the same time, recommendations of the International Organisation of Supreme Audit Institutions - INTOSAI for the objective assessment of local self-government in full scope were met. Extending the auditing competence of Supreme Audit Office of the Slovak Republic was important from the point of view of needs for NC SR, during its decision making process in the given area, providing information on audit results the other body cannot deliver in sufficient scope. Information can be used also by other bodies (e.g. the state administration authority at decision making on providing allocations from the SR national budget).<sup>2</sup>

## 2 Chief municipality auditor

The chief auditor function is considered to be a basis pillar of the municipality system. It is an elected function, he/she is elected by the municipality authority pursuant to Article 11, (4), (j) of the Act No. 369/1990 Coll. on Municipalities as amended.

Article 18 of the Act No. 369/1990 Coll. on Municipalities as amended regulates the position of the chief auditor; precondition for the performance of his/her duties; the scope of audit activities; the rules of audit activities; and tasks of the chief auditor.

The chief auditor is an auditing body of the municipality and at the same time he/she is a municipal employee. Rights and obligations of the municipality chief auditor are governed by the Act No. 369/1990 Coll. on Municipalities as amended, as well as by the Act No. 552/2003 Coll. on Performance of Work in Public Interest as amended. The chief auditor as the municipal employee has all rights and duties of a manager.<sup>3</sup>

The chief auditor performs his/her duties with complete impartiality and independence in accordance with the main rules for auditing activities.

<sup>1</sup> Najvyšší kontrolný úrad Slovenskej republiky.: 20. výročie Najvyššieho kontrolného úradu SR 1993 – 2013. [online]. 2015 [cit. 2016-05-05] Available on the Internet: <http://www.nku.gov.sk/en/publikacie>.

<sup>2</sup> Jasovský, J.: *Kontrolná činnosť NKÚ SR v územnej samospráve v období rokov 2006 – 2009*. [online]. 2010 [cit. 2016-05-05] Available on the Internet: <http://www.nku.gov.sk/documents/10157/15a1190e-93db-46aa-90c1-cdc29ec1f69c>.

<sup>3</sup> Veverková, I., *Ekonomické minimum hlavného kontrolóra*. Bratislava: Iura Edition, 2013. 279 p. ISBN 978-80-8078-678-6.

The scope of activities of the chief auditor is specified by the Act No. 369/1990 Coll. on Municipalities as amended and Act No. 502/2001 on Financial Control and Internal Audit as amended.

Pursuant to Article 11 of the Act No. 502/2001 on Financial Control and Internal Audit as amended, the chief auditor is the main auditing body performing ex post financial control and verifies:

- the objective condition of inspected facts and their compliance with special regulations, international agreements based on which the Slovak Republic received funds from abroad, decisions issued on the basis of special regulations or internal principles of management focusing at the principles of economy, efficiency and effectiveness when managing public funds,
- meeting the requirements for public funds provision and meeting the requirements of public funds use,
- performance of interim financial review,
- adherence to the defined procedure for interim financial review delivery,
- delivery of measures to remedy the shortcomings found out by financial review and elimination of its causes.

The chief auditor performs ex post financial control in the municipality focusing at meeting the principles of economy, efficiency and effectiveness when managing public funds, the review of compliance with the legal conditions for public funds provision and use.<sup>4</sup>

### 2.1 The scope of the chief auditor activities

The chief auditor conducts audits to the extent set out in Article 18d of the Act No. 369/1990 Coll. on Municipalities as amended as follows:

- control of legality, efficiency, economy and economic efficiency during management of property and municipality property rights as well as during management of property used by the municipality according to specific regulations,
- control of claims and petitions solving,
- control of municipality incomes, expenses and financial operations,
- control of following generally binding legal regulations including municipality regulations, control of fulfilment of the local council decrees,
- control of internal municipality regulation fulfilment,
- control of other tasks setup by the specific regulation fulfilment.

The chief auditor has the competence to control the municipal office; budget and contribution organisations established by the municipality; legal entities, in which the municipality has an investment, and other entities that manage the municipality property or to which the municipality property was given to use within an extent affecting this property; entities, which received grants for specific purposes or repayable or non-repayable financial support from the municipality budget according to specific regulation within the extent of these funds use.<sup>5</sup>

### 2.2 Tasks of the chief auditor

The chief auditor fulfils other tasks according to § 18f of the Act No. 369/1990 Coll.:

- performs control within the extent of the provision in 18d,
- once in six months submits the proposal of auditing activity plan to the local council which must be published

within 15 days prior to its hearing within the local council session, and in a form common within the municipality,

- at least once a year submits a report on auditing activity to the local council, within 60 days from the last day of the calendar year,
- submits report on audit results directly to the local council at its earliest session,
- develops expert statements on municipality budget proposal and account closing prior to its approval within the local council,
- deals with complaints, if states so within the Act No. 9/2010 Coll. on complaints,
- cooperates with state authorities in the matter of management of funds allocated to the municipality from the state budget or structural funds of the European Union,
- fulfils other tasks defined by a specific law, such as e.g. Act No. 583/2004 Coll. on budgetary rules of the local self-government as amended by other acts,
- is obliged to perform audit if requested by the local council,
- is obliged to upon request present the results of an audit to a member of local council or the mayor.

The chief auditor participates in the local council sessions and has a consultant role; he/she can participate also in sessions of the commissions established by the local council.

### 3 The analysis of the control system effectiveness

The following analysis will present some of the negatives within the chief auditors activity. The representative group for the analysis included 93 municipalities taking into account the size and geographic representation of the whole group of municipalities in SR. The data for the analysis were taken from individual protocols (records) of the Supreme Audit Office of the Slovak Republic on the results of the audit on effectiveness and efficiency during the competences execution of the municipalities of the Slovak Republic.

The analysis of the control system effectiveness was aimed to discover whether the municipality had a chief auditor elected according to provisions of § 11 Art. 4 letter j) of the Act on municipality establishment, where the local council elects and withdraws the municipality chief auditor. In terms of § 30a Art. 2, the municipalities where chief auditor is not elected, or within municipalities where chief auditor does not perform its activity of several municipalities, the chief auditor shall be elected in accordance with this act by the 1st January 2005.

From the total number of 93 municipalities, there were 2 municipalities with the number of inhabitants up to 199 inhabitants which did not have elected chief auditor due to the fact that the local council did not announce the elections of chief auditor in terms of the § 18a Art. 2 of the Act on municipality establishment due to the lack of financial resources.

The analysis was also aimed at whether the chief auditor was at the same time an auditor in other municipality/municipalities. In 2013 some chief auditors performed their activities also in other municipalities. The analysis showed that from the total number of 93 municipalities, 48 % had a chief auditor, who performed his activity also in other municipalities. Within the municipalities with number of inhabitants up to 199, 50 % of chief auditor were at the same time a chief auditor also in other municipalities. Within municipalities with the number of inhabitants from 200 to 499, it was 68 % of chief auditor, within municipalities with number of inhabitants from 500 to 999, it was to 40% of chief auditor. In municipalities with 1 000 to 1 999 inhabitants, it was 39 % of chief auditor, within municipalities with the number of inhabitants from 2 000 to 4 999, it was 44%, in municipalities with 5 000 to 9 999 inhabitants, it was 50 %, and within municipalities with the number of inhabitants above 10 000, the chief auditor did not perform their activity in another municipality.

<sup>4</sup> Veverková, I., *Ekonomické minimum hlavného kontrolóra*. Bratislava: Iura Edition, 2013. 279 p. ISBN 978-80-8078-678-6.

<sup>5</sup> Zákon č. 369/1990 Zb. o obecnom zriadení v znení neskorších predpisov

Furthermore, the analysis showed that 31 % out of these 93 municipalities had elected chief auditor, who performed his activity for 5 and more municipalities at the same time. The analysis pointed out that the most critical municipalities were those with number of inhabitants up to 999, which forms almost 93 %. One municipality with inhabitants up to 199 showed extreme value as the chief auditor had a 0,025 contract and performed his activity in other 24 municipalities.

The analysis also focused on provisions of § 18b of the Act on municipality establishment, according to which the chief auditor can perform auditing activity for several municipalities. If chief auditor performs activity for several municipalities, the municipalities in question conclude an agreement on this matter for the execution of specific task according to § 20a. chief auditor is elected by the local council of each of the municipalities that are participants of this agreement. The mayor of each municipality concludes a work contract with the chief auditor within the period given in § 18a Art. 7.

The analysis showed that 82 % of municipalities in which chief auditor performed the activity for several municipalities, did not have a common agreement for the performance of specific task. This analysis showed that in the case of the insufficiencies, there was no significance in the size of the municipality.

The analysis focused on the working time of the chief auditors (according to the work contract). The working time of chief auditors in the individual municipalities were different. Chief auditors, who performed their activity in municipalities with inhabitants up to 199, had working time 0,01 – 0,1. In municipalities with 200 - 499 inhabitants, the working time of a chief auditor was 0,02 – 0,2, In municipalities with 500 - 999 inhabitants, the working time of a chief auditor was 0,05 – 0,533, in one municipality there was a full-time working contract. In municipalities with 1 000 - 1 999 inhabitants, the working time of chief auditor was 0,067 – 0,32. The working time of CHA in municipalities with 2 000 - 4 999 inhabitants was 0,07 – 0,53, in municipalities with 5 000 - 9 999 and above 10 000 inhabitants it was a full-time contract.

As the chief auditors working times were low, the analysis was focused on the execution of chief auditor's activity for 2 days within a month or not at all. In the size categories of the municipalities up to 199 inhabitants, the analysis showed that it was 92 % of chief auditors, in municipalities with 200 - 499 inhabitants it was 65 % of chief auditors, in municipalities with 500 - 999 inhabitants it was 25 % of chief auditors. In municipalities with 2 000 - 4 999 inhabitants it was 11 % of chief auditors. In the size categories 1 000 - 1 999 inhabitants, 5 000 - 9 999 inhabitants and in municipalities above 10 000 inhabitants chief auditors did not execute his activity less than 2 days in a month.

Furthermore, the analysis showed that in as many as 32 % municipalities from the sample group chief auditors executed their activity less than 2 working days in a month. The highest number of such small working times was in municipalities up to 999 inhabitants, which represent 97%.

Then the analysis assessed how many ex post financial audits were performed by a chief auditor in 2013. In municipalities with up to 199 inhabitants 42 % chief auditors did not perform any ex post financial audit and 17 % only one ex post financial audit. In municipalities with 200 - 499 inhabitants 16 % of chief auditor did not perform any ex post financial audit and 20 % of chief auditor performed only one ex post financial audit. In municipalities with 500 - 999 inhabitants 28 % of chief auditors did not perform any ex post financial audit and 8 % performed only one ex post financial audit. In municipalities with 1 000 - 1 999 inhabitants 17 % of chief auditor did not perform any ex post financial audit and 6% performed only one ex post financial audit. In municipalities with 2 000 - 4 999 inhabitants of chief auditor 34% did not perform any ex post.

Further, the results of the analysis showed that in municipalities with 5 000 - 9 999 inhabitants there were performed 7 - 14 ex post financial audits and in municipalities above 10 000 inhabitants it was 13 – 20 ex post financial audits.

The analysis showed that from the selected sample group 24 % of chief auditors did not perform any ex post financial audits. The highest number of these chief auditors was in municipalities with up to 999 inhabitants, which represents 73 %. Then, in 2013, 11 % of chief auditors performed only one ex post financial audit.

Furthermore, the analysis showed that 40 % of municipalities performed other audits that were mostly aimed at control of decrees.

## Conclusion

With regard to the fact that municipalities manage substantial financial resources and assets, it is essential that the municipal system of internal control is effective and functional.

Problem of the Municipalities Act is that upon approving a working time of a chief auditor, municipal councils are not limited by their minimum working time. Especially small municipalities determine working times on the grounds of their financial conditions, not the need and scope of control activities. Municipalities thus only fill the chief auditor function only formally. Problem is related to the effectiveness and functionality of municipal internal control systems.

We can further state that in the area of effectiveness of the control system, municipalities under the greatest risk were those with up to 999 inhabitants, where chief auditor reported significant bottlenecks especially upon carrying out subsequent financial controls, and upon following the basic legal regulations concerning the work of chief auditor. These were recorded in the work of chief auditor carried out less than two days a month or not at all in 92 % of cases in the municipalities with up to 199 inhabitants, in 65 % in the municipalities with 200 – 499 inhabitants, and in 25 % of cases in the municipalities with 500 – 999 inhabitants. Based on this finding, the system of municipal control is ineffective.

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5. *Zákon č. 369/1990 Zb. o obecnom zriadení v znení neskorších predpisov*
6. *Zákon č. 502/2001 Z. z. o finančnej kontrole a vnútornom audite a o zmene a doplnení niektorých zákonov*
7. *Zákon č. 39/1993 Z. z. o Najvyššom kontrolnom úrade Slovenskej republiky v znení neskorších predpisov*

## Primary Paper Section: A

## Secondary Paper Section: AE, AG

## DEVELOPMENT OF METACOGNITIVE SKILLS AND PROCESS OF TEXT RECEPTION

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This article was written within the project of the Grant called "Cognitive and Metacognitive Aspects of Text Production in Primary School Learners" under the auspices of the Dean of the Faculty of Education at the Palacký University.

**Abstract:** This article is dedicated to the theoretical basis of developing reading skills in primary school learners. In this area we especially focus on the definition of the process of comprehension of the text and on the metacognition process, which is a prerequisite for learning from a text. Metacognitive processes have a high degree of significance for the reception of the text in all school subjects, regardless of the type of the text to be read, therefore their development is considered necessary. In terms of metacognition, a reader must be aware of the various possible ways how to work with the text and understand the text. A teacher's job is to guide learners to build knowledge on how to work with texts at this metalevel.

**Key words:** metacognition, reading strategies, reading, learning, text comprehension.

### 1 Introduction

This theoretical study is dedicated to the field of developing reading skills. We do not want to focus on an overview or methods for acquiring technical parameters that are needed for reading, but on the area of reading comprehension and on the processes that are necessarily represented in this area – these processes are related to the field of metacognition. The study is divided into the following sections; there are three basic parts. The first part defines metacognition; there are definitions by various authors who are specialists in this area. The next part focuses in more detail on the metacognitive processes in terms of their representation during the reception of the text. This chapter also includes clarification of the reception process of the text and emphasizes the relationship between metacognition and comprehension of the text. The last part describes the reflection of metacognition and its development in reading, because learning to read is a key skill that learners need in order to have access to information in all school subjects and in order to know how to learn effectively.

### 2 Definition of metacognition

*„It is at least conceivable that the ideas currently brewing in this area could someday be parlayed into a method of teaching children (and adults) to make wise and thoughtful life decisions as well as to comprehend and learn better in formal educational settings“ (Flavell, p. 910).*

John Flavell was the first author to deal with metacognition. In his understanding, metacognition is what helps people understand better, learn better, achieve better scholastic performance and make wise and informed decisions. The term „metacognition“, which John Flavell and his colleague Ann Brown gave to this type of reflection has led a whole new area of research and the fruits of these studies are now being seen in classrooms across the world (Larkin, p. 3).

Metacognition is a way of thinking that everyone is able to “turn on” at times; the problem is to keep it functioning long enough to know how to benefit from it. Flavell talks about the process of reflecting on our own thought processes and seeing how this takes us closer to achieving our goals or how it impedes our progress (based on Larkin, 2010). There are two ways of looking at metacognition: the first view describes metacognition as unrelated to age and not requiring any cognitive effort. The second view mentions conscious behaviours that become automatic with time and through practice. The second view is problematic for researchers who deal with metacognition because any cognitive act which has been incorporated into a

person's cognitive repertory can become automatic and inaccessible to the consciousness (Larkin, 2010).

According to Livingstone (1997) metacognition is one of the latest buzz words in educational psychology, but what exactly is metacognition? The length and abstract nature of the word makes it sound intimidating, yet it's not as daunting a concept as it might seem. We engage in metacognitive activities every day. Metacognition enables us to be successful learners, and has been associated with intelligence (e.g., Borkowski, Carr, Pressley, 1987; Sternberg, 1986). Metacognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress toward the completion of a task are metacognitive in nature. Because metacognition plays a critical role in successful learning, it is important to study metacognitive activity and development to determine how students can be taught to better apply their cognitive resources through metacognitive control.

### 3 Metacognitive processes and text comprehension

Metacognition is a process that is essential for learning from a text. It means “knowing about knowing” and developing the key skill “learn how to learn”. Metacognition comes from the root word “meta”, meaning beyond in Greek, and “cognition”, which means knowledge. “Metacognition is a higher level of cognition compared to the ongoing learning process. Reading includes the control, assessment and regulation of the reading process – with an emphasis on understanding the text. Learners who have developed metacognitive skills can set a reading target, they know what to concentrate on when reading” (Gavora, et al., 2008, pp. 81-82).

The aim of many teachers is to keep children on task, solving the maths problem, writing the story or practising one of the several very necessary skills children need to acquire for life outside of school. The aim of many children is to complete the work as quickly and as successfully as possible. The rewards for this may be a chance to play, or at least not to have to do the work again, or some form of praise from the teacher. It is not only children who think this way, many adults too aim to complete their work as quickly and efficiently as possible so that they can go and do something more enjoyable or so that they can gain their hard earned reward more quickly. Unfortunately, metacognition doesn't fit into this way of working very well. It can lead to more efficient and thus quicker ways of working, but it also entails a slowing down of the process of thinking. However, the rewards can be increased motivation and interest, maintaining on task behaviour and developing skills and strategies, which enable us to transfer knowledge from one domain to another (Larkin, 2010).

Becoming more metacognitive is about slowing down and taking time to enjoy the thinking process, even to marvel at the ability we have to think about so many different things and to allow ourselves to follow our thoughts. Whether metacognition is by definition a conscious act or whether some forms of automatic processing can also be deemed metacognition is an issue still debated by metacognition theorists. Automatic processing has been defined as fast, requiring little effort and control by the subject and operating at a level below consciousness (Larkin, 2010).

There is a theory that proposes two ways of looking at metacognition: the first view describes metacognition as unrelated to age and not requiring any cognitive effort. The second view mentions conscious behaviours that become automatic with time and practice. The second view is problematic for researchers who deal with metacognition because any cognitive act which has been incorporated into a

person's cognitive repertory can become automatic and inaccessible to the consciousness (Larkin, 2010).

"When we ask advanced readers to describe how they received a text, they are able to tell us what kind of goals they had for the reception of the text, on which parts of the text they put emphasis, how they acted when one part of the text was not clear, etc. That means that advanced readers not only take notice of the content of the text but also of their own activities carried out when reading the text" (Gavora, 1992, p. 90).

Processes that accompany the reception and also occur during other cognitive activities are known as metacognitive. "Metacognition means "knowing about knowing". It is the active monitoring and managing of our own cognitive activities" (Gavora, 1991, p. 90).

Gavora (1992) divides metacognitive processes into different stages as regards the reception of the text, namely:

- metacognitive processes at the beginning of the text's reception;
- metacognitive processes during the text's reception;
- metacognitive processes after the completion the text's reception.

At the stage of the metacognitive processes at the beginning of the text's reception recipients define their goals in order to know what they want to achieve based on the reception of the text. "Learners' own goal for the reception of the text arises from the transformation of the aim provided by the teacher" (Gavora, 1992, p. 92).

Anticipating and monitoring are metacognitive processes that are applied during the reception of the text. At this stage, besides the reception of the text that is being read, advanced recipients try to anticipate the content of the text and what follows next. "This is called anticipating the text's content" (Gavora, 1992, p. 93). Anticipating can be seen as a diagnostic tool because it reveals the way in which the reception of the text takes place. Existing research studies on the level of anticipation show that there are three characteristics impacting on it, which is the existing knowledge of recipients, the capability of identifying the relationship between the content of the text to be read and recipients' knowledge and the ability of critical assessment of the anticipation alternatives. The monitoring process related to the reception of the text is launched in connection with the fact that recipients are aware of and monitor the success of the procedure that they use during the text's reception. "Monitoring is a manifestation of self-regulation. It is the monitoring and management of their own activities in the process of the text's reception. These are activities of control and assessment. If recipients are not capable of adequate monitoring, serious errors occur in the reception of the text" (Gavora, 1992, p. 94).

It often happens that children emphasize secondary things and overestimate important things. It is considered effective when recipients themselves formulate the questions arising from the text's content during the reception of the text and look for the answers to these questions. "These own questions (self-questioning) are an essential element for monitoring the text's reception" (Gavora, 1992, p. 95).

Metacognitive processes after the completion of the text's reception include recipients' ability to evaluate the success of their activity, whether the objective of the reception has been achieved. As regards learners, these are of course assessed by their teacher.

According to Zelina (1996, p. 25) metacognitive processes include:

- "introspection in the second plan", that is not watching the content but the forms and dynamics of the expression;
- self-examination, self-questioning;
- self-regulation".

Zelina (1996, p. 31) assigns metacognitive skills to the area of personality cognitization and also outlines the methods comprising:

- "exercise in anticipating, estimating, predicting the effects of actions, predictability - what happens when?;
- supervision, examination, control over the results of our own activities;
- monitoring of our own activities – how I achieved it, how I did it?;
- testing the reality – does it make sense what I do or what I did?;
- coordination and control in learning and problem solving".

The task of developing metacognitive skills is to guide learners to monitor their own work and to avoid doing it only mechanically. In addition to monitoring of their own activities, it is also important to monitor the activities carried out by their peers. This creates an opportunity to express their feelings during the activities and to evaluate the process and realize what was bad about the procedure or what was good, etc. (Zelina, 1996).

The reception of the text has an important role in the development of meta-cognitive strategies. The reception of the text (learning from a text) is a purposeful activity that represents the sum of the following processes: motivation, reading comprehension, memorizing, processing of memory, metacognition and perception of the text. Motivation is the first psychologically important process for learning from a text. In terms of motivation, Hrabal and his team (Čáp, Mareš, 2001, p. 479) outline learners' needs as:

- "cognitive needs such as the need to acquire new knowledge and the need to find and solve problems;
- social needs, particularly the need for positive interpersonal relationships (affiliation) and fear of rejection by people, the need to influence others (power),
- output needs, including the person's level of aspiration and experiencing success and failure in learning".

In addition to this, the learner might be stimulated to learn based on the appearance of the text. For example, the appropriate content of the text to be studied, its attractive graphic design, its interesting visual part, its well thought-out regulatory elements that lead learners through the learning process and give them some feedback to find out how much they understand the issue, etc." (Mareš, according to Čáp, Mareš, 2001, p. 479).

"The reception of the text means receiving and internal processing of information contained in the text. The meaning of the word "reception" is different from the word "reading". Reception is an activity that results in an awareness of the information. Therefore, not every reading is reception" (Baláž, 1986, p. 16).

However, the text is received not only by learners but also by teachers. But teachers receive the text at a completely different level than learners. The text is not a source of new information for them, it is only about specifying the issue. The text tells teachers what to teach in particular, in what order or how.

To make the reception happen, one must make some effort. The person must be activated. The text's reception cannot take place without the will to perceive the text, to understand and remember it. Therefore, the engagement of the will is a prerequisite for the reception of the text. Learners receive texts in order to acquire knowledge required by school. Some of this knowledge is then used in solving tasks and problems. However, also skills and abilities are developed based on this knowledge. In other words, just like every product of communication activity, the written text was also created for a reason (motivational aspect) and with an aim (target, communication purpose). The author wrote the text to make an announcement, to tell the readers something. The readers are going to read the text when looking for information they need. Some learners are sufficiently aware of the

importance of the text's reception as well as of the need for specific information. Others have only a vague idea of what it is about. Therefore, results of the text's reception for individual learners tend to be different. But these results cannot in many cases be attributed to the learners' low level of reception but to the actual assumption of this reception, i.e. learners' objective and motivation. An experienced recipient can receive the text as a routine, quickly and to certain extent without being aware of it. Unawareness is the evidence that the processes of the text's reception were mastered perfectly and that they run smoothly and without problems. Unawareness is a sign of effective reception here, so it is not a negative phenomenon. Depending on the level of the recipient and the difficulty of the text, a major or minor part of the text may be received without being aware. Some parts of the text might be processed by the recipient with a higher level of awareness and some with a lower level of awareness. For sure the ideal to which we should lead the learner is the unaware and unproblematic reception of the text. The path to achieving this level, however, is through a gradual awareness of their own activity and through the improvement of this activity under the guidance of a teacher. This awareness should be confined to those text-related activities which are causing learners problems and where they expend much effort. The other activities that are carried out smoothly and easily do not need to be transferred to the conscious level. However, they should be given the possibility to use and further develop these activities (Gavora, 1992). Referring to various research studies in our country or abroad, we can conclude that the way how learners receive the text is often superficial, which means that learners do not really understand the text, so learners tend to learn things by heart and reproduce the text mechanically. To detect the level of reading literacy we can take a look at the standings of learners in the international assessment programmes. "The text's reception is not just an activity for itself but it is a tool for learners to meet the needs of the curriculum. The inappropriate text's reception hinders the effective learning" (Gavora, 1992, pp.102-103).

There are two known approaches or concepts that propose a way of dealing with the above situation. The first approach is about the total improvement of the text's reception in order to enhance its speed, fluency and comprehension. The reception must be carefully led by a teacher. The second approach regards the improvement of self-regulation during the reception of the text, i.e. to provide learners with better metacognitive skills. The first concept which was created by Švajko (1985, In Gavora 1992) is based on three principles:

- the effective reception of the text requires the learners to view the text as a problem
- situation that needs to be solved;
- learners must define specific goals for the reception;
- the course of the reception must be monitored by learners.

These principles exclude ineffective reception of the text, which is only about a mechanical repetition of the text. Švajko (1985, In Gavora 1992) also developed a method for practicing the text's reception where he puts emphasis on creating ideas about the content of the text, on identifying new information, identifying "topics" of the text, assessment of information and anticipating.

The authors of the other concept are Palincsar and Brown (1984) who were inspired by Vygotsky's theory on the need to switch from adult control to children's self-control and by his theory on the zone of proximal development. They developed a method for the reception of the text that is based on the following procedures:

- making summaries of the text;
- formulating questions about the text;
- explaining the content of the text;
- anticipating the text.

They justified their method as follows: If we ask learners to make a summary of one section of the text, we can find out how much attention they pay to the key information in the text and

verify whether they really understand the given text. As regards the formulation of questions about the text, learners again have to focus on the key information in the text, which results in a comprehension check of learners' reading. Learners are required to have a critical assessment of the text at the point when they have to explain the content of the received text. These authors suppose that anticipating the received text is an approach that leads to the formation of inferences and to the actual way of verification that allows to find out if these inferences are really correct. Both concepts were created for learners at the second level of primary schools. The mentioned authors of these concepts claim that receptive communication skills need to be developed and formed to make the reception become a "tool" for acquiring the learning content (Gavora, 1992, p. 105).

"These concepts did not consider the possibility of practicing the text's reception when learning to read. Although the comprehension of the text is to some extent also acquired when learning to read, there is no deep penetration into the content of the text, which is the aim of both these concepts" (Gavora, 1992, p. 106).

Metacognition is not typical only for a specific area of educational activity, it is reflected in all subjects that are taught in primary schools. Understanding metacognition is complex. From one point of view it is clear that metacognition is related to the types of tasks and skills that are required in different school subjects. Many programmes aimed at stimulating cognitive skills, which are incorporated in education courses, are designed to promote metacognitive habits that learners would then be able to apply in different school subjects. "Metacognitive processes ensure active learning and prevent mechanical activities, such as learning by heart without really understanding the actual text. Active learning is more effective than mechanical learning, it allows to obtain deeper and more lasting knowledge, and therefore it is really important to promote it in the teaching process" (Gavora et al., 2008, p. 82).

#### 4 Metacognition and reading

Metacognitive processes can be developed across all school subjects, based on findings from a number of different research studies (Larkin, 2010). In this sub-chapter we are going to outline the form of metacognition in the area of reading and comprehension of the text.

Learning to read is a basic skill that learners need in order to gain access to information in all subjects. Children and adults who have difficulty reading are at a disadvantage in many areas of life. It may seem that metacognition is not related to language processors and reading techniques at all. But reading involves much more than just the ability to decode characters and turn letters into words that have a meaning. Metacognition is very important here and has a large impact on teaching how to read (Larkin, 2010).

There is a well-known method by Palincsar and Brown (1984) called *reciprocal teaching* which encourages teachers to design, examine, clarify, predict and model the key principles that help learners better understand the text. This reading approach is viewed as a constructive process that involves comprehension monitoring as well as the control of cognitive information processing. The *reciprocal teaching* method specifies metacognitive strategies and skills used by readers during the text's reception in the conscious way. Decoding and fluency is really important for the process of learning to read. Learning to read is to understand that the printed letters correspond to the language that we speak. It is about a shift in thinking from focusing on the spoken content to understanding that a language can take various forms, the oral one and the written one. Through acquiring knowledge of the written text we tend to develop our knowledge of how the text was created. Next step is to learn about nouns, verbs, adverbs, etc., and also how sentences are arranged and what types of texts are used with regard to the communication intent. It is a way of storing metacognitive knowledge, it is something that is gradually

developed with a focus on multiple and different types of texts and through a variety of instructions, strategies.

Bryant and Bradley (1985) found out that the ability to apply appropriate strategies when reading to discern between good and poor readers are more than just phonological skills. Metacognitive skills, regulation and control in the process of reading are considered key aspects of successful reading. Reading is something more than just decoding written symbols. We read to get a sense of the world, further reading is important for learning, exploring and explaining situations and it inspires us to create new things. Reading should be above all a pleasure, something we do with devotion, but we realize that many learners have reading comprehension problems. Readers are in a position where there is a dialogue with the author of the text and with the text itself. We help learners understand the text if we play an active role as a reader. In playing this role, we can use strategies designed to encourage active reading, such as asking learners what is going to happen next in the text or putting together the information they read with some previous knowledge, experience. We can also do some reading of factual texts about the environment, about our daily lives, etc., and based on this we can also work with these texts in other school subjects.

Rosenblatt (1969, p. 32) viewed reading as “an event, something that happens between a reader and a text, situated within a particular, wider context. This event she said is also part of the life of the individual and of the group. The focus is always on the relationship between the text and the reader, rather than on the words and decoding”.

Rosenblatt (1969, In Larkin, 2010) referred to “aesthetic” and “efferent” reading, which she saw not as opposites but as part of a continuum. Aesthetic reading, or reading for pleasure, would include a focus on the sound of the words, the rhythm of the line, the way the words provide us with the ingredients for creating our own mental images, our own imaginative worlds in response to the text. Efferent reading, or reading in order to do something else, tends to focus on the content of the text – we want to take away some knowledge from the text which we can use in another sphere.

## 5 Conclusion

In terms of metacognition the reader must become aware of these different possible ways of approaching a text and the teacher's job is to guide the child towards building knowledge of how texts work at this meta-level. One important strategy is to encourage children to reflect on their response to the text, and to discuss with others how the text connects with their own knowledge about themselves. In this way there is an iterative process between text and reader, with the reader bringing to bear their metacognitive knowledge of themselves to the text and the text helping to construct and develop further metacognitive knowledge of self as a reader. Good readers have automated many of the processes of reading including how they make meaning from the text (Larkin, 2010).

This study presents the basic theoretical background for the planned research focused on how to make the development of reading skills more effective. Through finding out about metacognitive strategies represented in the reception of the text in primary school learners, we focus on their abstracting, categorizing and efficiency assessment. Based on this we provide learners with pre-arranged strategies to develop their metacognitive skills (when working with instructive texts) and then we verify their effectiveness.

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**Primary paper section: A**

**Secondary paper section: AM, AN**

# CULTURAL DISTANCE OF FOREIGN INVESTORS IN THE CZECH REPUBLIC BASED ON HOFSTEDE'S DIMENSIONS

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**Abstract:** Business internationalization brings more or less intensive contact with different cultures. Cultural factors have to be taken into account when making decisions about foreign localization, entry mode choice and local staffing. The aim of the paper is to investigate national cultural distances between 12 selected countries that represent the most frequent foreign investors on the Czech market and the Czech Republic as their business partner and a host country of the investment. Cultural distances were calculated by using Kogut-Singh formula for four original Hofstede's cultural dimensions and compared with variation of six dimensions. Findings show the various differences resulting from including the last two dimensions into formula and their important impact on overall national cultural distance.

**Keywords:** culture, Czech Republic, distance, foreign direct investment, Hofstede, multinational companies.

## 1 Introduction

The globalization includes several aspects such as institutional, political, cultural and economic globalization. These trends can be seen by growth in international trade and capital flows. Rise of economic mobility, attractive migration policies for highly skilled professionals, international networks and increasing number of multinational companies (MNCs) are significant determinants supporting the world tendency of internationalization and interconnectivity. The trend of internationalization is however a challenging process for all activities within a company as they are gaining multinational feature.

A company has generally two main options to expand to foreign markets; through export or via foreign direct investment (FDI). When the company decides to invest in foreign market, the integration, control and management of foreign subsidiary is determined by choice of local staffing. MNCs have to decide whether and on which positions to employ parent country national expatriates, third country national expatriates or host country nationals in order to fulfil their strategic needs.<sup>1</sup>

Expatriates from the headquarter country are often used for leadership positions in the subsidiary and for knowledge transfer and they therefore provide the biggest potential to influence the performance of the subsidiary among three mentioned categories of employees.<sup>2</sup> On the other hand, parent country expatriates are most liable to difficulties in adaptation process. As findings suggest the unsuccessful adaptation of the expatriate and his family to the host country environment is one of the most common reasons for expatriate failure.<sup>3</sup> This problem emphasizes the crucial role of candidate selection process for international assignments and also its cross-cultural pre-departure training.

Business internationalization carries additional risks and costs or so called the liability of foreignness. The liability of foreignness can be defined as *"the total sum of additional costs, including the hidden costs related to dealing with new rules and regulations or new cultures"*.<sup>4</sup> The costs arise from geographic, institutional, economic and cultural distance, and increase difficulties for succeeding abroad.<sup>5</sup>

## 2 Cultural distance

The overall distance between two markets has a multidimensional concept including geographical, administrative/institutional, cultural and economic distance.<sup>5</sup> Administrative/institutional factors include currencies, trading arrangements but also colony-colonized links. A study found out

that the common currency boosts trade more than 300 %.<sup>6</sup> Differences in incomes or distribution-channel quality represent the economic factors of distance. Besides these determinants, especially the geographical distance that is the most often considered, firms also have to consider a foreign culture. Cultural factors are those in religion, race, social norms and language. Culture is also reflected in rules of behaviour of employees as well customers and their preferences. The existence of different cultural values is particularly relevant for MNCs since there is often intensive contact between various national cultures in their operations and it determines headquarter-subsidiary relationship. A factor of cultural attractiveness is pointed out as preference for establishing some partnership between countries.<sup>7</sup>

Concept of national cultural distance is often investigated in terms of foreign market attractiveness, location decision, expansion process, entry mode choice, performance of MNCs in international market, technology transfer or also for example issues of international human resource management and expatriate adjustment.<sup>8</sup> Some studies however suggest that it may be just as difficult to do business and work in culturally similar countries as in countries with low cultural distance.<sup>9, 10</sup> The application of cultural distance concept has a great impact on research of FDI.<sup>7</sup>

Other findings of previous researches show that as cultural distance between countries increases, MNCs has a higher tendency to use more expatriates in the host subsidiary.<sup>11, 12, 13</sup> The other issue to consider is that expatriates coming from the headquarter country bring with them both the national and organizational culture while third country nationals will more likely bring just the parent company's culture into the subsidiary. Very welcoming is then the presence of bicultural individuals that are familiar with both cultures – home as well as host culture. These employees, often in senior positions, serve as a mechanism in bringing cultures together and closing cultural distance.<sup>12</sup>

Cultural differences have the impact on people mobility creating diasporas and business network across borders as evident by observing patterns of migration, information flows as well as patterns of trade and investment.<sup>14</sup> The greater cultural distance between home and host countries, more FDI are encouraged as a way of overcoming market failures.<sup>15</sup> Moreover, the type of distance affects industries differently.<sup>5</sup>

The most often used measurement of cultural distance is based on Kogut-Singh index<sup>16</sup> and it uses the original scores of dimensional framework from Hofstede's survey.<sup>17</sup> Kogut and Singh found out the cultural distance to be a significant predictor of market entry choice and the index has been used in numerous subsequent studies. Although it is widely used, it has been criticized for combining all Hofstede dimensions into one distance measure. Secondly, the Kogut-Singh formula assumes that cultural distance between country A and B is similar to the distance between country B and country A. This illusion of symmetry is object of criticism since it may be culturally easier for Czech firms to invest in the Great Britain, then vice versa.<sup>7, 18</sup> Despite all the criticism, the index has its rational justification same as using Hofstede's cultural dimensions in calculation. As noted by researchers, the culture and cultural values are relatively stable over time and change very slowly and Hofstede's results of measuring national cultural dimensions are therefore the appropriate choice for computing national cultural distance.<sup>18, 19</sup>

### 2.1 Methodology and data

The logic of the cultural distance measurement in the paper is based on Kogut-Singh index as the most popular cultural distance calculation. The cultural distance index is calculated as

an arithmetic average of the variance-corrected squared differences in each dimension.<sup>16</sup> Algebraically, the following formula is formed:

$$CD_{jk} = \sum_{i=1}^n \{(I_{ij} - I_{ik})^2 / V_i\} / n$$

where  $CD_{jk}$  is the cultural distance between the  $j$ th and  $k$ th country,  $I_{ij}$  and  $I_{ik}$  are indicators of the  $i$ th cultural dimension for the  $j$ th and  $k$ th country,  $V_i$  stands for the variance of the  $i$ th cultural dimension,  $n$  is the number of cultural dimensions.<sup>16</sup> In Kogut-Singh study from 1988,  $n$  stands for four Hofstede's original cultural dimensions.<sup>17</sup> In this paper, the cultural distance index is calculated as in the original study of Kogut and Singh and then modified by using Hofstede's country scores on the six dimensions, including two extra dimensions added later.<sup>20</sup> Similar modification of Kogut-Singh formula was already made by Ott<sup>21</sup> by using nine dimensions from the GLOBE study.<sup>22</sup> Six dimensions that constitute the model of national cultures are: power distance, individualism, masculinity, uncertainty avoidance, long term orientation and indulgence. These dimensions are very briefly described as follows.

Power distance refers to the inequality among people and the way in which power is distributed. In countries with high power distance, there is a hierarchical order between bosses and subordinates and vertical arrangements make clear of everyone's place. Dimension of individualism versus collectivism might be reflected whether people define themselves as "I" or "we". In cultures with high individualism, individuals are expected to take care of themselves and their immediate family. On the other hand, in collectivist societies people are integrated into strong in-groups, group goals and achievements are important and people are emotionally dependent on organizations. The masculinity preference stands for cultures with orientation in individual achievement, assertiveness, materialism, strength and more competitive environment. Masculine cultures encourage separate sex roles. Contrary, feminine-oriented societies prefer cooperation, modesty and caring and value quality of life and the environment. Uncertainty avoidance is the degree to which people feel uncomfortable with uncertainty and in unstructured and unknown situations. It deals with tolerance for ambiguity and relying on rules and plans.<sup>18, 23</sup>

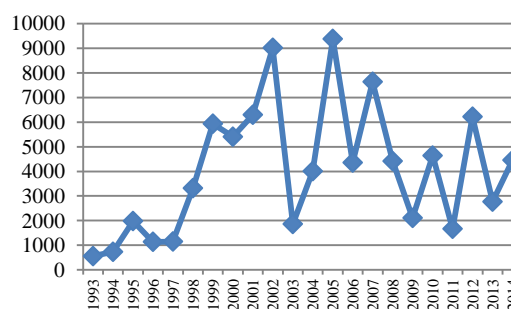
Long term versus short term normative orientation from 2001 was added later compared to four original cultural dimensions. Via Chinese value survey, it generally distinguishes between the East and West. Short term-oriented societies are characterized by personal steadiness, suspicion to societal changes, protecting own "face" and reciprocation of favours. Contrary, long term-oriented cultures encourage thrift and order relationships by status.<sup>18</sup> The sixth dimension of indulgence was complemented to the model in 2010. Indulgence-oriented societies allow relatively free gratification of human drives of enjoying life, leisure time as well as freedom is important. Restrained cultures regulate this gratification by strict social norms. This dimension is still relatively new and has not been widely adopted within the intercultural management as other dimensions.<sup>23</sup>

## 2.2 Case of the Czech Republic

Since opening the borders of the Czech Republic in 1989, the Czech government has aimed to attract foreign investors through introducing systems of investment incentives for FDI to increase its competitiveness as other neighboring countries. The Czech Republic has been recognized as very successful in bringing foreign capital on the local market among Central and Eastern European countries.

Since 1990s, the inflow of industrial FDI has maintained the employment in the structurally affected regions. Moreover, these investments extensively supported Czech economy during the economic crisis.<sup>24</sup> Figure no 1 shows the development of inward FDI into the Czech Republic during the last years.

Figure 1: Inward FDI into the Czech Republic; 1993-2014 (in millions of EUR)



In the overall Global Competitiveness Report 2015-2016, the Czech Republic came 31st in the competition of 140 economies of the world with high scores especially in macroeconomic environment and category of health and primary education. It also got 2nd rank within Central and Eastern European, just behind 30th Estonia.<sup>25</sup> The positioning of the country in international rankings support and characterize its level of development.

Based on data from the Czech National Bank<sup>26</sup> and CzechInvest<sup>27</sup>, the most of the investors in 2015 came from the United States (22 %) and Germany (21 %). Each Taiwan, Korea, and Switzerland have share of 7 % on total investment inflow. Other significant source countries are Japan (4 %), India (3 %), China (3 %) and France (2 %). It is important to note, as National Czech Bank emphasizes, that these data are based on the location of the company investing in the Czech Republic. Many MNCs however invest on the Czech market through other third countries for corporate tax optimization reasons. This happens via subsidiaries often established in Netherlands, Luxembourg or Cyprus that have very favourable tax systems of planning.

The paper presents calculated cultural distances measured between the Czech Republic as a host country and twelve selected source countries of the investment. These countries has been chosen regarding to their importance among investors going to the Czech Republic; as the United States, Taiwan, Korea, Japan, India and China among the key non-European investors and Germany, Switzerland, and France among top investors on the Czech market from the Europe.

Scores of Hofstede's six cultural dimensions<sup>20</sup> that are used for further calculation are available as dimension data matrix on the official website of Hofstede's research and they are list in table no 1.

Table 1: Scores of Hofstede's dimensions of selected countries

Country	PDI	INV	MAS	UAI	LTO	IND
Belgium	65	75	54	94	82	57
China	80	20	66	30	87	24
Czech Rep.	57	58	57	74	70	29
France	68	71	43	86	63	48
Germany	35	67	66	65	83	40
Great Britain	35	89	66	35	51	69
India	77	48	56	40	51	26
Japan	54	46	95	92	88	42
Korea South	60	18	39	85	100	29
Netherlands	38	80	14	53	67	68
Switzerland	34	68	70	58	74	66
Taiwan	58	17	45	69	93	49
United States	40	91	62	46	26	68

PDI – Power Distance Index, INV – Individualism, MAS –Masculinity, UAI – Uncertainty Index, LTO – Long Term Orientation, IND – Indulgence

In this paper, the composite cultural distance construct proposed by Kogut and Singh<sup>16</sup> is used. The index calculates the average difference in two countries' values by combining original four

and secondly six cultural dimensions named above. Variance of each dimension was calculated as table no 2 presents.

Table 2: Variance of Hofstede's cultural dimensions

	PDI	IND	MAS	UAI	LTO	IND
Variance	444,65	567,26	356,65	521,89	580,56	486,75

Calculated cultural distances between selected countries and the Czech Republic are shown in table no 3. In order to compare the results of measured cultural distances, the difference between cultural distance based on original four dimensions or six dimensions is clearly demonstrated.

Table 3: Cultural distance between selected countries and the Czech Republic (in alphabetical order)

Country	CD <sub>1</sub>	CD <sub>2</sub>	Difference between CD <sub>1</sub> and CD <sub>2</sub>
Belgium	0,36	0,55	+ 0,19
China	1,92	1,37	- 0,55
France	0,35	0,37	+ 0,02
Germany	0,40	0,36	- 0,04
Great Britain	1,48	1,64	+ 0,16
India	0,82	0,66	- 0,16
Japan	1,24	0,98	- 0,26
Korea South	0,99	0,92	- 0,07
Taiwan	0,85	0,86	+ 0,01
Switzerland	0,58	0,86	+ 0,28
United States	1,04	1,77	+ 0,73

CD<sub>1</sub> – Cultural distance of 4 dimensions, CD<sub>2</sub> – Cultural distance of 6 dimensions

As can be seen from findings in table no 3, calculations of cultural distances by using four or six dimensions are very various. Differences within the countries caused by number of cultural dimensions included in the formula are not proportional nor the same direction. It has been proved that scores of the last two dimensions added to Hofstede study, long term orientation and indulgence, can have a significant impact on overall cultural similarity or difference.

The Czech Republic has the lowest cultural distance within the selected countries with France and Germany. Contrary, cultures of Great Britain and United States are culturally more distant in comparison with other investors' source countries. The Great Britain and the United States have similar result which supports the similarity of their countries' background, as also in the case of Japan and South Korea. China has the highest cultural distance in terms of measuring only four dimensions but when considering the dimensions of long term orientation and indulgence, the difference lowers since these two dimensions have scores close to the Czech values. Other measured countries; Belgium, India, Japan, Korea, Taiwan and Switzerland belong to the medium score of cultural distance from the Czech Republic within the chosen sample.

### 3 Conclusion

As Zaheer et al states, "international management is management of distances".<sup>8</sup> Distance between countries is not only the geographical which is the first association in our mind. The concept covers many aspect and cultural knowledge and understanding are becoming important parts of business and investment activities as companies expand abroad and go international.

This paper lists the most often source countries of foreign investors in the Czech Republic. The cultural distance between these investors and the Czech Republic is calculated based on Kogut-Singh formula. Findings indicate that computation based on four original cultural dimensions from Hofstede's survey or including two additional and later added dimensions (long term orientation, indulgence) make a notable difference in distance values which shows their significance.

Although there is several limitations concerning to Kogut-Singh cultural distance index, it is still very widely used in literature as a cultural distance measurement. These limitations as well as fact that cultural distance might be very individual matter depending on specific circumstances (e.g. competences of the employees), and it may also change over time as companies gain experience; must be taken into account.

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**Primary Paper Section: A**

**Secondary Paper Section: AE, AH**

## INNOVATIVE ACTIVITY OF SLOVAKIA IN COMPARISON WITH EU COUNTRIES

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The article is prepared as one of the outcomes of a research project VEGA no. 1/0305/15 "Impact of environmental tools on the growth of competitiveness and sustainability of businesses" conducted by Department of Production Management and Logistics of University of Economics in Bratislava, Slovak Republic.

**Abstract:** Innovations are the main drive mechanism of competition growth. This growth capability is directly dependent on an acceptable concentration on knowledge, which is based especially on education, resourcefulness, creativity, experimenting and ability to be innovative. The main objective of the survey is to examine and assess the proportion of the corporate innovation activity, to analyze the causes of the phenomenon and its correlation in the analyzed company. On this basis, we proposed assumptions, conclusions and recommendations, which should contribute to an improvement in the development of innovative potential of enterprises in the Slovak Republic.

**Keywords:** *intangible capital, innovation, innovation potential*

### 1 Introduction

New trends of business are created, such as business outside of business. Currently people do not always require particular space provided by an employer to perform their work, but the new information techniques and technologies enable performing the work outside the company. Here, we can point out, that in comparison of tangible and intangible sources, the importance of intangible sources is still rising. In the past man had to travel for work, however, currently there is a trend that man create work himself, with his own creative activities and ideas. This is what vision of modern businesses is built upon.

In order to succeed in an environment of market economy, business must seek new opportunities offered by market and thus increase its innovation activity that leads to development of innovation potential. In fact, it is innovation potential that describes innovation environment of a company in which innovations are created, implemented and improved. Innovations are the main moving mechanism of economy development and its implementation is a necessity that guarantees business to survive in ever changing business environment. Innovation and innovation potential of businesses contribute to growth of work productivity, growth of product quality, development of innovating activities and qualification of working labour. Innovation process contributes to growth and development of product quality in every phase of production process and thus increases economic prosperity of business, satisfaction of consumers and is one of the most significant means in competition.

### 2 Literature review

The core of innovation is in creating new knowledge, as a result of scientific, experimental and developmental activities and ability of workers to apply this knowledge in business environment, in an area of product manufacturing, creation of service as well as process creation. Turbulent technological progress impacted definition of innovation also from author perception of the world. The term innovation has its origin in Latin *innovare* which means create something new. In its previous meaning innovation was understood as a change in behaviour. An attempt for closer specification resulted in a vast amount of definitions.

According to J. Tidd, J. Bessant, K. Pavitt innovation refers to something introduced for the first time, something new. He puts forward that change and novelty are important, where the

perceived degrees of change and novelty are in the eye of the beholder.<sup>1</sup>

The authors S. Myers and D. G. Marquis point out that innovation is no to be confused with invention. Innovation is not a single action but a total process of interrelated sub processes. It is not just the conception of a new idea, nor the invention of a new device, nor the development of a new market. The process is all these things acting in an integrated fashion.<sup>2</sup>

J. A. Schumpeter is considered the founder of economic discipline dealing with research of innovations and their processes. His understanding became a fundamental base for further studies. However, at first he does not define innovations as we know them, but only as new combinations of development changes especially in a market production. Modern definitions of innovations are discussed by G. Mulgan and D. Albury according to whom we can define innovations as implementation of a new or significantly improved product, process or service, new marketing or new organisational method which brings vital improvement in effectiveness, efficiency and quality.<sup>3</sup>

K. Atuahene-Gima researched innovations in China and came to conclusion that innovations of product must support innovations in areas of marketing, branding, distributions, delivery and production in order for product to be successfully established on the market.<sup>4</sup>

Innovation is a new, commercially useful way of doing things. The result of innovation by A. Afuah is new product in the sense that it has reduced costs, its features are improved and also has characteristics that had never previously or that on the market did not exist before.<sup>5</sup>

According to E. B. Bayercelik, F. Tasel, S. Apak the most significant factors influencing the development of innovation activities involve financial factors, size of a company, institutional factors, technological capabilities, customer preferences, economy factors, cultural factors, managerial skills, ability to learn, orientation on market and competition advantages.<sup>6</sup>

J. R. Cooper provides an alternative view. The emphasise is given on the fact that innovations are realised in different ways and he takes into account demands on structural changes in organisations and divides innovations as follows: revolution and value added innovations, technological and administrative innovations, regarding processes and product innovations.<sup>7</sup>

J. DeGraff states that it is crucial to know the definition of innovation, because if there is not a collective definition to explain innovation there is a small chance to reach the same aim together with your co-workers. This is especially important for entrepreneurial businesses which mark fast increase to something better and bigger.<sup>8</sup>

Innovation is not a single process; it is a long and cumulative process of number of organisational decisions, starting from the

<sup>1</sup> Tidd, J., Bessant, J., Pavitt, K., *Managing Innovation: Integrating Technological, Market and Organizational Change*. 3rd edition. Chichester: John Wiley & Sons Inc., 2005. pp. 5-6.

<sup>2</sup> Myers, S., Marquis, D. G., *Successful Industrial Innovations: A Study of Social Factors Underlying Innovation in Selected Firms*. Washington: Report for the National Science Foundation, 1969. NSF 69-17.

<sup>3</sup> Mulgan, G., Albury, D., *Innovation In The Public Sector*. London: Prime Minister's Strategy Unit/Cabinet Office, 2003. pp. 3-4.

<sup>4</sup> Atuahene-Gima, K., *What Is Innovation?*, New African, London, October, 2012, Available at: <http://newafricanmagazine.com/what-is-innovation/>.

<sup>5</sup> Afuah, A., *Innovation Management: Strategies, Implementation, and Profits*. 2nd edition. New York: Oxford University Press, 2002. pp. 1-4.

<sup>6</sup> Bayercelik, B. E., Tasel, F., Apak, S., *A Research on Determining Innovation Factors for SMEs*, 10th International Strategic Management Conference, pp. 203-206, Elsevier, September, 2014.

<sup>7</sup> Cooper, J. R., A multidimensional approach to the adoption of innovation, In *Management Decision*, Vol. 36, No. 8, pp. 493-502, 1998.

<sup>8</sup> DeGraff, J., *What Is Innovation?*, The Huffington Post, New York, June, 2014, Available at: [http://www.huffingtonpost.com/jeff-degraff/what-is-innovation\\_b\\_5939508.html](http://www.huffingtonpost.com/jeff-degraff/what-is-innovation_b_5939508.html).

creation of a new idea until its realisation phase. New thought regards perception of new needs of customers or new way how to produce. Thus perceive innovation K. Urabe, J. Child, and T. Kagono.<sup>9</sup>

Analysis of all above mentioned definitions led us to abstract definition involving characteristic treats of innovation. Innovation is a qualitative and quantitative change of product or process; it comes from intelligence of human mind that leads to improvement of uniqueness of a product or process by increasing its qualitative function ensuring the growth of management and efficiency of the subject in time. It creates monetary and added value for consumer depending on the essence of given innovation.

### 3 Methodology and data

The aim of the research was based on the data collected on innovation activities for Slovakia to analyse the innovation potential of manufacturing companies. The variables in the statistical verification were slightly research and development in companies. Of the 80 respondents manufacturing companies in the survey 31 companies, representing a 38.75% response rate. The survey was conducted using a combination of random companies.

Critical area:  $\chi^2_P > \chi^2_{1-\alpha} [(r-1).(s-1)]$  when  $\alpha$  is level of importance, or  $(1-\alpha)$  is credibility.  $\chi^2_{1-\alpha} [(r-1).(s-1)]$

At level of importance 0,05:

$$\chi^2_{21-\alpha} [(r-1).(s-1)] = \chi^2_{20,95} [(2-1).(2-1)] = 3,841$$

With credibility 0,95 or at the level of importance 0,05 we accept the hypothesis that there is statistically important dependency between coefficients.

Calculation for chi-quadrat:  $\chi^2 = \sum \frac{(O - E)^2}{E}$

Chi -quadrat = 14,39

$$14,39 > 3,841$$

The reliability of 0.95, respectively. at the significance level of 0.05 we accept the hypothesis that the variables are statistically significant dependence.

If we discovered, there is an association between statistical elements we can precede to the next analysis which is characterization of intensity of association based on relation.

At level of importance 0,1:

$$\chi^2_{21-\alpha} [(r-1).(s-1)] = \chi^2_{20,90} [(2-1).(2-1)] = 2,706$$

$$14,39 > 2,706$$

The reliability of 0.90, respectively. at the significance level of 0.1 we accept the hypothesis that the variables are statistically significant dependence.

$$Q = \frac{(ab).(a\beta) - (a\beta).(ab)}{(ab).(a\beta) + (a\beta).(ab)}^{10}$$

where,  $a$  = statistical variation and  $b$  = statistical variation;

$$Q = 0,9568$$

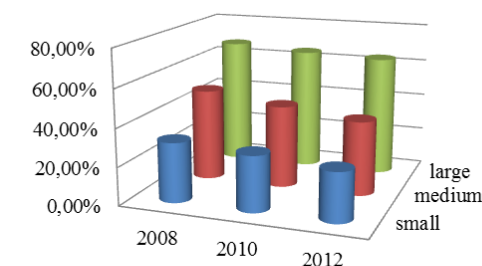
### 4 Data analysis

Research and development activities in Slovakia are relatively underdeveloped, with the total gross expenditure on R & D are the second lowest in the OECD (Organisation for Economic Co-operation and Development) and the efficiency of public

spending on research and development in order to improve the performance of private R & D is low.

From the graph 1 it shows that in the period between 2008-2012 the innovative capacity of firms in each category dropped. This is a significant drop in innovation activity medium-sized businesses where, in 2010 to 48.70% decreased innovation activity compared with 2008 to 43.60% by 5.1%. Small businesses in the Slovak Republic spent the lowest innovation activity among the three categories of enterprises. Their innovation activity in 2010 is 29.30%. Large enterprises were characterized in 2010, the strongest innovation activity in the Slovak Republic e.g. 65.10%. In the next reporting year 2012 innovation activity decreases in each sector enterprises as well.

Chart 1. The percentage of companies in each category of enterprises with innovation activity in the years 2008-2012 in Slovakia



	2008	2010	2012
■ small	31,50%	29,30%	25,90%
■ medium	48,70%	43,60%	39,30%
■ large	67,60%	65,10%	63,80%

Source: Statistical Office of the Slovak Republic, processed by SBA, Slovakia 2014, p.213

According to the average performance in innovation, Member States are classified into four different performance groups:

- Denmark, Finland, Germany and Sweden are "innovation leaders" s performance in innovation significantly above the EU average.
- Belgium, France, Ireland, Luxembourg, Austria, Slovenia and the UK are "successful innovators", with performance above average or near average.
- Performance of Cyprus, the Czech Republic, Estonia, Greece, Croatia, Lithuania, Hungary, Malta, Poland, Portugal, Slovakia, Spain and Italy are below the EU average. These countries are "moderate innovators".
- Bulgaria, Latvia and Romania are "weaker innovators" s performance in innovation significantly below the EU average.

The most innovative countries have achieved the best results in all dimensions: from research and innovation inputs through innovative activities in business to innovative outputs and economic effects, reflecting the balance of a national system of research and innovation. Group of innovative leaders showed the smallest variance in performance across all eight dimensions of innovation. This means that the performance of the innovation leaders (Sweden, Denmark, Germany and Finland) in all dimensions is almost the same. These countries are mostly located in the top partition and above the EU average. Only in the second dimension open, excellent and attractive research systems, Germany is ranked slightly below the EU average and the eighth dimension of the economic effects are Finland and Sweden just below the EU average.

Among the European countries outside the EU confirmed its overall leadership in innovation and Switzerland this year with a performance higher than in the EU Member States and with the highest position in six performance indicators. But Switzerland's

<sup>9</sup> Urabe, K., Child, J., Kagono, T., *Innovation and management: International Comparisons*, Berlin: Walter De Gruyter&Co, 1988, pp. 3-4.

<sup>10</sup> Pacáková, V. et al., *Štatistická indukcia pre ekonómov a manažérov*. 1. vyd. Bratislava: Wolters Kluwer, 2015. pp. 67-90.

innovation performance is improving much slower pace than in the EU. Iceland is a successful innovator with results above the EU average, Norway and Serbia are the moderate innovators and the former Yugoslav Republic of Macedonia and Turkey are among the weaker innovators. In the case of Serbia and Turkey, there was a significant improvement in innovation with an average annual growth rate of over 6%.

Through statistical analysis, the proportion of public and private expenditure on science and research, we concluded that the Slovak Republic in comparison with EU countries most investment stems from public resources. In the Member States of the European Union is the opposite condition. We found that the low proportion of innovation in the business sector requires increased support innovations as a scientific research area of the private sector, encouraging the private sector to increase spending on research and development. As the main incentives could improve the unfavorable situation in the expenditure share of private and public sector legislative measures. As mentioned earlier, most innovation in Slovakia is ensured by a transfer of technology, the entry of foreign investors into the market, creating strategic alliances and purchase of know-how. It is this situation encourages companies to pay greater attention in its operations with the creation of innovations in-house.

Specific attention was paid in addition to spending on science and research and its impact on the type of industry technology development and intangible assets input into the transformation process. The sectors with the lowest innovation development include light industry (food) and to sectors with higher share of innovative development include electronics, automotive and information technology industry. On innovative development it is also affected by the size of the company. SMEs have less potential for innovation than large enterprises. The automotive industry in Slovakia is a strong sector for the development of the country's economy and record it in most jobs. Significant influence on the country's macroeconomic indicators, including GDP, from which the area of science and research depend.

## 5 Results and discussion

The share of innovative products in the Slovak manufacturing companies in comparison with EU countries very low. The proportion of innovative products is between 0% - 20%. The least innovative activities are enterprises of the food industry 0% - 10%. The largest share of innovative products we have seen in information technology, electrical engineering industry 80% - 100%. It is closely linked with the highest share of exports to foreign countries and business agility. Information technology and electronics industries are forced to react flexibly to market requirements in order to remain competitive in domestic and foreign markets.

Low share of innovative products in companies and causes low share of government expenditure on innovation. In comparison with the countries of the European Union Slovak companies are subsidized by the State minimum. Companies are forced to draw from its own funds derived from the parent company. Each new release of the product extended the existing functionality and adds new area of functionality. On the share of innovative products it is also affected by the size enterprises. SMEs are, paradoxically, more innovation potential than large companies. This is because SMEs are forced to devote to innovation, improvements to remain competitive, while big corporations to build a strong position in the market, tradition, and the massiveness.

The share of enterprises with independent department of innovative development represents 38% of the respondents of the survey respondents. Innovation processes in companies with innovative departments led to the successful production, implementation and exploitation of novelty in the economic and environmental areas. Those companies carry out innovative work in-house. The remaining 62% of companies have separate departments innovation development has partly respectively. It does not at all. Innovative activity is provided by external

suppliers in the form of outsourcing. The aim of the innovative outsourcing business is cost savings, increased service quality using suppliers who are professionals in their field, access to cutting-edge technologies without having to invest in their purchases, increasing flexibility and performance. The second case, the undertakings which did not address innovation development. The most frequently occurring reason is that innovation activity is paid to the parent company that operates innovative development department.

Completed survey, we found that the proportion of the total cycle development phase is less than 50%. Development is typically in a range of 0% - 5%. This demonstrates the fact that research and development companies in Slovakia dealing minimum. Businesses that reported the proportion of development in the range of 21% - 40% to 41-60% includes the development and activities of such modifications, alterations, innovation first order, construction and testing of prototypes and models, construction tools, jigs, molds and smart use of new technologies, construction and operation of the chosen alternative for new or improved materials, devices, products, processes, systems, etc. But development does not take place completely new product. Survey means survey conducted in order to gain new scientific knowledge or technical knowledge, activities aimed at obtaining new knowledge, search for alternatives for materials, devices, products and design. These activities are undertakings, taken from an accounting perspective. Companies can ensure the development of part-time basis on their own, passive licensed, often from the production and operational know-how. Making in-house development includes activities such as the drafting of the product; The structural design of the product; preparation of design prototyping; Technological production prototype; manufacture, testing and approval of the prototype.

## 6 Conclusions

Intense competition are a reality. The market has changed, new players were added, and the competition sharpens. Slovak production companies have a close eye on market changes and respond to the needs of the domestic and foreign markets. Particularly the need to address compliance with the conditions of foreign trade, as Slovakia is heavily dependent on exports. At present, the rapid development of material resources no connection with intangible assets as a basis for successful existence of enterprises. To achieve the desired effect, it is necessary to minimize material resources and pay more attention to intangible assets. Increase public awareness of the existence and use of intangible resources also it contributes to the improvement of other areas such as business, environmental, ethical business conduct. Companies should be open and adaptable to new market opportunities, global production trends, advanced technology, innovation, research and development, modernization of the production schedule, ensure quality products, high-quality workforce and the creation of new organizational forms (strategic alliances).

Enterprises are forced to research and development to compensate for other activities, such as alternatives, the creation of start-ups, start-up offices. This form of alternative research and development companies also require substantial capital. The most commonly beginning of start-ups interested large corporations, which have a fixed market background and profitable. Start-up businesses to create workplaces of the problem, and quickly when needed alternative solutions tasks. A good initial idea or ideas that the firm may obtain participation of workers in decision-making respectively, rationalization proposals.

Another proposal is to acquire know-how and new technologies to improve the image of your own company, penetrate new markets, strengthen competitiveness and reduce business risk. Compared to the old-upmi are more convenient form strategic alliances mainly because spreading the risks inherent in the start-up epoch borne by the company itself. The main disadvantage of strategic alliances in comparison with start-upmi the unwanted

outflow of know-how, which is caused by working together and deciding on strategic enterprise.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## MODERN TOOLS OF TRANSPORT ORGANIZATION MANAGEMENT

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**Abstract:** Financial accounting provides to management of a transport organization comprehensive information on its activities. This information is indeed relatively detailed, but not enough. Therefore, in practice, organizations have developed term managerial accounting such as term for the complex information needed for a successful managerial work. Managerial accounting belongs to the modern tools of organization management, since its content is in principle not subject to off-site control. The success of the organization is not decided only by department in which they operate, but also by used managerial tools and methods.

**Keywords:** financial accounting, managerial accounting, costs, financial understanding of costs, value understanding of costs, economic understanding of costs.

### 1 Introduction

Transport organization, like other organizations is legally obliged to keep accounts. Organization accounting focuses on the value side of economic activity of each organization and records its quantitative process.

For accounting purposes, the economic reality is always measured and expressed in relation to a certain organization. That is why accounting is primarily category of organization created and developed essentially as a tool for business management.

Managerial Accounting represents the part of accounting which deals with the collection of data on economic phenomena, their analysis and processing in the form of information used by management in economic management of the organization, (Tumpach, 2008, p. 5).

Managerial Accounting is designed for management and should serve primarily for the management of the organization to make good decisions about its operation and its further development. Unlike financial and tax accounting, where users require a uniform interpretation and comparability of financial information submitted, the accounting information intended to managers is characterized by the fact that its content is not subject to out-plant control. This accounting subsystem, is not only defined solidly in terms of the objective, content and structure, but even in the world is not used even uniformed term for it.

The global trend in building world-class organization is facing in terms of managerial accounting in particular, to reduce costs in the organization and finding ways and means of optimizing cost types.

### 2 Costs - basic concept of managerial accounting

Costs as a corporate value statement of production factors necessary for the implementation of corporate performance have their irreplaceable role in the system of corporate management and decision making, (Majtán, 2014, p. 243).

Costs are subject of interest to each manager because they belong to the most important characteristics of the organization and every activity, operation or process is associated with the development of costs or expenditures.

The most important area that distinguishes the management accounting from financial accounting is significantly greater need for cost information that employees at different levels in the corporate hierarchy requires both process control business, where its basic parameters have been held and, secondly, to decide on its future variants.

### 2.1 Substance of costs

Every business activity is associated with the consumption of live and materialized labor. We call such consumption costs. Costs represent an important criterion denouncing the success of any organization, not just transport organization. They are also an important tool for decision-making, as in monetary terms reflect the efforts that organization has to make to achieve its goals.

External users of accounting information, understand costs in financial accounting as any monetization of reductions in equity during the reporting period; costs are defined as the outflow of economic benefits, reflecting a decrease in assets or increase in liabilities and that in the reporting period leads to a reduction in own capital. Thus simplified the definition of costs as a sacrificed source to achieve returns of sale is characterized not only by being in the contrast with expressed baseline for profit measurements in financial accounting, but also other features as:

- considerable freedom of the relationship between reflected costs and scope of business; costs in this regard include, for example disposals of capital,
- an effort to show such decreases of own capital, which will not lead to its future valuation; such a decrease is the loss of value of certain asset component due to the effects that accompany business.

In defining costs of management accounting in relation with their management is important to specify purpose of economic source spending and adequacy of costs for this purpose. This means that costs are rationally spend. In managerial concept actual costs represent costs which performance can be assessed - comparing their actual rate with predetermined task.

Costs in managerial accounting are defined as a value expressing efficient expend of economic resources that is intentionally related to the economic activities of organization. For thus the definition of costs is essential to the expediency and purposeful character. In terms of expediency costs are just expended economic resources that is reasonable and adequate to the result of the activity. In terms of purposeful character the meaning of economic resource expending is evaluation. It occurs only in the creation of such component of assets, which will bring bigger economic benefit, as original cost brought. An important feature of such cost is considered to be a relatively close relationship with performances that form the subject of business activity.

In terms of time, the costs of managerial accounting is already visible at the moment of economic resources expending. This, however, usually does not lead to an overall decrease of assets, but only to change in its structure (purchase of goods, materials, machinery). In the terms of financial accounting costs become costs only at the moment when this source "drawn down" its usefulness (e.g. It will become a part of the product that was sold to the customer), "(Kráľ, 2012, p. 49).

From the relationship between the spent costs and gained economic benefits will be derived following criteria for the rational course of carrying out specific operations which are subjects to the reflection in managerial accounting: economy, economic efficiency, economic effectiveness, costs and expenses - income and revenue, cash flow, solvency, liquidity, structure of equity and borrowed capital.

Rationality of economic resources spending has its basis in the economy, because it expresses the changes in costs by which establishments are achieving the desired outcomes with the least resources spending of economic growth. It promotes efficiency in the form of (a real reduction in the absolute amount of the costs for a given performances volume) and not in the form of yield (management is focused on maximizing volume of

performances carried out at constant spending of economic resources).

Another criterion is the economic effectiveness of expended costs. Its elemental form is a comparison of the expended costs in relation to the sold performances with the sale return of these performances. Thus, economic efficiency can be relatively clearly quantified by profit.

The third criterion is economic efficiency, as the top criterion of expended costs rationality. Its level is based on the profit quantification of the reporting period and the goal of managerial accounting is not only to measure overall economic efficiency but examine the partial factors of its increasing. These are useful because of their responsibility for action divided into those associated with the course of the main getting activities of organization that belong under the responsibility of corporate management and those that are the result of effective hedging during the financial and investment transactions, which are the responsibility of the owners.

As between the two concepts of costs and revenues there is a time difference, also between the costs creation and payment of liabilities that caused the creation of costs or between the creation of return and payment of receivables which results from that return creation. This criterion indicating the time separation of costs and returns from cash flows that are part of them, makes it necessary not only to effectively manage costs and returns, but also the cash flows associated with them.

Other criterion - cash flow provide information on the creation and release of financial resources in the organization. Based on the revenue and expenditure of the organization, the revenue represents the increase in financial resources in the organization and the expenditures represent a decrease of financial resources.

For compiling the cash flow is used direct and indirect method. In both methods reporting cash flow is quantified as operating (economy) activities, investing activities and financial activities.

Solvency criterion represents a stable, long-term ability of the organization to cover all its liabilities when due. Instant or so short-term solvency, thus liquidity is in contrast defined as the organization's ability to cover its immediate liabilities.

The structure of equity and borrowed capital is a fundamental long-term criterion for the financial stability and a measure of financial risk, which should be considered in relation to return on invested capital.

The use of foreign sources whose yield is higher than the interest paid for them, increases the profitability of its own resources, but also raises the risk of a fall in the profitability of the organization if it will not be able to repay the foreign sources on time.

Mutually contradictory movement of the two criteria requires solving problems concerning the optimal relationship between them.

## 2.2 The concept of costs displayed in accounting

Differences in concept of costs in financial and managerial accounting are affected by the way of expressing a measurement of the costs. In this context, the general starting point for understanding the costs threefold is displayed in accounting: financial, value and economic.

In financial accounting is most often applied financial understanding of the costs, which is based on the application of money form and of means circulation.

The costs in this case represent money invested in performances that provide compensation money in the original amount. This

concept is the basis of maintaining financial capital in its initial nominal amount.

Financial understanding shows some of the following characteristics, which in its exclusive use in managerial accounting considerably narrowed the object of its interest. This means that as the economic resources consumed may be subjected to display only those costs that are based on real spend of money. And after that, a typical feature of this understanding is the valuation of such consumption or use of economic resources (costs are valued at actual prices).

Value understanding of the costs is associated with the development of costs accounting, whose purpose is to provide information for the current management as well as control over the real course right through realized processes. This understanding is based on relationships, which express consumption or the use of economic resources under conditions, which exist at the time of implementation of the involved processes. The sense of this understanding of costs is based on the information display of economic resources cycle, under the conditions currently in force. So the value understanding is based on the valuation of economic resources by reproduction prices and then the profit is measured on the principle of maintaining the so-called businesslike capital.

Within this kind of understanding of the costs they are not acting only as monetarily ensured economic resources but also those factors which not necessarily mean spend of money, but they effect the economic rationality of the activity by their consequences. In conclusion, the value of understanding the costs can be stated as the financial value and understanding the costs are two basic approaches to the general interpretation of the costs, which are an expression of the dual understanding of financial and managerial accounting. Equivalence in the meaning that the costs exist only if they are costs of business management decision-making tasks based on the current expressed costs and the actual spend money that is the expenditure. The differences between both understandings of costs can be divided into two groups of costs.

The first group of costs are costs which don't necessarily have a reference in financial accounting, but the decision-making tasks that addresses the management requires to be expressed at a different valuation level. Such costs are in terms of financial accounting expression referred to as neutral and in terms of expressing them as management accounting they are referred to as calculation costs. The second group includes the costs for which in the financial accounting do not exist expression, because they are based on the expenditure of money. Such costs shall be in management accounting referred to as supplementary.

Economic understanding of costs is based on the requirement to provide the necessary information not only to the management of real ongoing processes, but also the needs of decision-making with the aim of option selection of optimal future alternatives. These conditions are fulfilled in so-called category opportunity costs, which are defined as the maximum loss of effect that has been sacrificed due to the use of economic resources in the chosen alternative. These costs then represent additionally inserted measure of chosen alternative effectiveness. Main characteristics threefold understanding of costs displayed in accounting are summarized in table 1.

## 3 Managerial accounting - the tool of transport organization management

Management tools consists of obtaining information and data which are important for qualified decision making, planning, organizing, leading and controlling, i.e. management. In principle, management tools form the layer data collection and processing. The utilization rate of each layer of the data processing thus management tools means the need to use them for a specific level of management.

Table 1. Basic characteristics of financial, value and economic understanding of costs (Source: Král', 2012, p. 65)

Costs understanding	Financial	Value	Economic
Relationship with the accounting subsystem	Financial accounting	Costs accounting	Decision-making accounting
Relationship with displayed reality	Transaction represented in parameters which existed when the transaction was made	Transaction represented in parameters which should have been valid in the presence	Transaction represented in the form of comparison with another suitable alternative
Relationship with expressing of the profit	Profit is measured on the principle of so-called nominal maintaining of capital. According to this understanding organization makes a profit when its own financially expressed capital at the end of the period is higher than capital at the beginning of the period.	Profit is measured on the principle of so-called businesslike maintaining of capital. According to this understanding organization makes a profit just after the successful reproduction of the own capital which is measured (and valued) by capacity of production or capacity of business activity.	Profit is measured on the principle of so-called businesslike maintaining of capital while its level is further reduced by opportunity costs and increases of possible opportunity returns.

Basic tools are standardized management information systems. Such is the accounting. Data collection in the accounting is formalized in particular pursuant to the Accounting Act, as well as other directives that affect it, sometimes even internal rules of the organization. Accounting is used to manage the transport undertaking, but for larger organizations with a structured portfolio and complex process map provides transparent information for top management decision making. The organizations classified as medium and large enterprises, the accounting for the management is used within operational management. Also from this point of view it is more a specific type of management, such as operational financial management.

Accounting tools are an extension of managerial accounting. They give management an overview of the aggregate variables, the important ratio indicators of financial analysis, even in specific types of calculations managers have available information from accounting, but assigned to individual products or customers. Management accounting is an important tool for tactical decision-making and monitoring of sustainable development plan leading to the fulfillment of strategic objectives.

As accounting enters the managerial accounting, which supplement and clarify the needs of decision-making so managerial accounting enters into the other management tools and add to the managerial accounting add other information from non-financial aspects of organization operations. An example of such a tool is the Balanced Scorecard, which adds to managerial accounting dimension of relations with clients and employees. Balanced Scorecard is a tool tactical decision-making, but also monitors fulfillment of the plan, either tactical or strategic. It is based on the notion that corporate strategy should be set out by the terms that are comprehensible and which can help you navigate. It is used to more clearly define the strategic vision as growth, customer satisfaction and quality. The Balanced Scorecard is considered to be the engine of the organization performance with a precise description of the corporate strategy. It also serves as an organizational framework for management decisions. Its basic idea is to focus attention on a metric, which is important from a strategic point of view and to avoid concentration on short-term indicators, in addition to using the Balanced Scorecard metrics and financial metrics in areas such as customer, internal processes and growth prospects and learning.

As they say, that most good ideas, has a simple basis, the Balanced Scorecard concept is very simple too. It can be defined as a management system or managerial methodology that facilitates organization to define their vision and strategy and those subsequently put into practice. Correct grasping of the Balanced Scorecard can make a real nerve center of the organization. The basis of this method is the vision and strategy of the organization. It is based on the assumption that the success of the organization's financial results only by measuring them is now no longer enough. This leads to underinvestment in physical sectors such as innovation, customer satisfaction, employee skills, and so on. Already the first users have found that the

correct selection of targets and indicators illustrate the Balanced Scorecard strategic direction of the organization and at the same time allowing its measurement. The second feature of the Balanced Scorecard has proven that on the correct objectives can be directed through the Balanced Scorecard behavior in accordance with the strategy.

Balanced Scorecard as a new method of management, maintains financial indicators, but adds the new driving forces indicators of future performance. Objectives and indicators of the Balanced Scorecard are based on the vision and strategy, monitor the performance of the areas of different perspectives - financial perspective, the customer perspective, from the perspective of internal business processes and perspective of learning and growth. Balanced Scorecard perspectives are assigned targets and indicators that are the result of designed vision and strategy to grasp the plans. Said means with which one can meet, cannot express the complexity of the Balanced Scorecard concept and capture all the areas of the company who are affected.

For the strategic management of the organization, it is therefore necessary to enrich analysis dimension of internal environment from managerial accounting for the analysis dimension of the external environment affecting the functioning of everyone, not just a transport undertaking.

#### 4 Conclusion

Transport organizations, are organizations providing various forms of transport. The use of modern managerial tools is currently necessary for them. Managerial accounting is an important tool for tactical decision-making and monitoring of sustainable development plan leading to the fulfillment of strategic objectives. Such as financial accounting enters into management accounting, which supplement and clarify the needs of decision-making also managerial accounting enters into other management tools to the management accounts add other information from non-financial aspects of organization operations.

Central concepts of managerial accounting are the costs. They represent an important economic category, which significantly affects the functioning of the transport undertaking and it is still necessary to analyze, evaluate and optimize that category.

Cost optimization is an activity that ensures optimal costs. In this process, it is necessary to accept the influence of various factors on the level of costs so the negative effects should be eliminated. Process optimization is recording so-called complementary effects (positive linkage of effects) and so-called compensation effects (sum of adverse positive and negative impacts of the degenerativity and progression and costs).

Optimal costs represent the most generous, the most favorable and the lowest organization costs of acceptance of the relevant conditions, such as the level of production capacity utilization, applied work organization, technical equipment of the organization, and possibility of production factors and so on.

Achieving optimal level of costs is a difficult process and managers are often faced with the question of how to optimize the cost level of the organization. The growing trend in costs is forcing all organizations, not just transport, pay more attention to this issue and therefore managers are looking for different methods and tools to reduce the cost of organization, thus ensuring the competitiveness of the company. Managerial accounting area gives managers space for the application of various modern methods, since this form of accounting is not limited by legislation. The main drawback, however, is the issue of applicability of modern approaches and methods since their introduction in business requires first of substantial financial resources, changing the philosophy of the organization, a change of attitude and motivation of staff in terms of continuous improvement. But backlog in certain organizations does not create space for the implementation of these methods.

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**Primary Paper Section: A****Secondary Paper Section: H**

# THE TRANSFER OF KNOWLEDGE THROUGH INTER-DISCIPLINARY SEMINARS AS A SOURCE OF CREATIVITY IN THE DESIGN STUDIO

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**Abstract:** Bacon has famously stated, "knowledge itself is power.". This study investigates how power is invited into the design studio, underlining the importance of inter-disciplinary cooperation as the source of creative activity and innovation in architectural education. Using seminars that feed the cognitive aspects of design and the relevant applications in support, a design studio set-up undertaken with inter-disciplinary contributions was realised. Shared knowledge from seminars on engineering, landscaping, interior architecture and sculpture were transformed in accordance with their respective fields by architecture students and then re-constructed using constructivist learning to fit their respective purposes.

**Keywords:** knowledge, inter-disciplinary, creativity, innovation, design studio

## 1 Introduction

Sir Francis Bacon (1561–1626) has famously stated, "*knowledge itself is power.*" Dutton claims that knowledge is not a neutral entity. Like any commodity, it is produced and distributed according to particular voices situated in relations of power that are asymmetrical. To talk about knowledge, then, is to talk about power, and therefore the legitimization of some forms of knowledge due to their association with forms of power over others. Thus, it is more accurate to talk about dominant and subordinated forms of knowledge (Dutton 1987).

What Simon is suggesting that the study of design could be a fundamental, inter-disciplinary study accessible to all those involved in creative activity of making the artificial world. According to Cross, it is the challenge for design research to help construct a way of conversing about design that is, at the same time, both inter-disciplinary and discipline-bound. Conversations that fail to connect across discipline, that fail to reach common understanding, and that fail to create new knowledge and perceptions of design are not wanted. This is the paradoxical task of creating an inter-disciplinary discipline (Cross, 1999).

Norman believes that there should be a new form of design education "with more rigor, more science, and more attention to social and behavioral sciences, to modern technology" (Norman, 2010). As a result, new kinds of designers will emerge, those who can work across various disciplines, who understand human beings, business, and technology (Fartushenko, 2012).

Throughout history, architecture has been influenced by social, political, economic and artistic factors and has renewed and changed itself accordingly. Architectural education has both complied with such circumstances and has also led the way at times. Although the theme of the fields that the architect has related himself to has changed and renewed over time, the habit of relating to them has remained unchanged.



Figure 1. Architecture fields and its related (Kirci, N, 2016).

Looking at just the past century alone, architecture had close links with painting, sculpture, literature, philosophy and industry. (Figure 1)

Cubism had its influence on De Stijl (Hollingsworth, 1988), Purism (Frampton, 1992) and Modern Architecture. The art of painting and sculpture also influenced the design of Russian Constructivist architecture (Figure 2). The constructivists came under the influence of abstract works of artists such as Lissitzky, Kandinsky and Malevich who were working in architectural schools and on the other hand used mental constructivism methods and produced dynamic three dimensional objects (Russian Futurism). The artists who left Russia, after some time with the new duties that they had been assigned to within the education program, had a say on the structuring of Bauhaus (Peel, Powell, & Garrett, 1989). The education program of Bauhaus being an extremely effective establishment on the teachings and implementations of 20th century architecture, is full of arts, crafts and industry. It was composed of twelve representatives of leading handicraft companies and artists whose aim was the cooperation of art, industry and crafts in the ennoblement of commercial activity by means of education, propaganda and united stand on pertinent questions (Dorste, 2002). The founder and eponym of de-constructivism Jacques Derrida is a philosopher and it was architect Bernard Tschumi who established the link between Derrida's thoughts and architecture (Proudfoot, 1988)



Figure 2. Examples of the relationship between painting, sculpture and architecture. a. Mondrian painting, (Mondrian, 1921) b. Schröder House (Rietveld, 1924) c. Tatlin Tower (Tatlin, 1920) d. Rusakov workers club (Melnikov, 1928)

Today's architecture is still taking advantages of knowledge coming from other disciplines. There are mainly two ways to acquire such a knowledge: One way is the architect's himself being another specialism beside architecture. For example; Buckminster Fuller was also a mathematician, surveyor, ecologist and a poet at the same time. (Sharp, 1991) Santiago Calatrava is an engineer and Daniel Libeskind is a musician (Libeskind). Rem Koolhaas has worked as a journalist and a screenwriter (Lacy, 1991). Hadid studied mathematics (Hadid, 1). Another way is to collaborate with people who has other specialties. For example; SOM is the pioneer and the most influential architecture firm in which architects collaborate with engineers, interior designers, urban planners and technicians (SOM). Gehry and Partners relies on the use of digital project, a sophisticated 3D computer modelling program originally created for use by the aerospace industry, to thoroughly document designs and to rationalize the bidding, fabrication, and construction processes to able to build Gehry's sculptural design (Gehry). Zaha Hadid's interest is in the rigorous interface between architecture, landscape, and geology as the practice integrates natural topography and human-made systems that lead to experimentation with cutting-edge technologies. Such a process often results in unexpected and dynamic architectural forms (Hadid, 2).

As can be followed from the explanations above, the professional field of architecture lends itself to working directly or consecutively with other disciplines. The practical abilities of providing solutions together, within the work group and assessing the problems using different points of view should be brought forth during the education itself without getting delayed for working life. The Unesco/UIA Charter considers this same aspect: that educators must prepare architects to formulate new solutions for the present and the future as the new era will bring

with it grave and complex challenges with respect to social and functional degradation of many human settlements. In the same document, the areas of co-operation are underlined: "one of the objectives of architectural education is that architecture is a discipline which draws knowledge from the humanities, the social and the physical sciences, technology, environmental sciences, the creative arts and the liberal arts" (Unesco/UIA 2011). Figure 1 depicts the fields to which architecture is related.

In this context, stretching the boundaries of architectural education programs in accordance with the versatility of professional life is both a sort of richness and necessity. When the above given information is evaluated, the flow of information coming from different disciplines has been thought of as a source of riches for architectural education capable of developing critical thought and having a contributing role in creativity for the production of the new ideas and forms. Inter-disciplinary support is not a novelty of today. Instead, the flexibility of the boundaries of the profession of architecture and the comprehensiveness of its education has already been there.

The design studio, being the venue where free and experimental studies of a whole architectural program can be undertaken, is the heart of architectural education. Gazi University's Department of Architecture in Ankara, Turkey, organises its design studio hours within a system whereby the students from the 4th, 5th, 6th and 7th semesters share a common design studio (they are not split up by their year of study). The working methods and implementations of each atelier in this system purposely differ from each other, in order to provide a varied experience for the students over the years. The focus of this study is Atelier 6 (A6).

The following projects were assigned according to the semester of the student: 4th semester – wedding hall, 5th semester – art gallery, 6th semester – district education centre, 7th semester – city council building in the multi-semester environment of A6. A working strategy had been built for the purposes of feeding the design studio works and the cultural environment. In this article, how this diversity has been achieved, reflected into design studio works and how the results were evaluated are the subjects that have been touched upon. The heart of architectural education is the design studio and the main objective of the design studio is to produce solutions to define potential problems by way of improving creativity.

Firstly, the following aspects should be scrutinised in respect to an inter-disciplinary approach:

- whether or not inter-disciplinary educational methods trigger creativity
- how inter-disciplinary could be transformed for use in design education
- how inter-disciplinary could be incorporated into the design-studio education scheme.

## 2 An inter-disciplinary approach to creativity

Even though it is difficult to exactly define creativity, the answer to the first question (whether or not an inter-disciplinary approach increases creativity), is hidden in what exactly creativity is. It is obvious that an inter-disciplinary approach requires synthesising. Some experts believe that the process of synthesising contributes to the production of novelties, which are a part of the definition of creativity. For example, Saebo et al has concluded, "Creativity is a state of mind in which all of our intelligences are working together. It involves seeing, thinking and innovating" (Saebo, Mc Cammon & O'Farrell, 2006).

Creativity is often defined as the development of ideas or work that have the quality of being both useful and original (Amabile et al 1996<sup>1</sup>; Elton 2006<sup>2</sup>; Mayer 1999<sup>3</sup>; Paulus & Nijstad

2003;<sup>4</sup> Sternberg & Lubart 1999)<sup>5</sup>, or plays an important part in the process of cultural reproduction, technological advancement, innovation and intervention (Runco 2004). A significant force for innovation and change is design, of which creativity is considered a key element.

Casakin also claims that creativity enables the talented designer to transcend conventional knowledge domain[s] so as to investigate new ideas and concepts which may lead to innovative solutions; it enables the designer "to perceive a problem from unorthodox and innovative perspectives" (Casakin 2007). In brief, inter-disciplinary work requires synthesis of knowledge that contribute to innovation for creativity in design process.

- The acquisition of new information
- The transformation of knowledge
- A checking of the pertinence and adequacy of knowledge (Bigge & Shermis, 2004).

The main source of cognitive knowledge in the design studio is theoretical classes. This knowledge is transformed and constructed within the design process. Schön describes design as a reflective conversation with the design situation, thus addressing the human thought-processes and the language used to make design decisions (in the case of architectural design studio: drawings and models) (Schön, 1988)

The transfer of knowledge into other fields is unfortunately not easy. Piaget has taught us that knowledge is not a commodity to be transmitted. Nor is knowledge simply information to be delivered from one end, encoded, stored and reapplied at the other end. Instead, knowledge is experience, in the sense that it is actively constructed and reconstructed through direct interaction with the environment. The understanding of knowledge is similar, in many ways, to the ideas expressed by various scholars associated with "situated cognition": for example, to know is to relate (Ackermann, 1996). For constructivist learning implementations, architectural design studios are valuable fields of experiment. However, stimulants such as reminders are required. Such reminders could be in the form of encouraging research by way of triggering curiosity or in the form of providing knowledge.

Creativity has been characterised by "the sudden interlocking of two previously unrelated skills, or matrices of thought." More precisely, creativity is the result of a relationship between a working (short-term) memory and a long-term memory, based on a process of "selective emphasis" (Koestler 1975)<sup>6</sup>. In brief, knowledge needs to be interpreted, related, structured and transformed. Using this point of view, as the contribution of inter-disciplinary co-operation, it is expected that knowledge placed in the short-term memory be the source of new works in the future from the long-term memory.

## 3 How can an inter-disciplinary approach be incorporated into the design studio?

Another important question is how an inter-disciplinary approach can be transferred into the design studio. The Bauhaus is an excellent example in this respect. Whitford has emphasized that the continuing influence of The Bauhaus in art and design education takes the form of a faith in the efficacy of foundation courses of one kind or another, and in carefully designed projects given to spur a student's creativity (Whitford, 1984). Bauhaus students were classified as either apprentices or journeymen. What differentiated the Bauhaus was a tandem system of workshop teaching that attempted to equate craft with art, and equip graduates with as much technical expertise, as well as

<sup>1</sup> Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M.: *Assessing the work environment for creativity*. Academy of Management Journal, 39, 5, 1996. p.1154-1184. In Williams et al 2010.

<sup>2</sup> Elton, L.: *Assessing creativity in an unhelpful climate*. Art, Design & Communication in Higher Education, 5, 2, 2006. p.119-130. In Williams et al. 2010.

<sup>3</sup> Mayer, R. E.: *Fifty years of creativity research*. In Sternberg R. (Ed.), *Handbook of creativity*, Cambridge: Cambridge University Press. 1999. p. 449-460. In Williams et al 2010.

<sup>4</sup> Paulus, P., & Nijstad, B. *Group creativity*, New York: Oxford University Press. 2003. In Williams et al 2010.

<sup>5</sup> Sternberg, R., & Lubart, T. I.: *The concept of creativity: prospects and paradigms*. 1999. In Williams et al 2010.

<sup>6</sup> Koestler, A.: *The Act of Creation*. London, UK: Macmillan. 1975. In: Bonnardella, N. & Marmèche, E. 2010.

theoretical and creative expertise. Apprentices were instructed by masters of each particular craft as well as by practicing fine artists (Wingler 1969).

Although the inter-disciplinary approach was not specifically underlined in Bauhaus doctrines, it existed on a passive level as Bauhaus students were exposed to many different technical, theoretical and creative aspects of art and design. Today, such a model can be planned as a part of an educational program. In such an implementation, different departments support each other by way of theoretical and practical classes. The synthesis of knowledge, coming from multidisciplinary areas, continues to be a challenge in the typical design studios of most architecture schools.

However, when an inter-disciplinary approach has not been established in the structuring of academic departments, there are administrative difficulties finding professional practitioners of different scientific fields as the assigned persons during studio hours. As part of the current research, organising an architectural design studio under these inter-disciplinary circumstances required finding practical solutions to this problem. As has been mentioned by Linser, Naidu & Ip out of the four basic learning methods for architectural education, “the seminar” has been found the most appropriate (the other three being “target oriented,” “role oriented” and “web oriented” communication and co-operation) (Linser, Naidu & Ip, 1999).

### 3.1 The seminar as a method of flowing knowledge into the design studio: The acquisition of new information

Most of the time, typical studio works are based on the bilateral relationship between a tutor and a student, who is an architect-to-be. From time to time during the semester, juried reviews are held with the goal of strengthening the weaker areas of the students using jury members’ knowledge and different points of view. However, aspects such as not being able to talk about exactly the same points for every project, the lack of conveying basic knowledge in a simultaneous, qualified and standardised manner and the students not sitting through and listening to all of the jury critiques render making an equal use of the such jury reviews impossible. Although how jury critiques will be going to be used depends on the student, the transfer of knowledge to all of the students simultaneously, without an intermediary (like a juror) and without any subjective interpretations can only be possible through theoretical classes and seminars.

In this study, making use of the condition in which the boundaries of theoretical and practical habits inherent in the respective professional and educational fields nested within each other has been considered to be a pragmatic approach in accordance with the grounds that have been provided above. Thereby, knowledge that has been included in the course program and not being included into the design process and knowledge that has not been included in the education program and being a part of the design world has been invited for contributions to the studio works. The moment that what type of knowledge is wanted is decided upon, what type of power is going to be possessed is also decided. In accordance with Dutton’s definition (Dutton, 1987) an interpretation could be made that alongside the dominant knowledge of architecture in architectural education the knowledge coming from other disciplines could be subordinate. Relations were established with the below-mentioned fields, considering that, in order to increase creativity, the design design and production studio should be fed with knowledge coming from genetically similar areas of study in terms of:

- Civil Engineering (For managing structural design of the architectural form)
- The Art of Sculpture (For enhancing 3D plastic expressiveness of architectural form and evaluating it within urban pattern)
- Landscaping (For awaking environmental awareness of the students and integrating topographic properties in accordance with the purpose of the design)

- Interior Architecture (To ensure harmony between function and meaning of architectural space, using colour, light, shade, texture, material in interior design)

Special care was given so that these seminars were scheduled on particular dates throughout the semester when students were available, needed the information and were also able to make the most use of it. The following section of this essay is a brief explanation of the contents of these seminars.

#### 3.1.1 The consequence of structural systems in architecture

In this seminar, the basic principles of setting up structural systems in buildings were introduced. A balanced load distribution and a symmetrical geometry were the main criteria in an appropriate structural system design. The estimation of external disturbances and loads, and the assembly of an accurate load transfer mechanism were the issues that were underlined. While establishing their structural systems, the students’ projects were appraised on stability, strength, functionality, cost and aesthetics. Balanced load distribution and a symmetrical geometry were clarified with examples from nature and remarkable visual materials selected from well-known architectural masterpieces.

As part of a fictitious scenario, a typical reinforced concrete building with a regular and symmetrical structural system was introduced. Subsequently, the structural behavior of the building caused by unexpected loads or other external disturbances is demonstrated. The structural behavior of the building in the symmetrical and asymmetrical form has been compared using mathematical models developed for computer analysis. In this manner, the healthy structural behavior of buildings is proven to depend not only on its geometrical symmetry but also on the symmetry according to the center of rigidity of the structural system. The objective of this seminar was to instruct the students when and how to use in the design studio the theoretical knowledge that they had been given during various classes of their architectural education.

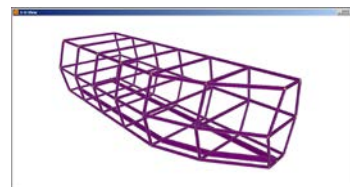


Figure 3. Structural modelling and computer-aided mathematical modelling of a student’s project (Unay, A.I., 2016)

#### 3.1.2 Sculpture and architecture

Sculpture is a three-dimensional form created through an artistic point of view. Although in general terms, nature and human beings are taken as the sources of inspiration and interpretation in classical works, the relationship of sculpture and architecture is more obvious in abstract sculptural works. Surface and texture, design components studied in basic architectural education classes, are also studied in this seminar. Parameters such as geometry, mass composition, ratio and proportion, depth, light and shadow effects are also challenged.

In this seminar, the students undertook a study led by a visiting artist/sculptor for the purposes of investigating the three-dimensional effect of form, composition and movement using the plastic and easily-shaped characteristics of clay. The students produced countless number of clay models during and after the study, which was realised in order to develop their three-dimensional thinking and shaping skills. It was been observed that these models are the tools for trying out their design ideas in respect to their project subjects, and at the same time tools for producing design ideas. The models produced by some of the students in this seminar actually defined the main characteristics of their final projects.

### 3.1.3 Landscaping arrangements

The objective of this seminar was to establish a consciousness for the conservation and planning of the natural environment. Architects, landscape architects and all professionals whose work is linked to the environment around us should reach a level of consciousness where they are more constructive than destructive. For urban landscaping to be successful and sustainable, one needs to first undertake an inventory study. At this stage, it is important to determine the social and cultural infrastructure, the qualities and density of the users, along with the natural and physical data of the place. It is also important to make an appropriate use of this data. Micro-climates caused by the density of architectural structures in urban settings can be changed and in some cases controlled with the application of planned landscaping. In the project site, the balance between the allowed hard landscaping and green spaces was not allowed to be disturbed and the area was to be made useful with the use of correct plantings. For example, any form of water creates a cool effect in the city centre, thick textured plants provide sound insulation, plants with tall forms create a shelterbelt, and using plant groups placed on firm ground creates gathering spots. Examples of landscaping arrangements on the student projects have been provided below.

### 3.1.4 The effects of interior spaces

In addition to being a physical object of Cartesian status, space produces meanings and creates relationships. Its function and dimensions, the profile of the user, the colours, textures, lighting and materials used and the location of the furniture all affect the meaning of a space. One should be aware of the psychological effects to be created with space during the design of interior spaces.

If the message that the architect would like to give within the wholeness of a building is not supported with its interior spaces, then an incompatibility could arise between the content and the essence. The colours, textures, materials, dimensions and locations and the relationship between them that have been selected in order to achieve such compatibility affect the quality of the space and would be reflected in the behaviours realised in that space. In this seminar, using various examples, the effects of colours and matching and mismatching colours are explained. In addition, the effects of varying the dimensions of the space (width, length and height) compared to the human body are explained by way of providing many examples.

## 4 How inter-disciplinarity could be transformed for use in design education

### 4.1 The transformation of knowledge

As mentioned, 4th semester students were asked to design a centre where wedding and wedding reception organisations could be held. (Figure 4) The site was Kurtulus Park in Ankara. For this group's projects, the contribution of landscaping knowledge was very important. In addition to presiding over the relevant seminars, the landscape architect also took part in site visits and studio studies. Examples of the influence on the student projects of landscaping arrangements and the sculpture seminars have been provided below.



Figure 4. Proposals for a wedding hall in a city park

5th semester students were asked to design an art gallery. (Figure 5) In addition to including the different areas for the exhibitions, these students' designs discussed the art gallery itself to become an object of exhibition for a residential area. For

this reason, the students made better use of the sculpture seminars, in comparison to the other groups.

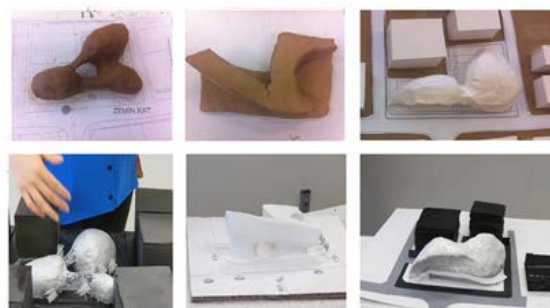


Figure 5. Proposals for an art gallery

The 6th term students were asked to design a social centre where the residents could pass their free time engaged in social activities. During the study, the students also looked for ways that the centre could attract attention and be easily reached. The contribution of landscape architecture proved to be effective in the use and design of the outer space as a social venue.

7th term students were asked to design a City Council Building. It has been discussed that the social areas of this building would include facilities to allow for meetings, celebrations, gatherings and protests. Again, the contribution of landscape architecture proved to be effective in the use and design of the outer space as a social venue.



Figure 6. Proposals for a city council building

### 4.2 The contribution of the seminars to the architectural projects

The students answered survey forms in order to make their own evaluations about the contribution of the seminar before the final delivery of the projects. In order to allow the students to express their views freely, it was optional for them to give their names. However, they were still asked to identify on the form in which term they were. At one part of the survey study, they were questioned about their general satisfaction in respect of the seminars held during that term and whether these seminars had a direct impact on their projects.

All of the 28 students taking part at the survey said they approved of the seminars. A vast majority of the students approved that the seminars had contributed to their works. (Table 1)

Table 1 Evaluation of the seminars

Evaluation of the seminars	Yes	Undecided	No
Do you approve the seminars that were organised during the term?	28	-	-
Do you think the seminars had a direct contribution had a on your work?	23	5	-

Besides the above-mentioned questions, the students were asked to elaborate the reasons for their remarks as an answer to an open-ended question. Some of these comments are presented as follows.

#### ■ 4th term students

A: After the seminars, we were able to spot the points that we weren't able to think otherwise before. By this means, we were

able to approach our designs with new ideas and thoughts and tried to develop our designs further. We saw that real architecture is not consisting of the crust alone.

B: I believe that this method and form of gaining information is going to make greater contributions to my work in the future than it does now. The seminars were very useful in terms of getting to know these lines of professions and experiencing the importance of co-operation. I think that this system is very useful, and for it to be even further useful it is necessary for the persons who are presiding over the seminars to pay attention to the projects of the students on a one-on-one basis. We worked like this with the landscape architect, and the results were very efficient.

- 5th term students

C: This had been a study where we were fed through other disciplines during the development of my project. The seminars warned us about the aspects that we should be careful about.

D: I did my best to include the subjects of the seminars in my project.

- 6th term students

E: Since the seminars were held in order to inform us on certain subjects, they had a big impact on my study. I learned things that I didn't know before. I tried to use the things that I learned on my project.

F: Seminars give new ideas. They helped me to be bolder in my designs.

- 7th term students

G: In fact we already receive frequent warnings/criticisms from our tutors on some of the subjects of the seminars. However, since they were presented to us in the form of seminars, it helped us to see their importance.

## 5. Results

When we see the latest prominent examples from all around the world, it does not seem to be right to evaluate architecture as just architecture. Today, to collaborate with other disciplines has become nearly a necessity for the practice of architecture therefore different disciplines now and then work simultaneously and consecutively. When including all these disciplines in the curriculum is not possible, the reflection of this polyphony on architectural education could be through the design studio studies at its fastest and most effective form.

In this study, transferring knowledge from different fields to the design studio through seminars had been scrutinised. In this method, which is far from the subjectivity of the bilateral relationship between tutor and student, knowledge is simultaneously given to all of the students in the same quality.

As for the transformation of all this information onto the final product, without a doubt the personal characteristics of students had an effect as well as the means and requirements of the subjects studied. Admittedly, these informative studies that have been squeezed into one semester were not adopted into all of the projects to their fullest extent. Still, the lid has been taken off with this study and the students have been given a sufficient amount of triggers to get into detailed research studies later. When similar studies are conducted, they will have similar effects on students who participate in the studio at that time and will reinforce the knowledge of students who had already previously gone through the experience.

In addition to the inter-disciplinary seminars, it is expected that knowledge that has been placed in the short term memory to be the source of new works from the long term memory in the future. It may also help to prepare students working directly with other disciplines or consecutively with other disciplines in their professional life. The main mission of education is to teach how

to learn and to develop critical thinking. A tutor should let the students find their own ways not only by showing them the current limits of present but also by showing some possibilities hidden in tomorrow.

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**Primary Paper Section: A**

**Secondary Paper Section: AL, AM**

# THE FOREIGN PRESENCE AS A DETERMINANT OF CREATION OF SPILLOVER EFFECTS OF FOREIGN DIRECT INVESTMENT

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**Abstract:** This paper aims to quantify the value of foreign presence of foreign direct investment which gained investment incentive. This foreign direct investment is localized at the region NUTS 2 Northwest and NUTS 2 Northeast. The foreign presence is considered as one of the key determinants of creation of spillover effects. Despite the growth trend in the evolution of this indicator were identified low levels of foreign presence. In the analyzed period 2002 - 2013 - on average, there was range 1.6% - 7.3%. From the calculated values could be making the conclusion of the low potential for the emergence of spillover effects in the analyzed regions of the Czech Republic.

**Keywords:** Foreign direct investment, foreign presence, host economy, spillover effects.

## 1 Introduction

Foreign direct investment (FDI) is a term which is mentioned in the world. Due to the forces of globalization, through which the world becomes more integrated in recent decades more than ever, FDI is currently an integral part of the Czech and other world economies. With the growth of international rank companies on a global scale is also paid more attention to the impacts of FDI. Especially, the impacts what are bringing through locating of FDI to the host region.

FDI has its supporters and opponents. The first ones (Wokoun and Tvrdoh, 2010) see them as a powerful engine of economic development, the bearer of know-how, new technologies and strategic employers. The inflow of foreign capital, that quickly helps to solve the economic problems of the local economy. The others (Říman, 2008) despite all the positives point out to the arrival of strong competition for home markets of newly started businesses. They also point out to the unfavorable system of investment incentives that causes a market disproportions.

Although FDI has many critics, individual states and regions are competing between each other to attract potential foreign investors. They offer a wide spectrum of prepared industrial zones, which in many cases remain in the Czech Republic for many years uncluttered. This situation is connected with the continued trend of excess supply of potentially suitable locations for international investment (CzechInvest, 2015).

According to the survey of the attractiveness of European countries for foreign investors, performs by Ernst & Young, is shown that the Czech Republic belongs to the top twenty most attractive countries for a long time. According to the latest data for the year 2013 was ranked at the 14th place in terms of FDI (Ernst & Young, 2014). Multinational companies (MNC's) as well as domestic investment may apply for granting investment incentives.

This paper will deal with FDI received investment incentives. Actually these FDI creates the dominant share in The Czech Republic. It is about 80% (CzechInvest, 2015) of the total FDI flowing into the Czech Republic. It is therefore a representative sample of investment, which will be analyzed the effects of foreign direct investment on. The effects can be divided into economic, social and political. To the economic effects can be classified the spillover effects.

## 2 Typology of economic effects caused by FDI

Economic effects of FDI can be divided into direct (primary) and indirect (secondary). Indirect positive effects are in special literature frequently referred to as spillover effects. Indirect

effects contain within themselves so-called side effects - externalities that are not clearly specified link to FDI. Nevertheless they result from the direct effects and the location of FDI (Mišun and Tomšík, 2002).

Indirect effects of FDI have the character of externalities, for whose existence anybody does not pay or does not get paid. This is similar principle which it is considered in the theory of public goods (Benáček, 2000). Spillover effects are kind of type "public interest", their existence is necessary to support government institutions that currently have a form of investment incentives (Pavlínek, 2004).

Spillover effects are one of positive economic externalities. Respectively, an external benefit for a host economy arises beyond the direct effects of FDI in terms of market transactions. It is anticipated that the overall contribution of FDI will be higher than the range granted institutional support. Foreign investors bring along to the host economy „a little bit extra" what might turn against them in the future. It is called the imitation effect of FDI. The government carries the risk in creating the appropriate institutional conditions that FDI brings with its not only positive but as well as negative effects, which can cause contra productivity of the whole system of investment incentives.

### 2.1 The potential for the creation of the economic effects of FDI

To maintenance at the domestic or foreign market businesses need to have a certain competitive advantage (firm specific asset). For example, there may be in the form of tangible assets that to allow to realize economies of scale. The firm specific asset can be intangible assets in form of know-how, managerial skills, marketing benefits, brand reputation, etc. As reported by Brainard (1993) if the company has only advantage in tangible assets, will not be for it lucrative to expand abroad and itself a competitive advantage not to lead to the internationalization of production. The concept of intangible assets as a competitive advantage deals Markusen (2001). An author highlights the simplicity and lower financial difficulty of the transfer of intangible assets abroad. Knowledge and skills can be freely moved from the parent company to subsidiaries, investment in science and research brings benefits to the headquarters and branches. Based on the research of these authors is possible to make a conclusion that if a company decides to move part of activities abroad, its competitive advantage is the most likely owned by specific intangible assets.

With strategy investment decisions also dealt Dunning (1981), who created the so-called Concept OLI (ownership advantage, location advantage, internalization advantage). The ownership advantage, the location advantage and the internalization advantage are the determinants of investment decisions of companies. If the investor is no different from the businesses in the host economy, it would not be lucrative for him to enter to that market. In order to competitiveness of FDI on the foreign market musts, as already mentioned, to own a specific competitive advantage so-called the ownership advantage. So-called the localization advantage of the site includes the attractiveness of the host region, incl. availability and cost of factors of production.

If an investor has the ownership advantage and in the host region sees the potential localization advantage does not have to realize the FDI. One of the alternatives entering the foreign market is for example the license sale. The reason for demanding access to foreign markets is the last determinant of the concept OLI - internalization advantage. It is the advantage of keeping the know-how and unique knowledge. Thru this kind of entry the investor protects himself against the risks associated with the sale of license and inadequate protection of intellectual property

and the problems associated with evaluating values of intangibles assets. At the same time, not everything can be patented (Blomström and Kokko, 1998).

According to Dunning (1981) have to be fulfilled all conditions of the Concept OLI an investor to decided to realize FDI. The concept OLI confirms and extends Markusen's claim (2001) about investing abroad in the case of having specific intangible assets. MNC's are according this concept companies that have specific intangible corporate assets, which are applicable to branches abroad. This means that is possible to realize a technology transfer within the same corporation. The technology transfer is multiplied if businesses in the host region are capable this transfer absorb. It is so-called spillover effects (Caves, 2007).

## 2.2 Definition of spillovers effects and possibilities of measurement

If MNCs realizes in the host region its FDI, the international company transferred to FDI a competitive advantage in the form of ownership of specific corporate assets. Thanks to the fact can FDI better faces competitive pressure from local companies that have the advantage of better knowledge about the local market, business practices, preferences of customers etc. The geographical dispersion reaches of know-how and technologies, respectively to technology transfer, but not automatically beyond the corporation. Spillover effects can be identified in case if the presence of FDI raises the productivity of domestic enterprises (Leshner and Miroudot, 2008).

In the case that FDI influences positively domestic firms in the same industry, there is a so-called identification Horizontal spillover effects. Blomström and Kokko (1998) defined four ways for local businesses to increase their productivity through the presence of FDI: the effect of imitation, human capital, competition, higher export performance.

Inflow of foreign investment brings with it an unpleasant impact on the investment itself – so called the effect of imitation. Competitors in companies host country observe a new foreign company - its procedures, marketing, public relations, the way how the company presents and acts. Thanks to observations of these methods the local firms could learn and improve in many cases. They could be more competitive and productive (Jahn, 2008). The range of this effect depends on the detail and complexity of the individual processes (Görg and Greenaway, 2001).

To the technology transfer most often occurs through the acquisition of human capital. Domestic firms can hire workers who previously worked in FDI. These people also could start their own businesses. Improving of productivity is the result of labor mobility. Although the primary incentive of an investor is cheap workforce, on the other hand MNCs are spending funds for training programs and they are different ways investing a lot of money in human capital. No company is able to protect 100% of its investment in staff. Workers themselves are bearers of intangible capital (Lindsey, 1986).

Transfer of know-how and an overall knowledge and management procedures is an impact that long and vigorously reflected in the economy of the host country. Employees who passed companies owned by foreign entities and had something to do with leadership, transfer sophisticated management and proven corporate culture further - to other businesses. They often become subsequently high executives in local companies or capable entrepreneurs (Jahn, 2008).

A key role in terms of spillover effects plays competition. The arrival of FDI to the host region disturbs the balance of the market and causes that the local businesses have to fight about its existing market share. One of the ways, how to face new competition is start to imitate the FDI. If to the imitation effect does not occur, domestic firms have to use their existing technology more efficiently, in order to maintain their position in

the competition fight (Wang and Blomström, 1992). More effective use of technology leads to increasing of productivity. At the same time the competition fight may also result in a change in the speed of implementing new manufacturing processes (Kokko, 1994).

Over the last indirect source of the growth of productivity in domestic firms is considered export. According Blomström and Kokko (1998) export represents spending the costs of establishing distribution networks, getting information about consumers and foreign markets, respectively costs of lobbying. The international company has already incurred such costs and has key information at the entrance to the host country. These findings may apply during export from a host economy, which may assist domestic firms in the export.

A foreign investor is trying to prevent the horizontal spillover effects just by entering a foreign market through internationalization of their activities. Respectively he establishes FDI instead of for example license sale to local business (Shaver and Flyer, 2000).

On the other hand, MNCs can benefit from the existence of spillover effects. If they can use the high-quality production of domestic suppliers, they have no reason to prevent the spread of so-called Vertical (intersectoral) spillovers. The fundamental difference from the horizontal spillover effect is that it does not arise from competition, but arises from the cooperation (Leshner and Miroudot, 2008).

The vertical spillover effects occur through the backward linkages and forward linkages. Backward linkages occur when FDI finds among local companies their new suppliers (Watanabe, 1983). The emergence of spillover effects of backward linkages is dependent on voluntary MNCs provide technology transfer and the willingness and abilities of local companies to adapt to the requests of MNCs (Lenaerts and Merlevede, 2012).

## 2.3 Determinants of the creation of the spillover effects of FDI

If the overall indirect effect FDI in the host region is positive or negative and whether any indirect action occurs, depends on a number of factors. The key determinants of the indirect effect's creation can include technological gap, absorptive capacity of the firms in the host economy or degree of foreign presence.

Kokko (1996) concerned the question, if exists a link between the degree of foreign presence (FP) and spillover effects. He concluded from the analysis of competition in the case of Mexico that this relationship is not always true. On the one hand, he found that the crowding-in effect does not occur in areas with a dominant MNCs, but on the other hand in areas where the proportion of foreign presence is to 50% and at a time is increasing, this effect was identified. Graphically, the relationship between foreign presence (FP) and spillover effects can be illustrated by a modified Laffer's curve - see Fig. 1.

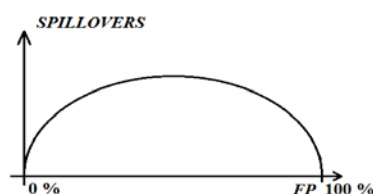


Fig. 1: The relationship between the size of spillover effects and the degree of foreign presence

Source: own processing

The fact of whether finally the effects will happen, depend not only on the foreign presence. The actual location of FDI is just kind of a first step, the final effect is dependent primarily on the interaction between domestic and foreign firms (Blomström, 2002).

### 3. Measurement of foreign presence in selected regions of the Czech Republic

Foreign presence is the level of state of foreign investment in the economy, region or sector, expressed by foreign companies' employment in total employment in the economy, region or selected sectors (Görg and Greenaway, 2004).

$$FP = \frac{\sum_{i=1}^n E_{FDI_i}}{E} * 100 \quad (1)$$

$E_{FDI}$  represents the number of employees in FDI, which received investment incentives in individual regions. This figure was obtained from annual reports analyzed FDI in each year (Ministry of Justice, 2016),  $E$  represents the number of people employed in the region, according to CSO statistics (2016).

According to the relation (1) was calculated foreign presence in five regions of the Czech Republic. They are regions – Carlsbad, Usti nad Labem, Liberec, Hradec Králové and Pardubice. Respectively the area NUTS 2 Northwest and NUTS 2 Northeast.

Tab. 1 contains the calculations.

	Carlsbad region	Liberec region	Hradec Králové region	Pardubice region	Ústí nad Labem region
2002	0,885	1,191	4,792	3,840	3,028
2003	1,223	1,339	5,757	4,331	3,517
2004	1,564	1,523	6,419	4,787	4,209
2005	1,546	1,836	6,520	6,439	4,781
2006	1,551	2,036	6,654	5,745	5,573
2007	1,656	2,178	6,398	6,096	6,369
2008	1,679	2,290	6,236	6,577	6,696
2009	1,538	2,088	6,098	6,746	6,113
2010	1,643	2,635	8,532	5,982	6,438
2011	1,785	2,317	9,153	5,714	6,617
2012	1,956	2,621	10,628	6,180	6,613
2013	1,835	3,071	10,038	5,784	6,412
Average	1,572	2,094	7,269	5,685	5,531

Tab. 1: Calculations of foreign presence in the analyzed regions (in %)

Source: own processing based on own calculations and data from the CSO and annual reports analyzed FDI

Foreign presence was calculated for the period 2002 - 2013.<sup>1</sup> The year 2002 was chosen as the first reference year for the reason that from this year are reported data for the employment of foreigners at the regional level in the Czech Republic.<sup>2</sup>

Development of the inflow of FDI per 1,000 inhabitants in the analyzed regions illustrates Fig. 2. From the point of view of development of this indicator is clarify that these are regions with relatively high - Usti nad Labem, Liberec and also relatively lower inflow of FDI - Carlsbad.

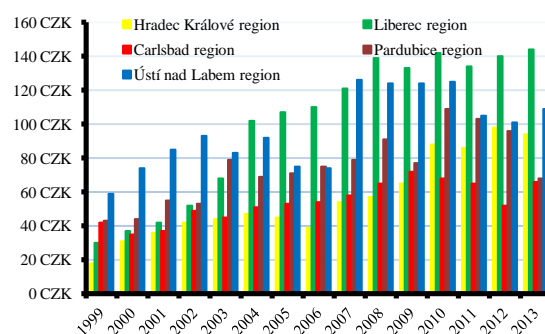


Fig. 2: Inflow of FDI in the analyzed regions (in millions CZK)  
Source: own processing, data RISY

Fig. 3 illustrates the results of calculation of the foreign presence in the analyzed regions. It should be noted that this indicator does not correspond with the values of the indicators of inflow FDI. Indicator FDI inflows into the region does not reflect the kind of the investment. Respectively it does not reflect whether and how much influences the local labor market. FDI inflows does not indicate that in regions dominated a fully automated manufacturing with the low number of employees. FDI inflows does not reflect, if growth of the indicator was achieved by incoming from new investors to the local market or a rise of the value of investments etc. Foreign presence is therefore measured using the formula (1) that enables these drawbacks at least partly eliminated through the monitoring of the development of numbers of jobs.

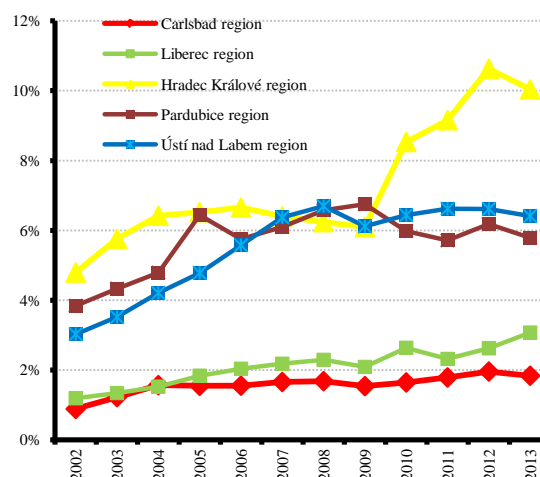


Fig. 3: Foreign presence in the analyzed regions of the Czech Republic

Source: own processing based on own calculations and data from the CSO and annual reports analyzed FDI

Although Liberec region has high long-term inflows of FDI (RISY, 2016), the number of new jobs created here in comparison with other regions is relatively low. This corresponds to the relatively low value of the indicator FP. Regions where on the contrary, FDI created relatively more jobs, have higher values of the indicator FP. The most progressive growth can be identified in case of Hradec Kralové region.

According to the methodology A. Kokko the highest rate of spillover effects should be identified precisely in Hradec Kralové Region, while low, if not minimal, the Carlsbad region – see Fig. 4.

<sup>1</sup> Due to comparability is the year 2013 is the last analyzed year. MNC's annual report, containing information on the number of employees, are released with a time lag.

<sup>2</sup> FDI employs besides local population also foreigners. For example the expatriates or employees from third countries (Čuhlová, 2015). For the evaluation of foreign presence is necessary data of the number of persons employed modify of the number of employed foreigners. After that is given impact on the regional labor market in terms of the local workforce.

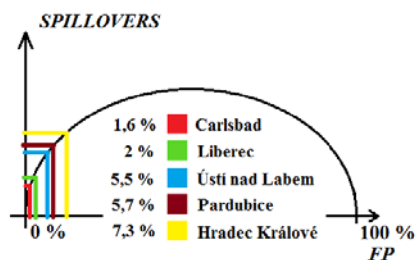


Fig. 4: Relationship between the size of spillover effects and the degree of foreign presence

Source: own processing based on own calculations

Figure reflects the low degree of foreign presence in all analyzed regions. This situation should indicate the low potential of creation spillover effect of FDI.

#### 4. Conclusion

Inflow of foreign investment currently supports most world governments. Governments spend considerable funds to obtain positive effects that are taken for obvious, but in reality they are very difficult to measure. On the other hand, they have not to prove in the host region granted investment incentives may give the creation of crowding-out effect and the creation of dual economy. Where on one side there are the capital-intensive foreign companies with advanced technology, quality management and efficient organization of production and on the other side domestic producers that they are unable to cooperate with FDI or participate in supply chains of MNC's.

As demonstrated the calculations of foreign presence in the five analyzed regions of the Czech Republic, despite the current inflow of FDI and awarding institutional aid could be considered the degree of foreign presence in the analyzed regions as a very low. The foreign presence as a determinant of the creation of spillover effects (positive indirect effects) reflected very low values. Therefore it can continue to argue about the efficient adjustment of institutional support.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

# HYDRAULIC MODEL OF HARCOV HISTORICAL DAM

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**Abstract:** The article deals with increase of safety of dams in connection with increasing safety standards, and it focuses on intelligent and careful methods of saving their cultural and historical value. The example is the historical dam Harcov: here, the hydraulic solution allowed to increase the safety of the dam in agreement with technical norm TNV 75 2935 „Considering safety of dams in case of flood“, and regulation No. 590/2002 Sb., about technical standards for dams, and at the same time, the original historical nature of the dam could be preserved. To evaluate the suggested change on the spillway, hydraulic physical modelling was used. The technique has its justification if complicated construction settings of safety spillways are tackled – safety facilities of dams and their capacity and safety. In case of Harcov Dam, a new shape of the overflow surface with a low-pressure regime of water flow was designed for floods higher than  $Q_{10\,000}$  (20-years-flood). For evaluating the original and the newly designed condition of the safety spillway and objects related to Harcov Dam, a physical model at a scale  $M = 1:20$  was used which accurately describes circulation on this object. The capacity of the newly designed spillway is at surface level of safety limit water level 373,80 m a. s. l.  $76,3 \text{ m}^3 \cdot \text{s}^{-1}$ ; that in sum with a bottom outlets is adequate to flow rate  $Q_{10\,000}$ . The project documentation for reconstructing the dam will be properly solved on the base of results of the physical model research.

**Keywords:** Cultural Heritage, Hydraulic Research, Dam Safety, Physical Modelling.

## 1 Description of the dam

Harcov Dam, sometimes also called Liberec dam, is situated near the centre of Liberec. Originally it was built on the edge of the city, but in course of last one hundred years it became an integral part of city environment as the city had naturally developed. The dam with wooded slopes nearby is a pleasant part of Liberec, serving for rest and recreation through the year. The uniqueness of the dam is confirmed by the fact that it can be found on the list of cultural heritage of National Heritage Institute since 1958. The impulse for construction was a series of damaging floods in the second half of 19<sup>th</sup> century.

The dam consists of a masonry gravity dam, built into arch with radius of curveness 120 m, height 19 m above foundation fissure and length 157 m in crest. Flood and safety facilities consist of two bottom outlets and crest spillway. The bottom outlet is a 16-meter-long pipe with an 800 mm diameter conducted in a tunnel. Both outlets have steel sluice gate on the upstream side and cast iron V-shaped sluice valves on the downstream side.

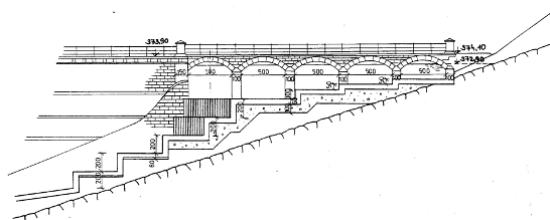


Fig.1. Harcov Dam – spillway from the downstream site

The crest spillway has five segments (one segment is 5 meters wide); above them there are vaults with deck of bridges; slide and stilling basin follow immediately after spillway. Among other components there are hydrometric profiles necessary for directing and manipulation with water in the dam and sedimentation partitions which retain pushed sediments in valleys of dam inlets. The main purpose of the dam is to retain flood flows of Harcovský potok and their lowering to a harmless flow  $6,7 \text{ m}^3 \cdot \text{s}^{-1}$ . Furthermore, the purpose is to create an accumulative space to assure consumption  $0,150 \text{ m}^3 \cdot \text{s}^{-1}$  for industrial and other purposes in the city and last but not least, recreation, fish farming and sports fishing.

In the last several years, the attention of the dam administrator, the Labe Basin Authority state enterprise, has been focused on the issue of the dam safety during extreme flood discharges. Because of that a number of studies have been made. Firstly, hydrological data were considered. It is obvious that the original data used for projecting more than 100 years ago will differ from data nowadays used for evaluations of the safety of dams. The value of protection required increased from  $Q_{100}$  to the value of a higher order, i. e.  $Q_{1\,000}$  (1000-year flood). In case of important dams, even the situation of 10000-year flood  $Q_{10\,000}$  is examined.

## 2 Flood flows in consideration

Entering hydrological data are closely related to the safety of dams. They may considerably change with a dam being in operation. Such a change of hydrological data is expected in all cases when the hydrotechnical constructions operate longer than hydrological data were observed until the beginning of the construction.

When dams were projected and constructed at the beginning of the previous century in the Czech Republic, flood flow  $Q_{100}$  was considered for designing safety facilities. To assure quality of hydrological data, the period when necessary results from flow observation were collected has to be as long as possible; that was almost impossible at the beginning of the previous century. That is why the highest flood flow value available was considered for designing safety spillways of the dams, after evaluating hydrological data from a short period of time. After many years of operation the hydrological data were precised; it contributes to evaluation of the safety of a particular dam as for the really existing flows.

From the point of demands to a spillway as a safety facility of a dam, it is the possibility of overloading the overfall object above the designed capacity that has the essential meaning without the safety of a dam being endangered. The experience with extraordinary floods between years 1996 and 2012 proved that the real flow could be markedly higher in case of extreme flood. Due to that there has recently been an obvious pressure to evaluate the border safety of dams (including the less important ones) related to extreme floods (in agreement with the methodical instructions of Ministry of Environment of the Czech Republic - TNV 75 2935 „Evaluation of safety of dams in case of floods“). That is why the up-to-date knowledge of hydraulic function of spillways in case of exceeding the suggested limits is becoming a very important presupposition for safe operation of a dam as a whole.

In recent years the evaluation of extreme floods in dams has changed in favour of a dam safety. The flow of an extreme flood repeated in 1000 or 10000 years (depending of the category of the dam) is used for the evaluation of safety facilities' capacity. To find out the value of extreme flow  $Q_{1\,000}$  and  $Q_{10\,000}$ , extrapolating methods and models of the precipitation-runoff processes are used. These values are further analysed and serve as a minor condition of designing a safety spillway in relation to maximal safe surface level in a dam. The value of an extreme flow is a limit for evaluation of the safety of dams and usually it is  $Q_{10\,000}$  (in case of dams of lower category it is  $Q_{1\,000}$  flow, rarely lower).

## 3 Issue of capacity of a spillway

Recent capacity of safety spillway (5-segment) was calculated to the value  $16,31 \text{ m}^3 \cdot \text{s}^{-1}$  and the capacity of both bottom outlets to a flow ca.  $12 \text{ m}^3 \cdot \text{s}^{-1}$ . Just to remind: the highest flow observable at Harcovský potok during projecting Harcov Dam was  $20 \text{ m}^3 \cdot \text{s}^{-1}$  (July 30, 1897). Nowadays the  $Q_{100}$  value is  $30,1 \text{ m}^3 \cdot \text{s}^{-1}$ .

The safety spillway of Harcov Dam was evaluated on the base of a hydraulic calculation for a spillway:

$$Q = \sigma_z m b_0 \sqrt{2g} h_0^{3/2}$$

where:  $Q$  – flow discharge [ $\text{m}^3 \cdot \text{s}^{-1}$ ],  $\sigma_z$  – downstream water coefficient,  $m$  – overfall coefficient,  $b_0$  – effective spillway crest length [m],  $g$  – gravity acceleration [ $\text{m} \cdot \text{s}^{-2}$ ],  $h_0$  – overflow head (including velocity head) [m].



Fig.2. Safety spillway and chute

It is necessary to remark that the preciseness of calculations was given by geometry and complicatedness of the construction that directly influences the capacity of the object. The shape of the construction was necessary to be taken into account by coefficient of side narrowing, coefficient of a spillway over the wide crest of the bridge and coefficient of spillway influenced by the vault of the bridge. All factors influencing the spillway capacity at various water surface levels in the dam were impossible to consider, and it is also impossible to separate individual coefficients for the particular hydraulic phenomenon. Out of these reasons it is better to concentrate on a single coefficient while it is necessary to have certain experience in the field of applied hydraulics to insert the coefficient into a spillway equation. The aim of hydraulic calculations was to describe the measuring diagram of the safety spillway as precisely as possible by means of analogy with spillway already measured.

Hydraulic phenomena, water flow and hydraulic characteristics may be observed on an existing dam, but out of objective reasons the research is very complicated; therefore, a small-scale model in a lab is observed as a more accessible option. Starting, border and limiting conditions are provided by a dimensional, force and weight analysis proceeding on the conditions of observing phenomena on a model using Froude's law of mechanical similarity.

Increase of a dam capacity can theoretically be realized by various technical acquisitions: increase of a capacity of present safety spillway (e. g. by lowering spillway edges of fields); construction of a new bottom outlet; adding another safety spillway (e. g. a side type on the right bank) etc. However, when choosing a solution it is absolutely necessary to have all the responsibility for not damaging both the overall historical nature of the dam and its surroundings and environment.

Variants which seem feasible were chosen and further elaborated on the base of expert recommendation. Nevertheless, before the choice of the final solution of increase of dam capacity it will be necessary to evaluate also the capacity of a cascade under a safety spillway. Water flow over a cascade is a very complicated hydraulic phenomenon that cannot be described with a simple calculation.

The aim of the research was to judge the existing safety spillway and slide for the purpose of a study of steps to safe transfer of  $Q_{10\,000}$ . It was to be done by means of a physical hydraulic model and hydraulic calculations.

#### 4 Hydraulic model research

The aim of the model research was to certify and precise the calculations of safety spillway and slide. Capacity of spillway is influenced by a shape of overfall surface, roughness of overfall surface, pillars between single fields, the zone in front of the spillway, vaults of decks of a bridge and downstream water from a chute. All these details had to be considered at physical modelling to get the most reliable results possible. The results of this research are followed with another phase which is going to answer questions about choosing the most suitable variant of a safety spillway and slide for transferring a control flood with flow  $Q_{10\,000} = 194 \text{ m}^3 \cdot \text{s}^{-1}$ . The model of Harcov Dam (forefield, safety spillway, cascade, vault of deck of a bridge, stilling basin and riverbed under the dam) was designed and modelled at a scale  $M = 1:20$ .



Fig.3. Photo from measurements in the Water management laboratory CTU in Prague

#### 5 Results of experiments

In sum there were 17 different variants of measuring of disposition and construction settings of a safety spillway and bottom outlets as well as various solutions of transferring flood flows. A sequence of simulated N-year-flood-discharges was carried out on the model of Harcov Dam. For all these variants, surface levels in the dam, slide, stilling basin, riverbed under the quay were observed, pressure ratios in slide and speed fields at the end of the stilling basin were measured (by means of hydrometric micropellers). A new design of a shape of the overfall surface, ribs in the spillway and layout of the zone in front of the spillway were undertaken.

Measuring diagrams (capacity) of both the existing and the newly designed safety spillway (spillway edge lowered by 0,4m) and the influence of widening the forefield were observed. Combinations of opening the bottom outlets transferring flood flows and their influence of flow relations in stilling basin and riverbed were observed. When the calculated measuring diagram of the spillway and the one measured on the hydraulic model were compared to each other, differences in capacity up to 17,5% on the surface level were found out (on the dam at 373,8 m above sea level). The difference in capacity is caused by inexact calculations of a coefficient of side narrowing, coefficient of a spillway over the wide crest of the bridge, coefficient of flooding and the vault of the bridge.

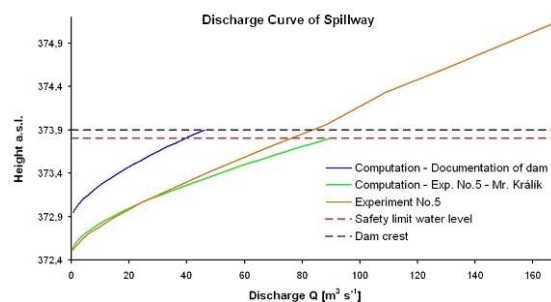


Fig.4. Comparison of current and proposed state of spillway

## 6 Conclusion

To design and evaluate safety spillway by means of basic hydraulic calculations is possible in simple cases if single hydraulic phenomena do not mutually influence each other and there is no non-standard water flow in the object and its surroundings. The greatest divergence in hydraulic calculations occurs in case of calculating spillway over a safety spillway; there is an outstandingly complicated hydraulic flowing which is difficult to describe with basic hydraulic equations. For these reasons it is very complicated to set a measuring diagram, and the most exact solution is a hydraulic physical research of the particular safety spillway. If an analogy with already observed spillways is used, the hydraulic research has a limited use dependent on a similar geometry of both spillways under observation.

Hydraulic physical modelling plays its role in settling complicated constructions of safety spillways – dam safety facilities and evaluating their capacity and safety. For evaluating the original conditions of safety spillway and related objects and for designing a reconstruction of safety facilities at Harcov Dam, a physical model accurately describing the flow in the object was used.

Results of these calculations and measurements serve for proposing, evaluating and optimization of partial objects of dam safety facilities. All results will be respected and used for choosing the final solution of a new more capacitive solution for constructing safety spillway. Based on results from a physical model research, a project documentation of a particular dam can be properly solved with respect to the historical value of the object and its preservation. A new overflow surface was designed for Harcov Dam having a low-pressure regime of water flow in case of floods higher than  $Q_{20}$ . The capacity of newly designed spillway is at surface of safety limit water level 373,80 m a. s. l.  $76,3 \text{ m}^3 \cdot \text{s}^{-1}$ , which in sum with bottom outlet is adequate to the flow  $Q_{10\,000}$ . Check on measuring diagrams of safety spillway will end in precisising them, and therefore in precisising the data about the water flow in the dam in case of a flood and in better evaluation of floods.

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**Primary Paper Section:** A

**Secondary Paper Section:** AL, JN, BK

## PSYCHOLINGUISTIC ASPECTS OF THE PROCESS OF TEXT CONSTRUCTION

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The paper was written within the framework of the project named Cognitive and Metacognitive Aspects of the Text Production Process of the Primary School Pupils under the Grant Fund of the Dean of the Faculty of Education of the Palacký University.

**Abstract:** The submitted study focuses on metacognitive strategies applied when writing a text, both from the theoretical and research point of view. The core of the theoretical starting points is the definition of three basic indicators of the adoption of metacognitive skills which are metacognitive knowledge, monitoring and self-regulation, which jointly form an algorithm applied during the process of textual construction. In another part of the study we present progress and results of the research survey of the diagnosis of metacognitive skills and potential deficits in the group of pupils aged 14 and 15. We notice fundamental factors that present the fundament for the creation of the didactic concept aimed to support the cognitive and metacognitive functions of pupils in the development of textual competence.

**Keywords:** metacognition, metacognitive knowledge, monitoring, self-regulation, text production, primary school pupil

### 1 Introduction

Condition of the written language of current young generation seems to be problematic in many aspects. Pupils' textual communication indicate deficits in the area of communication as well as on the cognitive and metacognitive level, despite simultaneously preferred communication-pragmatic and cognitive approach to the teaching of the mother tongue. Just as questionable is also the transfer of textually-productive skills to other didactic or extra-curricular contexts. The causes may be seen in frequent focus only on the resulting product in particular and in not respecting the processing production of a text, in increasingly separating teaching from real communicative situations and insufficient activation of cognitive and metacognitive processes in the course of the communication construction.

The text production itself is a didactic task which supposes use of a variety of cognitive and metacognitive functions. The way of pupil's interaction with the given pedagogic situation reflects the nature of their cognitive structures, the rate of implementation of metacognitive strategies and possible deficient cognitive functions (Feuerstein, 2006). We believe that the pedagogical intervention on the level of the cognitive processes of pupils and targeted development of text competence should be preceded by a detailed analysis of the whole complex process of communication creation (Čechová, Styblik, 1998, Winter, 1992), including monitoring the metacognitive skills, which may significantly affect quality of the final text. The first part of this study is focused on the basic characteristics of the text production process and the algorithms used there. Then we deal with the basic components of metacognition, directly in relation to the creation of textual communication. An integral part of the study is the description of the research survey focused on the analysis of the metacognitive skills of the monitored group of primary school pupils and the presentation of the research findings.

### 2 Writing as a solution to a problem

The main fundament of our study is the perception of textual production as a complex problem task, in which there are more possible approaches to the solution (cf. Winter, 1992, Späker, 2006). As Merz-Grötsch says (2010), the model of textual construction is characterized by the essential attributes of a problem task:

- formulation of the problem,
- production of possible solutions,
- testing and assessment of the given alternatives,

- selection of the most suitable alternative,
- implementation itself.

The process of textual production is at the same time specific with its cyclic character (Šebesta, 2005, Tribble 1996, Larkin, 2010). The individual steps repeat in the course of the elaboration several times in all major phases – pre-writing (planning), writing (formulation), post-writing (review). Pupil therefore seeks the solution to the problem in several stages and repeatedly. This means selective activity – application of previously acquired experience and selection from the possible alternatives (both on the level of the content and composition as well as in the form of the language). This way pupil gradually acquires solution algorithm. Resulting communiqué is not the only product of the learning itself, but it is especially certain instructions, guidance strategies that can be used during repeated solution to a similar didactic task. Repetition then brings the reinforcement of the algorithm. The pupil consciously uses stable solutions (Krejčová, 2013), applies a general model of textual construction and particular textual model in those steps for which such a procedure proved useful. The algorithm is composed of several layers. It is based on the knowledge of the given textual model (particularities of individual stylistic procedures and structures) and includes the ability to apply them in successive steps (adoption of each phase of the actual textual construction process), including the ability of algorithmized manipulation of linguistic norm. Automatization and interiorization are also equally desirable among metacognitive strategies that allow monitoring and regulation of all phases of the textual production process.

### 3 Basic metacognitive strategies when writing

Text production is a structured training task which requires complex mental operations and their consolidation using the language. The successful implementation of the individual phases of the whole process is directly influenced by activating appropriate cognitive processes (attention, memory, perception of stimuli, problem identification, the extension of the mental field, categorization, seriality and sequentiality, deductive and inductive processes, analogical thinking, analysis and synthesis, work with hypothetical relations etc.). The development of cognitive functions is at the same time determined by the use of metacognitive strategies, which will facilitate the consolidation of the algorithm and support the interiorization of the thought process and the strategies applied in the text production (Krejčová, 2013) – then the transfer of acquired skills is much easier. With regard to the facts above, it is desirable to extend the text production by metacognitive dimension; it means conscious control of the own cognitive activities.<sup>1</sup>

Metacognitive strategies are based on the adoption of so-called self-controlling speech (Málková, 2009). This is a certain form of inner speech that will make the perception of the didactic task structure, consideration over the solution procedures, possible alternatives and one's own thinking possible. It is applied at all stages of the text production. The pupil plans the word processing, monitors it with his/her own mental activity and evaluates the used strategies. Self-controlling speech is often hidden as a part of non verbalized mental process. When the conscious activation of metacognitive strategies really occurs, one should be able to explicitly express the given processes.

Description of partial aspects of metacognition arises from cognitive functions that are active during the text production. On their basis the rate indicators of adoption of metacognitive strategies can be generated. During metacognition two basic processes that often take place simultaneously are used –

<sup>1</sup> As V. Lokajčková says (2014) the implementation of metacognition into teaching is presently perceived as a challenge, which is part of the new (productive) culture in the classes. The author also points to the fact that metacognition is not reflected in the real form of teaching in the environment of the Czech education system. The emphasis is far more on cognitive knowledge than on metacognitive skills.

monitoring and self-regulation (Lokajčiková, 2014, Krejčová, 2013). Many theories also work with the component of metacognitive knowledge (Krykorková, Chvála, 2001, Otani, Widner, 2005, etc.). As Harris et al. say (2009) metacognitive knowledge includes knowledge of oneself, about one's ability, weaknesses and strengths. This is related to the so-called perceived academic effectiveness – a pupil is able to assess whether the problem task is simple or complicated (with regard to previous experience), he/she thinks about himself/herself and his/her relation to it (cf. Krejčová, 2013, Bertrand, 1998). Pupils thus perceive themselves as one of the conditions of text production (Winter, 1992). Knowledge of he ask, its importance and the strategies needed for its completion, general (i.e. the individual steps in textual construction) and specific for given stylistic structure is also part of the effectiveness. Metacognitive knowledge assumes the orientation in actual cognitive operations and knowledge of conditions realized in relation to the demands on the elaboration of the task given. This metacognitive knowledge is necessary for efficient management of the cognition itself.

When monitoring cognitive processes, an individual is planning the objectives and procedure – is thinking about the way how to approach the problem solution (is verbalizing cognitive processes that they need to complete the task – it means the solution algorithm) and is structuring the objectives at the same time. The more accurate and more sophisticated monitoring is, the more easily they reach the objectives (Hacker et al., 2009). Monitoring process is directly related to attention. A pupil is able to verbally describe the procedure of focusing their attention (communication takes place on the intrapersonal level) or they are considering alternative procedures (there is communication on both the intrapersonal and interpersonal level). So they are thinking about what to focus on first, on the contrary what to focus on later, which actions they must not forget about, which actions they will devote sufficient amount of time for, etc. (so-called selective attention). On this basis they are able to generate constituent activities which lead to the final solution of the didactic task. The individuals also activate their working memory (planning each stage, recording the steps that they have already finished, etc.).

Self-regulation lies in metacognitive control. The pupils register the steps leading to the solution of the problem and at the same time they evaluate them. They consequently formulate why the certain activity is important, they are able to consider alternative solutions, to evaluate them and to assess their potential effect, the importance for further learning or transfer outside the educational environment – on the basis of evaluation they may modify the original solution plan (self reflexive metacognition). In the framework of the metacognitive check of the text production process the pupils knowingly work with memory, i.e. that they fully register this process. They consider what information they recall, monitor their own association, think what information should be reinforced etc. (metamemory). At the same time they map in which areas it will be necessary to extend their own mental field. They knowingly approach to the perception of ideas and their processing (at all stages of the text production). Metacognitive strategy shall be applied on the intrapersonal level (e.g. they register how they will analyse information, process it and relate it to earlier experience), as well as on the interpersonal level (the extension of the mental field occurs in interaction with other individuals – the pupils therefore think about their way of thinking, and not only in the phases of pre-writing, but also during shared revision of the texts). During the self-regulation process the pupil registers and is able to comment on the procedure of information processing – they are able to describe the criteria for categorisation, consciously use analogical thinking, clarify the principle of generalization, they work selectively (distinguish between relevant and marginal information, knowingly choose appropriate linguistic means etc.), they can explicitly express the procedure of argumentation and verbalize relevant cognitive processes that are active during this procedure.

#### 4 The object of research and methodology

In the submitted study the authors present the partial results of the first phase of a qualitatively oriented research project *Cognitive and Metacognitive Aspects of the Text Production Process among the Primary School Pupils*, which is aimed at monitoring, systematic description and evaluation of metacognitive strategies that pupils knowingly use for text production. Thus the objective is:

- to capture the state of metacognitive knowledge and the level of demonstrated metacognitive skills of the monitored group of pupils;
- to determine to what extent they are aware of the importance of mental operations used in the text production;
- to diagnose possible deficit functions that will determine subsequent specific educational objectives.

Monitoring of the metacognitive skills of the pupils and diagnostics of possible deficits is needed as a basis for a qualitatively aimed forming experiment which forms the core of the next phase of the research and whose aim is the systematic activation of cognitive processes and metacognitive strategies of pupils during the construction of text communiqués. The research survey is based on long-term work with the experimental group of 18 pupils aged 14 and 15. It is during the adolescent period when metacognition improves – pupils' thinking is already more comprehensive, more abstract, executive functions also develop greatly (Krejčová, 2013). Pupils' writing in this developmental stage is oriented predominantly on interpretative, reflection and argumentation texts whose mastery is subject to significant levels of cognitive functions and metacognitive knowledge and skills. This fact has been respected during the construction of the research tools.

For the purposes of the first phase of this research survey a research tool in the form of record sheets (protocols) was composed. Methodologically it is based on so-called knowledge space theory, which will allow a deeper understanding of the examined situation and will also arrange metacognitive skills to a structure. We define knowledge and skills domain of the metacognitive level of the text production process in relation to the above described indicators (perceived academic efficiency<sup>2</sup>, monitoring and self-regulation). Recording sheets include monitoring assignment, which is based on the individual items of the knowledge domain on the level of metacognition and allow capturing knowledge structure of the investigated group of pupils, subsequently to assess the degree of adoption of the given items. Recording sheets were subsequently subjected to content analysis based on coding of the data material.

#### 5 Research Results

When processing the research data we watched three selected indicators of the metacognitive knowledge level and skills of pupils which substantially determine the final text of the communiqués.<sup>3</sup>

Indicator 1: The first indicator monitors relationship of pupils to themselves with regard to the given task (i.e. production of a text) and relation to the task itself. Monitoring assignment led pupils to think about the process of text production (pupils reacted for example to the following questions: *Do you like writing essays? Are you confident when facing this task? Do you*

<sup>2</sup> Other monitored indicators point at the rate of adoption of other components of metacognitive knowledge (knowledge about the task and strategies).

<sup>3</sup> We only indicate the method of implementation of the first phase of the research investigation; we are at the same time aware of certain generalisation when presenting the results. Detailed description of the research tools and detailed analysis of the data collected including monitoring of the relationship between the demonstrated level of metacognitive skills and real form of text communication will be an integral part of the research study *Cognitive and Metacognitive Aspects of the Text Production Process among the Primary School Pupils*, which will be published at the end of the research in 2017.

consider the writing to be easy or difficult task?). Analysis of the replies draws attention to the following points:<sup>4</sup>

- The observed group of pupils consider writing texts to be their favourite activity, but given topic is the defining and motivating factor. They appreciate mainly possibility to freely express their own ideas, work according to their own pace and creative freedom. Two pupils confirm their negative relationship towards writing and they justify it with the lengthy nature of the whole process and a vague idea of its course. This fact points at the possible deficits at the metacognition level.
- The majority of pupils consider the writing to be simple activity, but again only if they consider the instructions to be interesting. If the topic is unknown or unattractive, the whole process of text production is demanding for them. They consider writing stories to be easy (they can write freely, work with fantasy), that is the stylistic structure they have been facing almost whole study life. They perceive the structures of factual nature (interpretation, biography, etc.) to be demanding to elaborate. Therefore, the dominating determinants are the particularities of specific text models.
- The demonstrated academic effectiveness of the observed group is at a considerable level – pupils mostly do not reflect the concerns of the task, they believe in their own abilities in the field of text production and they do not perceive themselves as a factor which could negatively affect the text process. If opposite, they admit only initial fears of the course of the task processing and from the final form of the text. These pupils perceive the positive influence of the monitoring process (i.e., planning) to eliminate the initial uncertainties.

Indicator 2: The second indicator points out level of pupils in the area of monitoring. The observed pupils were invited to verbalize the solution algorithm when writing an interpretative text. In the first stage the pupils were again instructed using guidance questions (*What is your goal? What will you concentrate on first and what will follow? Which procedures proved effective? What complications may arise? etc.*). In the second stage the pupils were assigned a problem task (interpretation on the topic "Modern communication technologies") – the assignment given in the protocol instructed the pupils to verbalize the monitoring process once again.

Level of the monitoring process is in the observed group of pupils greatly differentiated. Students could be divided into three groups: pupils on level A are able to plan how to resolve the didactic task, structured at all stages (pre-writing, writing, post-writing). They follow the sequence of focus, remind of the necessary elimination of interferences, plan the way of gathering information (looking up, verification of information from unfamiliar sources, work with their own memory), their reinforcement, categorization and selection. They prefer to work with a mind map that clarifies information and indicates the sub-thematic areas (they judge its effect), but they also remind the possibility to work with a classical outline – they consider alternative solutions. They consistently plan the stage of writing, which they divide into several phases (work with the concept and its partial alterations); the same way they monitor all the steps that are part of the stage of post-writing (focusing on the structure of the text, its clarity, richness of vocabulary, text coherence and spelling accuracy). The pupils of the level A perceive the planning process as an activity which has already been made automatic. When verbalizing, they work with all the entries of the examined knowledge domain. The pupils of level B (highest representation) show partial lack of their ability to verbalize monitoring process, which may indicate real deficits in metacognition. These pupils most frequently do not respect three phase model of text construction – during planning of the

solution process they omit partial steps in the phase of pre-writing (forming the outline is often the first mentioned step, they do not pay their attention on the collection and classification of information, they do not distinguish between the work with their own memory or with somebody else's resources when expanding the mental field), more often they do not incorporate phase of post-writing at all. They do not keep in mind fixation and processing of information either, they prefer so called writing out of their heads – so they do not monitor the process of categorization and selection of information. When verbalizing the monitoring process they work only with selected items of the knowledge domains. It can be assumed that the knowledge structure on the level of monitoring is partially deficient in this group of pupils. Answers of pupils on level C (the least represented) indicate significant deficits in the monitoring process – explicit description of the individual steps of the algorithm is problematic for the pupils. They usually plan very limited number of steps needed to complete the task, they often use very general formulation (*I will write the text, I will invent the text, I will rewrite obtained information, I will use imagination*). Their knowledge structure is in the area of demonstrated metacognitive skills of monitoring significantly deficient.

Indicator 3: The third indicator of the level of the demonstrated metacognitive skills is self-regulation. This was monitored again in two stages: 1. registration of cognitive processes: pupils verbally glossing over all the steps that led to the creation of text communiqué; 2. the evaluation of the cognitive processes and the awareness of the possible transfer: in the second, reflexive stage, pupils summed up these activities again and at the same time assessed what was their necessity in relation to the given task and what is their further possible use.

The research findings in the third indicator correspond to the results of the monitoring indicator - pupils knowingly use and are able to identify those mental operations included in the scheduled procedure (for self-regulation they focused their attention in particular on the description of the work with a mind map or outline). During self-regulation pupils name only basic steps – they do not verbalize complex mental operations (categorization, selection, generalization, analogy etc.), although working notes (e.g. the mentioned mind maps) or the resulting products point to their real application. Deficits are therefore manifested on the level of verbalization in particular. It can be stated that in the area of self-regulation pupils mostly work only with certain items of the knowledge domain. Then the evaluation of individual steps appears to be especially problematic among the observed group of pupils. Only rarely we encounter realized possibility to transfer the acquired skills to other didactic or extra-curricular situations (using an outline to plan a procedure of any activities, using proofreading not only when writing an essay). In other cases pupils evaluate meaning of partial steps only in relation to the given task and they admit that they are not aware of further use (*a mind map will clarify the information needed for the text, then the text is not chaotic, thanks to it I stick to the topic, I can find information and use it when writing a text, etc.*), so it is possible to assume that the conscious transfer is not made.

## 6 Conclusion

The carried out research probe responds to the fact that the pedagogical intervention in the area of terms of cognition and metacognition should necessarily be preceded by a thorough monitoring of pupils in both areas. The initial diagnosis of metacognitive skills defines problem of practice and is the first step in individual long-term and intensive work with a research group of pupils. The submitted study provided a description of the factors which have a direct influence on the creation of the didactic concept and the formulation of specific educational objectives in the next stages of the research, it also presents a research tool that is methodologically built on the theory of knowledge space and subsequent analysis of three basic indicators – perceived academic efficiency, the ability to monitor and self-regulation. It can be concluded that the observed group

<sup>4</sup> In the submitted study we notice the knowledge the structure of the group as a whole. When formulating educational objectives, creating the teaching concept, performing the experiment and its evaluation, the research team assessed the knowledge status of all studies individuals separately.

of pupils has only partly adopted metacognitive strategies – deficits were found both in the ability to verbalize the procedure of dealing with the problem task as well as during self-regulation. The most problematic is the evaluation of the different stages of the text production process and the assessment of the possible transfer of acquired skills. A prerequisite for further development of text competence and thinking of pupils involved in research is with regard to these research findings represented especially by targeted activation of their cognitive processes and metacognitive strategies, a systematic approach to the verbalization of mind processes, which will support the development of the self controlling speech, consistent structuring of the didactic task and the inclusion of activities supporting conscious transfer of acquired skills – e.g. Feuerstein's methods of mediated learning.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

# PERSONALITY OF JAN PEŠAT IN THE MUSIC-EDUCATIONAL REALM OF SILESIAN OSTRAVA AND VÍTKOVICE FROM THE 1910S TO THE 1940S

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**Abstract:** The study deals with the personality of Jan Pešat (1892-1974) in the music-educational area of Silesian Ostrava and Vítkovice from the 1910s to the 1940s. It generally specifies the key activities forming a comprehensive profile of Jan Pešat; the principal core, however, consists of his music-educational activities in Silesian Ostrava and Vítkovice between 1915 and 1945.

**Keywords:** Jan Pešat, history, music education, music, culture, Ostrava

## 1 Introduction

The development of regional music culture is closely connected with distinctive personalities of the particular place. Our study focuses on Jan Pešat (1892-1974) and his music-educational activities, which he pursued from the mid-1910s to the end of World War II. Pešat continued carrying out his music-educational activities after 1945, too, but the following study only concentrates on the period of time from 1915 to 1945 as the archival materials and music-educational scope of Jan Pešat's activities are abundant.

Jan Pešat was a person who naturally combined various activities – music education, choir leading, conducting and music-publishing activities (Pešat's music-publishing activities especially focused on reviews of the music scene in Ostrava).

## 2 Life (1892-1974)

Jan Pešat was born in Mariánské Hory on 24 November 1892. He attended the local lower primary school between 1899 and 1905 and then the higher primary school (1905-1909). Pešat's personality developed in terms of music very remarkably between 1909 and 1913 when he studied at the teachers' institution in Silesian (Polish) Ostrava. His teachers were Rudolf Wünsch (1880-1955) and Edvard Rund (1879-1931), major personalities of the music education in Ostrava. Edvard Rund, in particular, developed young Pešat's violin skills.

As far as Wünsch's and Rund's music-educational activities are concerned, we can especially emphasize their orientation towards choir singing and orchestral playing, which was reflected not only in programmes of institutional academies and concerts but also in other occasional events. For example, on 4 October 1907 students of the teachers' institution gave a singing performance during the Holy Mass in Hrušov on the occasion of commencing lessons at the newly established primary school of Maticе školská.<sup>1</sup> According to Mazurek, both Rudolf Wünsch and Edvard Rund allowed Jan Pešat to gain his first valuable practical experience in the area of conducting and choir leading.<sup>2</sup> In July 1913 Jan Pešat passed the graduation exam at the Silesian-Ostrava institution and started to work as a teacher at lower primary schools in Mariánské Hory and Moravian Ostrava; in the 1920s and 1930s he also worked at a higher primary school in Hrušov; in Zábřeh nad Odrou he also worked as Headmaster of the local higher primary school.<sup>3</sup>

His artistic and teaching activities were interrupted by World War I, which Jan Pešat spent in the Balkans and later also in Vienna. Both the Balkans and Vienna were extremely important for Pešat in terms of music and culture. In the Balkans, Pešat met

his future violin teacher Jindřich Feld and in Vienna he was a frequent visitor to the Vienna Philharmonic Orchestra, which inspired him for later studies under the supervision of conductor Paul Graener.<sup>4</sup>

After the end of World War I, Pešat passed a state examination in violin playing in Prague on 29 October 1918. Pešat was involved in violin playing and strived to improve in this area later, too (1919-1925); in this period of time he studied with the above-mentioned teacher at the Prague Conservatory, prof. Jindřich Feld. Besides playing the violin, he also studied conducting with prof. Jaroslav Krupka at the Prague Conservatory.

In the area of specialized music education of Silesian Ostrava and Vítkovice Jan Pešat was active in the Záboj Singing Association Music School in Silesian Ostrava (later Rund's Music School of Záboj Singing Association) and the Metalworkers' Music School in Vítkovice (later Dr. L. Janáček Music School). Specialized music education and its establishment in Ostrava were also connected with Pešat's artistic activities as a conductor and choir leader. Jan Pešat presented himself as a conductor in the Orchestra Association in Vítkovice from the 1920s. Especially in Smetana's year 1924 "achievements that the Orchestra Association accomplished within the celebrations of Smetana's year 1924 improved the artistic reputation of the orchestra and, at the same time, increased its music-educational importance. The association actually wanted to serve all social levels, make both young and adult listeners of especially workman's backgrounds aware of good music and educate them in this area."<sup>5</sup>

In the 1930s workmen's singing ensembles started to develop dynamically in the cultural space of Ostrava. In 1933 Jan Pešat became the leader of the Singing Choir of the Workmen's Gymnastic Union Vítkovice I. According to Mazurek, the choir ensemble especially consisted of factory workmen, with whom Pešat interpreted not only choir arrangements of folk songs, but also included in the dramaturgy more demanding choir compositions by P. Křížkovský, B. Smetana or J. B. Foerster. The choir ensemble gave rise to the Janáček Workmen's Singing Organisation in Ostrava in 1935.<sup>6</sup>

Besides the artistic (choir leading or conducting) and music-educational activities, the comprehensive personality profile of Jan Pešat also includes music reviewing articles and critical essays focusing on contemporary productions of art music in Ostrava. Czech music reviews developed especially in 1918 in association with the independent Czechoslovak state being constituted. Eduard Marhula, František Mít'a Hradil, Josef Schreiber and Milan Balcar were the most distinctive music critics and publicists in the inter-war environment of Ostrava. Jan Pešat became a journalist specializing in music for DUCH ČASU. The number of Pešat's critical essays is remarkable – 370 articles, which dealt with the issue of professional and amateur music productions, concerts, operas and light operas, were published between 1925 and 1938. The contribution of Jan Pešat in the area of music publishing lies especially in the broad topical scope of reviews focusing on the culture of Ostrava and in their increased number.<sup>7</sup>

Until the end of the 1950s he worked as Headmaster of Vítkovice Music School. Jan Pešat died in Opava on 9 October 1974.

<sup>1</sup> *První zpráva c. k. ústavu na vzdělávání učitelů v Polské Ostravě za dobu od šk. roku 1905-06 do šk. roku 1908-09.* Polská Ostrava 1909.

<sup>2</sup> Mazurek, J.: *Jan Pešat (1892-1974). Příspěvek k dějinám ostravské hudební výchovy 20. století.* Ostrava: Repronis, 2002. p. 8. ISBN 90-7329-007-3.

<sup>3</sup> Dunátová, D.: *Zasloužilý učitel Jan Pešat.* Diploma Thesis. Ostrava: Pedagogical faculty in Ostrava, 1973. p. 5.

<sup>4</sup> The same source, p. 28; Mazurek, J.: *Jan Pešat (1892-1974). Příspěvek k dějinám ostravské hudební výchovy 20. století.* Ostrava: Repronis, 2002. p. 8. ISBN 90-7329-007-3.

<sup>5</sup> Mazurek, J.: *Jan Pešat (1892-1974). Příspěvek k dějinám ostravské hudební výchovy 20. století.* Ostrava: Repronis, 2002. p. 19. ISBN 90-7329-007-3.

<sup>6</sup> The same source, p. 27-28.

<sup>7</sup> The same source, p. 29-30.

### 3 Music-Educational Activities

We can find the music-educational activities of Jan Pešat especially in the area of specialized music education, which started to develop in Ostrava in the 1890s through the Academic Music School and Musik-Bildungs-Anstalt. Pešat performed his music-educational activities in two school institutions, which soon achieved a good reputation thanks to their high quality. These were namely the Záboj Singing Association Music School in Silesian Ostrava (later Rund's Music School of Záboj Singing Association) and the Metalworkers' Music School in Vítkovice (later Dr. L. Janáček Music School).

#### 3.1 Záboj Singing Association Music School in Silesian Ostrava / Rund's Music School of Záboj Singing Association

Opening of the Záboj Singing Association Music School in Silesian (Polish) Ostrava was approved in 1908.<sup>8</sup> Many patriotic personalities contributed to establishment of the music school, too, e.g. Josef Mojžíšek (a collector of folk dances from the region of Těšín), Ludvík Chrostek (school headmaster), Antonín Záškodný (a long-standing chairman of Zábor Singing Association), and school inspectors (Šimon Němec, Karel Kapička).<sup>9</sup> During World War I it continued carrying out its teaching activities, which took place in the literary school in Baranovec, Hladnov, and later in the old and new town halls of Silesian Ostrava.<sup>10</sup>

Jan Pešat, a pupil of Edvard Rund (playing the violin, orchestra and chamber playing, 1915-1938), started to work as a teacher in 1915.<sup>11</sup> "Teacher Jan Pešat, an ex-pupil of Headmaster Rund, followed in Rund's footsteps, and in the spirit of his teacher, he did very well and thus became the second main official and educator of the institution."<sup>12</sup>

Pešat's praiseworthy music-educational activities focused on teaching to play the violin, orchestra and chamber playing, which manifested itself in the music-organisational area, e.g. preparation and realisation of school celebrations on the occasion of the hundredth anniversary of the birth of Bedřich Smetana in 1924. Pešat also prepared concerts devoted to other personalities of European art music, e.g. on the occasion of the hundredth anniversary of the birth of Ludwig van Beethoven in 1924. According to Mazurek, Pešat achieved remarkable results at the Silesian-Ostrava music school; he contributed to preparation of school events and applied his own artistic and pedagogical knowledge.<sup>13</sup>

Jan Pešat stopped teaching in 1938.<sup>14</sup> "The Board of Trustees of Záboj Singing Association Music School in Silesian Ostrava regrets you surrendering your post as a violin teacher at this school and expresses (...) thanks and recognition for the work you have done at this school for the benefit of the pupils, school and music art for the period of 23 years."<sup>15</sup> "You were the main support to our music school for almost a quarter of a century;

there was no school event you did not actively participate in as an excellent teacher, conductor and organiser."<sup>16</sup>

#### 3.2 Metalworkers' Association Music School in Vítkovice / Dr. L. Janáček Music School

The Land Political Administration approved of establishment of the Metalworkers' Association Music School in Vítkovice on 15 September 1922. According to František Mířa Hradil, establishment of the music school in Vítkovice was important in terms of the history of the music education of workers, and mainly the above-mentioned school institution was the only facility of that kind in the independent state.<sup>17</sup>

On 21 June 1923 members of the Board of Trustees of the Vítkovice music school met the national music schools inspector, prof. Antonín Hromádka, in the National House in Moravian Ostrava. Prof. Hromádka "pointed out the necessity of proper location of the music school and thus the possibility of due development of music education of the town and its surroundings." In addition, Hromádka (in agreement with the Minister of Education and National Enlightenment) expressed his positive opinion concerning the previous promising development of the music school, "which was founded thanks to workmen's work and funds, which is an absolutely extraordinary and unique phenomenon in Europe."<sup>18</sup>

After Eduard Marhula, Headmaster of the Music and Organ School of Matice školská in Ostrava-Mariánské Hory, died in 1925, F. M. Hradil had to focus intensively on development of the school in Mariánské Hory, where he had worked as a teacher since 1919, and thus could not adequately participate in preparatory work related to construction of a new school building.<sup>19</sup>

"As, however, his further music and music-pedagogical activities had been very numerous and required considerable work commitment, (...) he resigned from the post of Headmaster and Jan Pešat was appointed to replace him."<sup>20</sup> The school Board of Trustees elected Jan Pešat Headmaster on 18 August 1926. In its organisation activities, Pešat focused on systematic promotion of results of the pupils of the Vítkovice music school within demanding pupils' and teachers' concerts.<sup>21</sup> Such promotion was necessary for the existence of the school as the number of pupils stagnated in the mid-1920s.

Development of the Vítkovice music school was limited due to space, and therefore "it was necessary to take a radical step in the form of construction of a new school building (according to a design by architect Bohuslav Fuchs from Brno)".<sup>22</sup> "Pešat approved of this solution, which was risky in terms of finance, and the hard work of all people engaged gave rise to a modern and purposeful school building, the opening of which on 8 September 1935 confirmed that the school modernization that Pešat had commenced had been the right decision."<sup>23</sup> The Vítkovice music school started to operate under the new name of the Dr. L. Janáček Music School.

The pedagogical personality of Jan Pešat was connected with the Metalworkers' Association Music School in Vítkovice / Dr. L. Janáček Music School especially in the area of violin playing, in

<sup>8</sup> 70 let lidové školy umění ve Slezské Ostravě, ulice 28. října 4, 1907/08-1977/78. Ostrava, 1978.

<sup>9</sup> 60 let lidové školy umění ve Slezské Ostravě, Archive of the Town of Ostrava.

<sup>10</sup> Kronika hudební školy pěveckého spolku Záboj ve Slezské Ostravě, Archive of the Town of Ostrava.

<sup>11</sup> There is a contradiction concerning the date of beginning of Jan Pešat's work at the Silesian-Ostrava school: 1914 see Mazurek, J.: *Jan Pešat (1892-1974). Příspěvek k dějinám ostravské hudební výchovy 20. století*. Ostrava: Repronis, 2002, p. 19. ISBN 90-7329-007-3 versus 1915 see *Kronika hudební školy pěveckého spolku Záboj ve Slezské Ostravě*, Archive of the Town of Ostrava; there is also a contradiction concerning the date of termination of Pešat's activities: 1939 see *70 let lidové školy umění ve Slezské Ostravě, ulice 28. října 4, 1907/08-1977/78*. Ostrava, 1978, p. 31 versus 1938 in later correspondence between Jan Pešat and the Board of Trustees of the Rund Music School of Záboj Singing Association in Silesian Ostrava.

<sup>12</sup> *Kronika hudební školy pěveckého spolku Záboj ve Slezské Ostravě*, Archive of the Town of Ostrava.

<sup>13</sup> Mazurek, J.: *Jan Pešat (1892-1974). Příspěvek k dějinám ostravské hudební výchovy 20. století*. Ostrava: Repronis, 2002, p. 11-12. ISBN 90-7329-007-3

<sup>14</sup> See the letter of Jan Pešat to the Board of Trustees of the Rund's Music School of Záboj Singing Association in Silesian Ostrava of 10 January 1938, Archive of the Town of Ostrava.

<sup>15</sup> See the letter of the Board of Trustees of the Rund's Music School of Záboj Singing Association in Silesian Ostrava to Jan Pešat of 10 February 1938, Archive of the Town of Ostrava.

<sup>16</sup> See the letter of the Board of Trustees of the Rund's Music School of Záboj Singing Association in Silesian Ostrava to Jan Pešat of 12 February 1938, Archive of the Town of Ostrava.

<sup>17</sup> Hradil, F. M.: *Hudebníci a pěvci v kraji Leoše Janáčka. Paměti a dokumentace*. Ostrava: Profil, 1981, p. 107.

<sup>18</sup> *Visitors' Book of the Metalworkers' Association Music School in Vítkovice established in 1922/23*, Archive of the Town of Ostrava.

<sup>19</sup> Mazurek, J.: *Jan Pešat (1892-1974). Příspěvek k dějinám ostravské hudební výchovy 20. století*. Ostrava: Repronis, 2002, p. 12. ISBN 90-7329-007-3.

<sup>20</sup> Steinmetz, K., Mazurek, J., Kusák, J., Olšarová, P.: *Ostrava hudební. Vývoj hudební kultury jednoho města v posledních 160 letech*. Ostrava: University of Ostrava, Pedagogical Faculty, 2014, p. 59. ISBN 978-80-7464-664-5.

<sup>21</sup> The same source, p. 59.

<sup>22</sup> *Lidové noviny*, 29 June 1938.

<sup>23</sup> Steinmetz, K., Mazurek, J., Kusák, J., Olšarová, P.: *Ostrava hudební. Vývoj hudební kultury jednoho města v posledních 160 letech*. Ostrava: University of Ostrava, Pedagogical Faculty, 2014, p. 59. ISBN 978-80-7464-664-5.

which he applied the method of Otakar Ševčík, which he innovated with his own tried-and-tested elements and procedures.<sup>24</sup>

Didactically, he especially focused on active violin playing through solo chamber and orchestra concert productions.<sup>25</sup> Pešat informed Vítkovice teachers about inclusion of "the study work, especially in Ševčík's work *Škola houslového přednesu*, which is available to teaching staff in the library,"<sup>26</sup> which is proof of support of Otakar Ševčík's methods. Besides Pešat, also František Lettovský was a competent violin teacher.

We can find evidence of holding the so-called lecture cycles since the mid-1930s. Their primary goal was to acquaint the public of Ostrava with major personalities of the music culture of Ostrava. The content of the individual lectures focused on the area of music historiography, music theory and music pedagogy. Jan Pešat also considered the possibilities of preparation of potential students of conservatories and teachers' institutions and offered students optional lessons in music theory and music history from the academic year of 1937/1938 onwards.

During the Protectorate of Bohemia and Moravia, the Vítkovice music school organised concert events trying to strengthen the national awareness and relation to national values during the brutal Nazi occupation. Besides common lessons, the Vítkovice music school also organised courses for conductors and choir leaders of music and singing associations, courses for preparation for graduation exams from teachers' institutions or for home sciences teachers, and courses for preparation for conservatory pedagogical academies admission examinations. The school also concentrated on music pre-education courses for children up to the age of nine.

Headmaster Jan Pešat tried to maintain the development continuity of the school, which began in 1935. Together with the school board, he considered preparation of construction of a concert hall by the music school. "Realisation of such a work would complete the long-standing efforts towards a dignified facility of music art in Moravian Ostrava – Vítkovice."<sup>27</sup> Pešat manifested his artistic and organisation qualities when promoting the Vítkovice music school within the cultural environment of Ostrava, e.g. the Vítkovice music school orchestra gave a performance at the Czech Radio station in Moravian Ostrava on 30 December 1940,<sup>28</sup> the school orchestra also gave a concert on 22 June 1941 (we can consider this performance a contribution to celebrations of the 150th anniversary of W. A. Mozart).<sup>29</sup>

In that period of time, we can mention the engagement of the Vítkovice music school in the area of music education and popularisation activities, which is documented by the contemporary press (*Národní práce*, *Moravská orlice*).

#### 4 Conclusion

Jan Pešat was a remarkable personality in the artistic and music-educational areas in Ostrava not only in the monitored period from the 1910s to 1920s, but also after 1945. He especially contributed to development and modernization of specialized music education in Silesian Ostrava and Vítkovice.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM, AL

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<sup>25</sup> Mazurek, J. *Jan Pešat (1892-1974). Příspěvek k dějinám ostravské hudební výchovy 20. století*. Ostrava: Repronis, 2002. p. 14. ISBN 90-7329-007-3.

<sup>26</sup> Record of regular and classification meeting of teaching staff of the Dr. Leoš Janáček Music School of 21 January 1942, Archive of the Town of Ostrava.

<sup>27</sup> Record of final and classification meeting of teaching staff of the Dr. Leoš Janáček Music School of 29 June 1945, Archive of the Town of Ostrava.

<sup>28</sup> Record of regular meeting of teaching staff of the Dr. Leoš Janáček Music School of 5 December 1941, Archive of the Town of Ostrava.

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# THE IMPACT OF A CORPORATE MARKETING SYSTEM ON MARKETING AND BUSINESS PERFORMANCE

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**Abstract:** Paradigm shifts in communication forced many organizations to abandon their command and control structures. Empowered consumers using social media actively do not perceive value in traditional communication pathways. Organizational challenges arise in marketing, where traditional functions get replaced by a broader, holistic understanding of marketing systems facing new key roles on an organization-wide level. Marketers are driven into internal/external network management, knowledge and data management and cross-organizational team managers. Based on a profound literature review, the research model of a corporate marketing system has been developed and its impact on marketing and business performance has been empirically investigated.

**Keywords:** corporate marketing, marketing performance, business performance, social media

## 1 Introduction

The field of marketing is based on a very simple invention of humankind: the trade. The act of exchanging goods between two individuals is the fundamental operation for the emergence of a market and the development of marketing (Layton 2011). Even though the origin is a simple one, its conceptualization, especially in a scientific approach, is far more difficult. The reason for this is the dynamic, genuine role of marketing as a practical discipline. In most social sciences, the dichotomy between theory and reality in marketing science lead to a philosophical discussion about the value of theories and concepts extracted from practical experience and expertise. But for expertise it is not only "knowing how", Ryle (1959) stated, "knowing that" is at least as important for successful problem-solving. Extensive knowledge of the field is necessary to know what the possibilities are and which solution to choose only after this it is the know-how that is of importance. Even though marketing lacks universal laws, academic division has its right to exist because the normative models such as the marketing mix frameworks, like the four P's from McCarthy (1981), Kotler's product life cycle (1994), strategic portfolio management from Porter (1980) or Ansoff's competitive strategy (1965) can improve the problem solving capability of managers by contributing the basic knowledge, the "know that". Some scholars critically reflect the validity, reliability and universality of this marketing conceptualization as they try to make universal statements about marketing related phenomena and cannot be scientifically established (Brown 1993).

Hackley (1999) mentions the existence of many generic, descriptive models of buyer behaviour, advertising communication and product conceptualization. Within this discussion, Brown (1993) emphasizes that academic marketers maintain the existence of that external reality. Further on, that these models deliver theoretical foundations and may show a high relevance of application in marketing practice and allow imperfect attempts to make universal statements. From an academic point of view, the heuristic power of such models is uncertain but still an important question within the managerial school of marketing, the most powerful school within academic marketing (Sheth, Gardener and Garrett 1988). Consequently, many theoretical foundations have their origin in the abstraction of expert practice or broad generalizing assumptions, which deliver conceptual frameworks but miss a scientific confrontation.

## 2 Changing Role of Marketing: from Functional to Organizational Level

Marketing fundamentals have undergone a controversial discussion within the scientific community ever since. The theoretical knowledge and conceptual frameworks are in a logically coherent relation to the contemporary economic,

organizational and technological zeitgeist. And ever since, researchers as well as marketing practitioners are facing forces of change to compete with. Hence, the sacred temples that define marketing need to be in a controversy discussion, influenced by major directional changes in the world (Singer 2006). For a deeper understanding a differentiation of the marketing terminus is necessary and leads inevitably to a major question: what is marketing? Is it a management science? Is it a social discipline? Piercy and Cravens (1995) claim a distinction between marketing as a philosophy or culture and marketing as a set of management activities. This implicates a new understanding of marketing asides its definition as a function. Namely, to understand customers' needs and wants a side from an exploiting marketing monopoly (Thomas 2006). Hence, marketing is seen as a cross-organizational philosophy and strategic necessity – dealing with intra-organizational relationships and networks (Piercy and Cravens 1994).

Nowadays Layton contributed several new articles to the topic of marketing systems which for him is "the voluntary economic exchange of single or multiple goods, services, experiences and ideas" (Layton 2011) and he offers a definition of marketing as a complex system as follows:

- *"A network of individuals, groups and/or entities;*
- *embedded in a social matrix;*
- *linked directly or indirectly through sequential or shared participation in economic exchange;*
- *which jointly and/or collectively creates economic value with and for customers, through the offer of;*
- *assortments of products, services, experiences and ideas; and*
- *that emerge in response to or anticipation of customer demand."*

This systematic view is a consequent alignment of different processes, networks and value chains within business environments. Hence, marketing can be seen as a complex structure of processes and set of values rather than a managerial function or a line-up of normative models. And it is an inevitable fact, that almost all marketing systems feature structural and functional heterogeneity (Layton 2011).

Singer (2006) points out, that the role of marketing is changing due to globalization and new information technologies. Traditional advertising is losing its impact on the buyer decision process. From the opposing perspective, all companies have an infinite source of information about consumers, but the fact that it is accessible for all competitors it can lose importance, something everybody knows is no advantage (Singer 2006). This leads from a customer-centric model to a network-centric model. It is no longer the brand that is the center of the marketing strategy but to build a business ecosystem and the focus is more on the future, how to foresee it and adapt to it than how to plan or respond to it. Also the paradigm change from push to pull is important in the network centric model, because the customers chose more to what exactly they give their attention out of the flood of information and for marketing the old promotion has to turn into a new information design, that people will attend to (Singer 2006).

The new technologies and especially the internet came with new challenges for marketing managers. The rise of digital media and technologies opened new channels for communication to reach specific individuals. This happens, when corporate marketing, which traditionally is selfish and focused on corporate interests, puts people back in the center of marketing considerations (Dibb and Carrigan 2013).

### 3 Current Managerial Challenges for Marketers and Organizations

Change is happening due to the growing popularity of social media (Coulter and Roggeveen, 2012). Paradigms are altered in the internet service and use of the web. The base of internet use is not the consumption anymore but the communication and interaction (Henderson and Bowley 2010) and old media might get replaced by it because information and content can be distributed in a wider range and a more effective way (Bruhn, Schoenmueller and Schäfer 2012). The biggest impact the instant evolution of the web has, is on the communication side that evolved from a face-to-face dialogue with one source talking to one recipient to a public conversation where one can reach many recipients at the same time (Coulter and Roggeveen 2012; Patino, Pitta and Quinones 2012). Also conversation over media got bi-directional and consumer have the possibility to interact with the source online (Henderson and Bowley 2010; Coulter and Roggeveen 2012) and most of the public conversations can be seen as public knowledge, accessible and for the use of everyone.

Malthouse and Hofacker (2010) deliver a clear model of how marketing changes due to the developments of digital communication landscapes. Figure 1 shows the potential communication channels between an organization and its target groups. Traditional media, like advertising or direct marketing still have their relevance, but as demonstrated by the single headed arrows, it is one-way communication, from the company as a sender to the customer as a receiver.

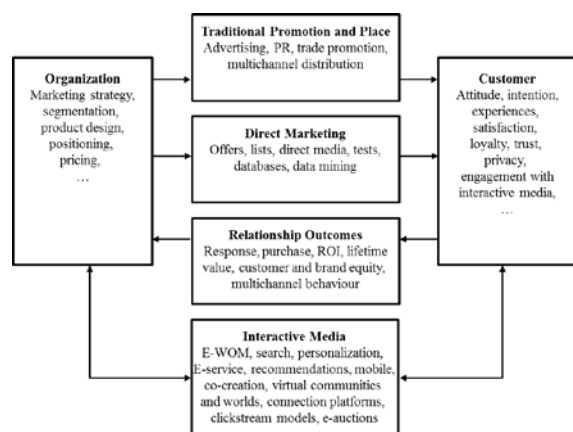


Figure 1: The New Marketing Perspective 2010+  
Source: Author's illustration based on Malthouse and Hofacker (2010)

But by the rise of interactive media, a game changer entered the marketing stage. For the first time, media allows to transmit messages to, from and between customers, as demonstrated by the double-headed arrows. As a result, organizations need to transform, adopt to multichannel distribution, measure outcomes, quantify customer and brand equity (Malthouse and Hofacker 2010). The new media types and coherent communication possibilities change marketing organizations and even traditional business models on the one hand. On the other hand, customers change their habits and engagement with brands and media. Social media brought a lot of change that is summarized by Peters (1998) in three areas: the communication style, personalness of communication, consumers control of contact and also of content. In a broader context, the engagement of customers is not only their online-activity and contributing content but also a long-term relationship with companies, creation of opportunities to bond and interact gradually over time. For Sashi (2012) customer engagement *"focuses on satisfying customers by providing superior value than competitors to build trust and commitment in long-term relationships"*. The process of value addition is a collaboration of company and customer, which is simplified by the new

possibilities of social media. A part of the foundation of customer engagement is the market orientation of a company as proposed by Jaworski and Kohli (1993), which includes:

- Organization-wide generation of market intelligence on customer needs.
- Dissemination of the intelligence across the departments.
- Organization-wide responsiveness to it.

In that context, building up an intelligence concerning the changing needs of customers is a basis for customer engagement, which adds active cooperation with the customer to assess their needs and entails a co-creation of value (Prahalad and Ramaswamy 2004).

Changes in the economic environment made knowledge an indispensable asset of a company and for marketing especially the data and knowledge from and about customers is essential. To achieve effective interactive strategies aiming for a close relationship with customers, high quality data is needed (Malthouse and Hofacker 2010). Following this, knowledge management is required for effective marketing implementations because information technology, globalization and the internet make huge databases available that need to be managed to infer important knowledge about customers and the market.

The growing role of information technologies forced organizations to abandon these traditional command and control structures. Fast decisions-making processes and empowered inter-organizational relationships are required (Tikkanen and Parvinen 2006). An organization, once it is aware of the ongoing paradigm changes in communications, must be able influence the organizational climate. It is a challenge to create an environment where other contribute innovative ideas and instantly develop or enhance a product or service. This brings a tacit aspect to management theories and affects the outcome of creation initiatives. A recent research study reveals new key functions of marketing managers which enclose network management, inside the organization as well as outside, gathering and managing information, customer relationship and controlling the efficiency and effectiveness of marketing (Gök and Hacıoglu 2010). With the new role inventory of the marketing manager Gök and Hacıoglu (2010) added six essential dimensions:

- Marketing mix management;
- Managing internal relationships network;
- Strategy development and execution;
- Managing external relationships network;
- Data and knowledge management; and
- Managing marketing productivity and performance

As marketing has broadly been regarded as a practical discipline in the past, scholars now see a shift from opinion-driven decision making to data-driven decision making. Hence, marketing is perceived as an organization-wide process and marketing managers become supporters, integrators and coordinators with an increased set of responsibilities throughout the organization (Gök and Hacıoglu 2010). From an organizational perspective, the described changing role of marketing managers is not only a functional issue. The impact of social media and the coherent paradigm changes in communication require companies to show a new managerial commitment for a nontrivial, cultural and organizational transformation (Rossi 2011).

### 4 Hypotheses Deduction and Development of the Research Model

The underlying comprehension of a corporate marketing system follows the principles of Layton (2011), who constitutes a marketing system to be a social matrix framework with exchange logics, flows and roles, networks and governance. Singer (2006) and Malthouse and Hofacker (2010) describe the changing role marketing due to globalization and new information / communication technologies and emphasize the necessity of a new organizational understanding. McGrath (1992) adds new dimensions such as cross-functional teamwork and customer information systems to the so far existing "tried and true" skill

sets of marketers. Finally, Piercy and Cravens (1995) who put marketing outside department boarders and replace it by a system on business, corporate and enterprise level. Approval is given by Gök and Hacıoglu (2010) analysing "marketing manager" job announcements by content analysis, and state new key-roles and functions, like internal/external network management, knowledge generation and performance management, in the managerial reality of marketers.

Information technology highly enables information exchange. Especially an improvement of tacit knowledge exchange can lead to a higher marketing productivity, as Arnett and Wittmann (2013) could prove in their study. Peltier, Zahay and Lehmann (2013) showed that an intensified marketing/IT integration in the organizational culture supports data sharing, which ultimately results in better marketing decisions and higher business performance. Moradi, Aghaie and Hosseini (2013) and Teoh and Pan (2008) could show in their case study the positive impact of knowledge management on organizational performance and emphasize strategy and leadership issues as important key factors for a successful implementation. This aspect of the importance of the "cultural factor" gets confirmed in the empirical studies of Magnier-Watanabe, Yoshida and Watanabe (2010) as well as by Ho (2009) who explicitly adds organizational culture to the list of knowledge management enablers.

Finally, the dichotomy between the organizational focus of knowledge management and the people focus of Web 2.0, the application of social media is an occasion for organizational change (Levy 2009).

Giving tribute to all these aspects and the general conceptualization of a marketing system, like presented in the theory chapter, the author proposes that:

**H1: The dimensionality of a corporate marketing system is determined by an organization's corporate culture, social media usage and knowledge management.**

The growing role of information technologies forced organizations to abandon their traditional command and control structures, fast decisions-making processes and empowered inter-organizational relationships are required (Tikkanen and Parvinen 2006). An organization, once it is aware of the ongoing paradigm changes in communications must be able to influence the organizational climate. It is a challenge to create an environment where other contribute innovative ideas and instantly develop or enhance a product or service. This brings a tacit aspect to management theories and affects the outcome of creation initiatives. Kimmerle, Wodzicki and Cress (2008) emphasize the necessity of an organizational culture that supports cooperation and knowledge sharing in an everyday work. This learning-by-doing approach is an enabler of an organization's culture (Williams 2006) which represents the foundation of organizational learning as a result of integration of people, processes and technologies within one cultural framework (Gorelick and Tantawy-Monsou 2005).

**H1a: A corporate marketing system is partly determined by an organization's corporate culture.**

Whereas social media can highly support cooperation and knowledge sharing within organizations (Kane, Robinson-Combre and Berge 2010; Levy 2009) their relevance for marketing-driven organizations is eminent, as social and economic networks merge (Gensler et. al 2013). Result is a new, self-sustaining economic system, in which traditional media such as television, radio or print show a decreasing impact on consumers. This is not saying that they are yet negligible but with increasing success, consumers' attention – either technological or mentally – to these traditional media is declining as interactive and social media became an influential game changer (e.g. Malthouse and Hofacker, 2010; Baird and Parasnis 2011; El-Haddadeh, Weerakkody and Peng 2012; Rossi 2011). Hence,

**H1b: A Corporate marketing system is partly determined by social media usage.**

Within a marketing system, marketers are in a central position of data gatekeepers. On one side the collect information from external sources and social media allow new ways of doing so, on the other side, they are responsible for an efficient and effective distribution of this information within their organization. Thus, new organizational structures, like the knowledge organization, can develop (Walczak 2005). The study of Peltier, Zahay and Lehmann (2013) did reveal the importance of data sharing through marketing/IT integration to increase customer and business performance. Hence, it is supposed that the appropriate treatment of knowledge will play an important role in more holistic marketing considerations as well.

**H1c: A corporate marketing system is partly determined by knowledge management.**

A legitimate goal for organizational development is value creation. Within this research, organizational value creation got defined as marketing performance and business performance. Following the logics of the previous antecedents, marketing function performance is an alignment of different value chains.

**H2: It is expected that there is a significant relationship between a corporate marketing system and marketing performance.**

Besides the fact that an organization can use social media to extract information from external environments, intra-organizational information flows are essential as well (Vuori and Okkonen 2012). This makes it possible to share and discuss insights, enables collaborative exchange and cross-functional information delivery. From an intra-organizational perspective, employees and their managers are expected to virtually cross time zones and require increased flexibility in work arrangements to form the virtual organization, which has become a new business model in the global economy (Meyers, Hearn and Bradley 2006). Therefore,

**H2a: There is a significant relationship between an organization's corporate culture and marketing performance.**

The role of social media is essential and is probably the real evolution in this matter. It enables open participation and access to information; it enhances communication and processing capabilities, optimizes supply chains and provides direct accessibility to actual information. And following Gupta, Grant and Melewar (2008) today's customer perceive value not only in products but also in modern forms of communications and technology, effecting their brand knowledge and brand associations. Hence,

**H3a: There is a significant relationship between social media usage and marketing performance.**

Exactly these web 2.0, respectively social media, applications enable a horizontal flow of knowledge and information between companies and customers (Rossi 2011). The efficient use of this idle knowledge will create a competitive advantage and will improve organizational success (Sandhawalia and Dalcher 2011; Moradi, Aghaie and Hosseini 2013). Extracting value from knowledge is a key management challenge for organizations (Mahesh and Suresh 2009). More precisely, key challenge is the ability to import new external knowledge and synthesize existing internal knowledge (Sandhawalia and Dalcher 2011). Or from a more strategic point of view: knowledge management needs to deliver the right knowledge to the right persons at the right time (Ho 2009) in dynamic processes (Pan, Bradbeer and Jurries 2011). Having a proper infrastructure and clearly defined process work flows seem to be essential for knowledge management. In an organizational redesign, it is important to create effective ways for the flow of knowledge, from the knowledge sources to

the points where knowledge is needed. Thus, organizational value will extract from knowledge (Mahesh and Suresh 2009).

**H4a: There is a significant relationship between knowledge management and marketing performance.**

Marketing, from a functional perspective, can be regarded as an exchange between organization and customer. The customer gives time and cognitive attendance. The organization, respectively the marketer, is expected to deliver entertainment and information as main value components (Ducoffe 1995). In traditional communication landscapes exchange does not happen. It is a technological limitation that there is a sender and a receiver. Interaction cannot happen. As the market is changing from consumption to interaction (Malthouse and Hofacker 2010) generating higher relevance and value for the consumer in a converse argument, increasing the efficiency and effectiveness of marketing on a corporate level. In that way, a company can face the challenges of new economies and digital communication landscapes and successfully use a new understanding of marketing, hence

**H3: It is expected that there is a significant relationship between a corporate marketing system and business performance.**

Gorelick and Tantawy-Monsou (2005) emphasize the importance of culture as superordinate framework of the learning organization, which aims at an overall improvement of performance results. Organizational structures and corporate culture need a managerial commitment for change, as many traditional hierarchical management structures will limit the knowledge transfer performance (Walczak 2005). Consequently, lacking knowledge will lead to inefficiency, which finally limits the performance potential of an organization.

**H2b: There is a significant relationship between an organization's corporate culture and business performance.**

The influential source of information exchange between consumers in digital communication landscapes is seen as an established consensus in literature (Dellarocas 2003). Consumer-to-consumer conversations can lead to measureable outcomes and social media can influence business performance:

- An improvement in a book's reviews leads to an increase in relative sales (Chevalier and Mayzlin 2006).
- There's an impact in box office revenues caused by consumer-to-consumer communication (Liu 2006).
- Online movie ratings significantly influence the predictive power of a revenue forecasting model (Dellarocas, Zhang and Awais 2007).
- Consumer-to-consumer communication during different stages of viral marketing positively influence the recipient's decision-making process (De Bruyn and Lilien 2008).

These studies did essentially prove that social media have a direct impact on purchase decisions. Organizations, which are aware of these business potentials and understand to change their traditional thinking will be successful. Hence,

**H3b: There is a significant relationship between social media usage and business performance.**

There is a significant relation of knowledge creation and internalization to financial performance, as presented by Ho (2009). Gibbert, Leibold and Probst (2002) see customer knowledge management as promoter of economic value creation. According to Sandhawalia and Dalcher (2011), obtaining, sharing, storing and using knowledge can only be successful if an organization finds the right balance between knowledge management infrastructure and process capabilities. Initiatives can only be implemented step by step, shifting knowledge management from initial states to an organizational state – matching organizational growth and sustain quality.

**H4b: There is a significant relationship between knowledge management and business performance.**

For the purpose of this research and with a positive assumption that a higher level of marketing performance can lead to an increased level of business performance, it is assumed that:

**H5: Marketing performance is positively related to business performance.**

Finally, it is assumed that companies with a more advanced level of corporate marketing system integration show a higher business performance level. Hence,

**H6: There is a significant relationship between the dimensions of marketing performance and business performance.**

H7: Company size has an impact on corporate marketing system integration.

H8: Industry sectors have an influence on corporate marketing system integration.

Figure 2 illustrates the finalized conceptual framework of hypothesis deduction and provides hypotheses references. It also outlines the dependent and independent variables.

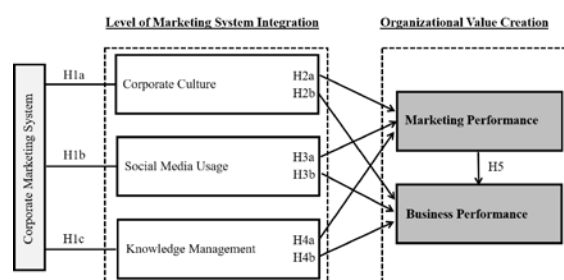


Figure 2: Conceptualized research model related to the impact of a corporate marketing system on marketing and business performance

Source: Author's illustration

### 5 Sample Deduction of Primary Research conducted

In order to address the research questions a decent number of companies within industry economy in Austria were approached. Further on, the participants were sampled among companies without micro companies, thus, minimizing confounding factors. An industry-wide database of marketing executives of the selected companies yielded potential respondents. The interview partners represented each one of the four predominant business models defined by three criteria, namely (1) number of employees, (2) annual turnover and (3) independence. While "number of employees" is generally considered as the main criterion to classify a venture, "annual turnover" represents the impact of a company on the market and its performance. "Independence" can be viewed as an important criterion to distinguish between small to medium companies either affiliated to large corporate groups or not.

For the sample collection small to medium companies which can't be considered independent as well as micro companies, defined by an annual turnover lower than 2 million Euros and less than 10 employees, were excluded. Hence, from a total of 426.364 within industrial economy in Austria still 31.460 companies remained for further processing.

After sampling the outlined 31.460 companies an accessible sample size consisting of 5.875 potential respondents has been drawn from an industry-wide database of marketing executives. It was assumed, that these potential research participants are representing management as well as non-management levels of the respective companies. Next, both lists were matched and a simple random sample of marketing executives from 4.697

companies was received. From a total of 4.231 successfully delivered emails, 233 (5.51%) answered questionnaires were received back, which make up 0.74 % of the relevant population.

## 6 Main Results of Primary Research

The subsequent main results have been derived from primary research and enhance existing theories related to a corporate marketing system and its impact on marketing and business performance. Hence, they represent a valuable contribution to the academic discourse of the research topic:

- It is verified that a corporate marketing system is determined by aspects of corporate culture, social media usage and knowledge management and that these variables represent a significant contribution to marketing and business performance.
- Marketing performance is positively related to business performance and enhances organizational value creation.
- In this context, social media usage and knowledge management have been identified as strong predictors for marketing performance and corporate culture for business performance.
- Interdependencies within the construct of a corporate marketing system and its influence on business performance appeared. Hence, a holistic approach of organizational integration seems appropriate.
- Corporate marketing system integration enhances business performance regardless of company size, indicated by number of employees and annual turnover.
- There are differences of corporate marketing integration caused by industrial sectors, especially for business-to-business, retail and service/tourism industries.

These main results strongly indicate that there is indeed an impact of a corporate marketing system on marketing and business performance throughout industry sectors and company classifications. The following sections go in detail.

### 6.1 Dimensionality of a Corporate Marketing System

In order to investigate the dimensionality of a corporate marketing system within small to large sized companies a principal components analysis has been assessed, in order to explore patterns in the collected data (Brown 2009; Fabrigar et al., 1999). Principal components analyses was performed with Varimax rotation in 6 iterations and a Kaiser normalization. This was done based on the 233 sample elements and for 30 measurement items, basically assigned to the independent variables corporate culture, social media usage and knowledge management. Factorability and correlation of the samples was considered appropriate based upon the values of the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity which showed values of 0.863 and  $p < 0.001$ , respectively. Cronbach's Alpha was used to assess the internal reliability of a questionnaire. The analysis of the model exhibited values ranging from 0.811 (social media usage), 0.845 (knowledge management) to 0.866 (corporate culture). This can be considered as indicative for high internal consistency of the measurement scales. Only components showing Eigenvalues above 2.0 have been accepted and items with factor loadings  $> 0.5$  have been included. Eight main components have been extracted, but only three have been considered for further investigation, as the others showed Eigenvalues only slightly  $> 1$ . Consequently, three main components were defaulted. These three main components were explaining 46.8 % of the variation. In detail, knowledge management explains 16.8 %, corporate culture 16.2 % and social media usage 13.8 % of the construct.

The underlying research construct of a corporate marketing system has been operationalized by corporate culture, social media usage and knowledge management. Firstly, corporate culture can be approached from different angles. The basic foundation is probably the recognition of knowledge as an organizational asset which refers to the attitude of a company and its top-management towards the evaluation of intangible

goods. Once there is a positive approach, managerial commitment can create a cultural climate that enhances information exchange and the fostering of ideas throughout the organization. This can happen on a voluntary basis in everyday situations but nevertheless, defined corporate procedures and proper technological infrastructures, like common knowledge platforms, further enhance exchange of ideas and information and contributes to a cultural understanding of a corporate marketing system. As research results did show, the consequent training of all employees for knowledge exchange and dedicated time schedules in daily operations are strong cultural factors and need to be considered in relating managerial frameworks.

Secondly, the usage of social media requires a professional engagement by all employees, across managerial and functional levels, as they represent a very important source for external opinions, market insights and the allocation of potential target groups. Further, social media deliver inspirational information that can lead to the development of new products and services or just to improvements in many areas of a company. Hence, information derived from social media dynamically captures sentiments and intentions from the external business environment that can directly be addressed to strategic decision-making and daily operations. Research results did show that the training of all employees for proper usage of social media is necessary to fortify the potentials of a corporate marketing system.

Thirdly, within the underlying research construct, knowledge management addresses structural and behavioral necessities of a systematic marketing understanding. The strategic foundation is an intensified focusing on customer needs and wants and an organizational setting that puts customer insights in the center of every organizational consideration. This is coherent with the above mentioned possibilities of social media, that allow new approaches towards customer-centric business models. But this possibilities need to be applied on an organization-wide level and flat hierarchies with short decision pathways strongly support this approach. Further, the dynamics of the external business environment needs to be reflected in organizational work processes. For people to catch up with these requirements, inter-divisional co-working and multifunctional teams contribute to the generation of new ideas, shared knowledge and the development of intellectual capital, which can be generated, processed and stored on virtual platforms. Thus, and for the use of real-life application in daily business, shared insights and experiences overwind departmental and functional borders and create a dynamic environment for constantly learning organizations, facing the organizational challenges of the data society and for the purpose to impact marketing and business performance in a digitalized world.

### 6.2 Influencing factors of Marketing Performance

Based upon the factor analysis the impact of the independent variables corporate culture, social media usage and knowledge management on the dependent variable marketing performance was determined. In order to calculate the factor scores the items of each dimension as resulted from the factor analysis were averaged. Corporate culture consisted of seven items, social media usage of eight and knowledge management of eleven items. The following regression analysis was performed to test the null-hypothesis (no relationship between independent and dependent variables). The F-test resulted in 57.3 ( $p = 0.000$ ), thus rejecting the null-hypothesis and indicating relationships between independent and dependent variables. Further on, considering the Durbin-Watson value of 1.9 no auto-correlation was detected, meaning that the residuals are uncorrelated. Results show, that 42.9% of the total variance in marketing performance is explained by the independent variables knowledge management and social media usage.

The beta values figured out, that social media usage appears to be the best predictor for marketing performance ( $\beta = 0.530$ ), followed by knowledge management ( $\beta = 0.239$ ). However, there was no relationship found between corporate culture and marketing performance.

### 6.3 Influencing factors of Business Performance

In analogy to the estimation of relationships between the independent variables corporate culture, social media usage and knowledge management on the dependent variable marketing performance a similar analysis for the dependent variable business performance was performed. Factor scores of the items of each dimension (corporate culture: 7 items; social media usage: 8 items; knowledge management: 11 items) were calculated based upon the results from the factor analysis. Regression analysis to test the null-hypothesis (no relationship between independent and dependent variables) yielded an F-value of 7.5 ( $p=0.000$ ), thus rejecting the null-hypothesis and indicating relationships between independent and dependent variables. Like in case of marketing performance the Durbin-Watson value of 1.9 suggested no auto-correlation among the residuals. Considering the beta values, corporate culture appears to be the best predictor for business performance ( $\beta=0.228$ ), followed by knowledge management ( $\beta=0.239$ ).

However, no significant relationships were found between both knowledge management and social media usage and the dependent variable business performance. Hence, the total variance of 9.0% in business performance is explained by just one independent variable, namely corporate culture.

Testing the influence of independent variables social media usage, corporate culture and knowledge management on the dependent variables marketing and business performance a multiple regression analysis was performed.

Summarized, there are significant positive relationships between the independent and dependent variables. However, considering the beta values, the impact of the single independent variables on either marketing or business performance, are not consistent. While social media usage has an influence on marketing performance ( $p=0.000$ ), this effect cannot be observed when it comes to business performance. The same is true in case of knowledge management, where an impact on marketing performance is detectable ( $p=0.000$ ), while the impact on business performance is weak but not statistically significant ( $p=0.087$ ). Corporate culture is the only dimension having an influence on business performance ( $p=0.002$ ). Consequently, combining the results, hypotheses H3a, H4a and H2b could have been confirmed while H2a, H3b and H4b had to be rejected.

While the dimensions knowledge management, corporate culture and social media usage showed an impact on both dependent variables, marketing performance and business performance, a correlation of the latter two variables appeared to be likely. Performing a simple linear regression analysis between the independent variable marketing performance and the dependent variable business performance identified a significant positive relationship between the two variables (F-value=5.3 at  $p=0.022$ ) explaining 2.3 % of the total variance ( $b=0.23$ ;  $t=2.3$ ;  $p=0.022^*$ ).

### 6.4 Correlation of Single Dimensions with Business Performance

Because a corporate marketing system seems to have an influence on business performance, the single dimensions of marketing performance were checked for correlations to business performance and for inter-correlations. After performing a Pearson correlation analysis, significant positive correlations between knowledge management and corporate culture and business performance (R-values are 0.227 and 0.279 at  $p=0.000$ , respectively) could have been observed, while in case of social media usage there was no correlation detectable. Inter-correlations among the dimensions of marketing performance were seen between corporate culture and knowledge management ( $R=0.503$ ,  $p=0.000$ ), corporate culture and social media usage ( $R=0.343$ ,  $p=0.000$ ) and social media usage and knowledge management ( $R=0.452$ ,  $p=0.000$ ).

Because the size of a company could have an influence on corporate marketing system integration, the three dimensions of marketing performance, knowledge management, corporate

culture and social media usage were tested. Analysis of variance (ANOVA) for group differences were performed, regarding the two main criteria for the classification of a company and the impact of a company on the market and its performance, which is (1) annual turnover and (2) number of employees, respectively. In both analyses there were no significant group differences detectable, suggesting no effects of company size, regarding marketing performance.

Because the industry sectors in which the respondent's companies resided in could exhibit specific issues, regarding the corporate marketing system integration, an ANOVA with a Games-Howell post-hoc-testing was applied. Significant differences between the groups could point towards diverging characteristics among the sectors business to business (B2B), business to consumer (B2C), retail, services including tourism and other. The results of the ANOVA showed differences in corporate culture ( $p=0.09$ ) and social media usage ( $p=0.015$ ). Post-hoc-testing specified these results as being mainly caused due to (1) the differences between retail and services including tourism ( $p=0.020$ ) for the corporate marketing system dimension corporate culture and (2) the differences between B2B and retail versus services including tourism ( $p$ -values are 0.045 and 0.014, respectively) for the dimension social media usage.

### 7 Conclusions

Companies of all industry sectors are exposed to the paradigm changes of digital communication landscapes and the eminent importance of new economies for business. The so-called information, respectively data society, forces companies to adopt their management procedures systematically to the evolution of internet-based networking. Considering that roughly one third of earth's entire population is connected to the usage of social media, one cannot ignore the implications of this fact for marketing systems. Since the value of social contacts is increasing, the systematic extraction and distribution of customer knowledge, respectively information shows a high relevance for all companies. However, apart from the common notion that the usage of social media is of high value as a marketing tool, there is confusion of how to achieve a well-suited application of this instrument into organizational structures. Hence, managerial challenges arise on an organization-wide level and especially the application of social media and web 2.0 is an important occasion for organizational change.

Thinking outside the box is necessary and hardened organizational structures need to be questioned when organizations face these challenges caused by strong external factors and a fundamentally changing environment. An absolute customer-centric approach and dialogue-orientated procedures are necessary for organizations to adopt their strategies but also their internal structures, hierarchy levels, functions and work- and information-flows to the web 2.0 challenge. Dynamic work processes should allow multifunctional teams to constantly exchange ideas and information, derived either from professional engagement in social media or from individuals within the organization. There should be no functional, structural nor technological boarders to understand the organization as a dynamic and permanently learning construct. Management must consider time management issues and an open atmosphere for their employees and encourage instant and dynamic information exchange through specified procedures.

Regardless of the fact, that marketing is often considered to be a practical discipline with a vast spectrum of specification, the possibilities of a new marketing understanding address many organizational challenges for development, which ultimately result in business metrics like competitiveness, growth and sustainability. The changes in a holistic conceptualization of marketing meet the development of the information technology, from its beginning to current state and give many hints for organization-wide implementation. The rise and growing importance of the internet, coherent digital communication landscapes and social media shows some enormous impact on organizations and marketing practice. With an increasing amount and accessibility to data, information and knowledge, an

organization-wide adjustment can be a crucial factor for future competitiveness. Especially marketers, which are traditionally at the front of consumer communication, can strengthen their position and jump out departmental borders by becoming knowledge ambassadors and central managers of external and internal networks and thus, become drivers of organizational change and renewal.

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**Primary Paper Section: A**

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# THE PERCEPTION OF THE LEADER'S PERSONALITY WITH EMPHASIS ON ITS DEVELOPMENT DURING THE PAST DECADES

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**Abstract:** The field of leadership and management science as well has a very deep roots. The leader personality is perceived in the context of specific leadership style of the working groups. This academic study is aimed to search the consequences of leader personality perception in the historical framework and economy development. Significant epochs are examined from a historical and economic perspective to find a connection with the gradual emergence of theoretical ideas. Ideas that laid the foundations of managerial and economic theory, up to current state of knowledge in the field of company leadership. Thanks to identification of particular approaches and schools of thought the study allow to clearly understand the perception of leader personality development in the last decades. The study creates the wide theoretical background for future research in the field of current theoretical leadership approaches within company management.

**Keywords:** Leadership, leader personality, management, development, theories, approaches.

## 1 Introduction

The leaders accompanying our society since time immemorial. Earlier in the role of elders, tribal chieftains, powerful monarchs of valiant generals to current leaders of international corporations (Bláha, 2013). The aim is to study the historical development of leadership within management, until today, when both of these areas have a vital role in the orientation of company in the right direction and its continuous development. The article will discuss the various theoretical approaches, in relation to historical events, which in many cases initiated the creation of the relevant theory. Leadership is currently by many authors considered as part of the management and constitutes one of its main functions, together with planning, organizing and control (Koontz, 1998). From the historical perspective leadership is associated with human civilization since time immemorial, while what we call management is a product of the last century in response to emergence of a large number of diverse organizations, that was necessary to adequately manage (Kotter, 1990). The aim will be to define the basic differences between management and leadership, but also find a way to unify these approaches in the context of company ideal, when a good manager is also a great leader. Such a state is currently very welcome, as it contributes to the fulfillment of a vision and helping company succeed in global competitiveness.

## 2 Management theory

The managerial skills, were very important for mankind already thousands years ago. Commonly mentioned example is the construction of the Egyptian pyramids, where it was necessary to organize the work up to 10 000 workers for a period of 20 years. Also, the Great Chinese Wall was built thousands years ago, and its creation required managerial personality capable of planning and coordinating the work of many people. In Europe can be traced unique managerial skills in building cathedrals and many other monumental buildings during the Middle Ages. Later, in recent history begins with the onset of the industrial society became increasingly important managing objects of industrial nature (Blažek, 2014).

Adam Smith (1776) in his work "The Wealth of Nations" suggested the division of labor into smaller, better manageable units, which should result in a significant improvement of economic output. It is obvious that many civilizations have been able to use this simple idea, but Smith was the first who wrote it and published. He proposed manufacturing process improvements in metallurgy, where every worker should hold any other function in iron production, to achieve significant growth in production (Scott, 2005). Specifically, according to Smith, the productivity is increasing if there are connected three basic factors. The first is the growth of dexterity and work skills of craftsmen, as well as better

use of working time and as the last factor improving productivity he indicates improvement of tools and their adaptation to the working performance (Fuchs, 2007). Implementation of these improvements, are considered as the first step of the industrial revolution (Scott, 2005). In this period there were due to the technical development significant changes in manufacturing processes. Industrial Revolution meant big changes in agriculture and productivity due to new discoveries and the use of new inventions. Also social structure of agriculture changed, landowners have routinely hired workers who did not own the land. There were emerged new manufactories, in an urban environment due to transformation of handicraft production in processes with developed division of labor activity and thanks to massive new energy sources and technical solutions (Hálek, 2014).

The beginnings of management are therefore associated with the development of production and the end of the guild organization. One of the first theoretical works, are works by Henry Poor and Daniel McCallum (1860), they defined management as the synthesis of organization, communication and information. They verify theoretical knowledge at the railway company in New York and Erie Railroad. Their recommendations included e.g. leave managing to experts and publish financial results. Unfortunately, some of their findings provoked displeasure at the company's owners and McCallum was released (Sládek, 2013).

When defining the history of economy theory with an emphasis on the figure of a manager, it is appropriate follow-up analysis of the historical context since 1871. In this year during marginalist revolution, was formulated the theory of marginal utility in a very sophisticated and comprehensive form, allowing to create a new system of economic thought. This new system of political economy was significantly different, from the still dominating Ricardo and Mill (1817) theory of political economy. Until now classics focused on the supply side of the market and therefore on the theory of costs, they were interested in long-term problems and overlook the importance of market demand to determine the relative prices. By contrast, marginalists were focused just on the demand side of the market. In framework of economic analysis, they focused almost all of them attention on the allocation of scarce resources, while the classics were primarily interested in economic growth. Revolution was also in the methodology, because it started using the marginal values. Marginalist method enables to analyze the allocation of economic resources and showed that the allocation of scarce resources is effective, when it respects the rule of balancing marginal values. Marginal analysis also brought to the economics new tools and techniques, and opened space for mathematization of economics.

So far, the classics have seen the company as a structure constituted of social classes - landowners, capitalists and workers. While examining relationships and the distribution of the national product among them. The capitalist was the creator of the payroll funds. Conserve his profits, which changed into the payroll fund and payroll fund was subsequently a source of employment and capital accumulation. He invested resources, led by Smith's invisible hand of the market and stimulate economic growth. In this new era, in the new marginalist economics, is a central figure the consumer. The consumer is seen as the primary bearer of a sovereign economic decision, his preferences are the primary driving force, while the producers register these preferences and fulfill his wishes (Holmann 2001). The process of expanded reproduction based on innovation, which in the initial stage was carried by the owners of capital, now moved to the competence of managers (Sojka, 2004). In this new economy paradigm, created by marginalist, figure of the capitalist disappear and disintegrate in the role of rentier, entrepreneur and manager (Holmann 2001).

In the beginning, the older neo-classical economists approached the firm as a compact, indivisible entity, without tackling its internal structure and operations. By contrast are formed "Managerial theory of the firm", which emphasize, separation of ownership from management in the modern large companies.

These theories focus on mutual relations and economic behavior of stakeholders within the company. The main attention of management theory is focused on motivating managers to ensure the long-term position in the market and maintain long-term stable profits. Owners in the role of shareholders, on the contrary, prefer high dividends and high market value of the shares (Sojka, 2000).

According to Němeček and Zich (2004), manager at the beginning of the 20th century, held various positions. We expect the following five functions of the main functions that a manager in this period performed. In terms of business functions, it means building sales and marketing strategies, market research and competitive assessments. Production functions means that the manager was tasked to ensure the production of products in the required quantity, quality and time at minimum cost. Technical function is represented in connection with efforts to invest in sustainable development and innovation, to maintain market share and staying ahead of the competition. Economic function instructs the manager to create economic analysis, tactics and strategy company decision, based on established economic parameters. The last mentioned is HR function that is associated with the recruitment, personnel development and key personnel stabilization.

When we focus on particular development of these views on the management in the 20th century, schools of thought could be divided according to Bělohávek (1996) in next tab. 1.

Table 1: Development of management approaches in the 20th century. Own work in accordance to Bělohávek (1996) Němeček and Zich (2008), Kennedy (1991).

Time range	Approach	Description	Key thoughts
Till the 20 years of the 20th century	Mechanistic approach	Pattern for designing organizational systems were accurate functioning machines. Mechanistic organization was founded on a perfectly configured system, accurately defining the roles, competencies and responsibilities, where human performing routine work as part of a great machine.	Theory of bureaucracy (Max Weber) Classical management (Henry Fayol, F. W. Mooney and Lyndall Urwick) Scientific management (Frederick Taylor)
20-30 years of the 20th century	School of Human Relations	Elton Mayo, brought new ideas in organizational theory. He drew attention to importance of social relationships and job satisfaction, for the success of the organization and performance of staff. He is also the author of Hawthorn studies, where with other researchers studied the factors that affect productivity.	New ideas in organizational theory Hawthorn studies (Mayo, 1933)
40-50 years of the 20th century	Humanistic approach	During this period, attention shifts to humans. As the major working stimuli, is considered to satisfy the personal development of the individual.	Theory X and Y (McGregor, 1960) Theory of hierarchy of needs (Maslow, 1943)
60-70 years of the 20th century	Modern opinions	The requirement of modern times is "keep it simple and short". The aim is to search for a simple essence, which easily explains the functioning of organizations, their problems and show how these may be solved.	Theory of contingency, general systems theory, population ecology, cybernetic principles and theory of "Z".
80-90 years of the 20th century	Postmodern Approach	Postmodernism is trying to avoid all the simplification, call into question big theories, accepts the complexity of the world and offers custom solutions to partial problems. Traditional aversion for changes is necessary to replace by the friendly attitude to chaos. Its essential role, here begins to have correctly applied the concept of change management. World experts are engaged in the study of Asian well-performing organizations and then recommend ways, to revitalize European organizations.	Understanding the need of change management concept application.

Management of the late twentieth century, is usually associated with the development of human capital. The main focus is on the customer, who must be satisfied and pressure is growing with innovation and marketing.

At the beginning of the 21st century the new global information technology of global society and prolongation of positive changes, in the concept of human capital captive entire management (Geršlová, 2012). According to Kareš (2006) an important position gaining, "knowledge management" in the context of the acquisition, evaluation and use of knowledge, which can become an important comparative advantage. Knowledge begin to be considered as the primary key factor of production. More and more organizations transferred to a "virtual model", characterized by high degree of flexibility. The aim of the virtual institution is after integrating modern know-how of cooperating firms and experts to create added value for the customer, which ultimately leads to a significant increase in competitiveness. Organizations whose cooperation is based on the principles of classical vertical organization with departments such as marketing, production, development etc. should become a history. As the business grows, there is a significant increase in the number of decision-making levels and longer lines of communication which ultimately leads to the bureaucratization of the organization and the loss of competitiveness.

### 3 Leadership theory

Historically, search for a leader characteristics or his properties last for centuries. One of the oldest thoughts about leadership can be found in works that are dated back over 2,500 years e.g. *The Art of War* by Sun-č (Steigauf, 2011). Next up thinkers in ancient Greece try to theoretically define leader personality. Socrates was convinced, that leadership is closely related to the situation and largely depend on the knowledge of a particular leader (Bláha, 2013). His student Platon perceived power and leadership in connection with the role and concept of state. He recommends recognize and accept as a leader, person who are best able to rule. According to Platon, ideal ruler is enlightened philosopher, who formed the company based on good laws, by contrast the worst and illegal, he considered tyranny (Lukas and Smolík, 2008). Platon focused, on individual characteristic traits as morality, justice, virtue and righteousness. These qualities should be applied to the state level, where they lead to the development of a community (Störig, 2007). Ancient authors perceived as the most important character and competence for the leaders. They argue that people who cannot manage their desires, will disturb the relationship between leader and the followers, and are therefore unfit to lead. On the other hand, those with good character attracts others and uplift them. Striving for perfection, therefore, requires both character and competence. In conclusion the ancient philosophy say that leader requires continuous development of mind, body and soul, to obtain a complete spectrum of courage in the intellectual, physical and moral field (Steigauf, 2011).

In the 15th century Niccolo Machiavelli dealt with the concept of leadership. Unlike many of his predecessors, including Platon and Aristotle, he did not come from ethical, but practical and realistic facts. In his book *"The Prince"* provide advices for the political leaders how to acquire and maintain power. He was aware, that the ideal monarch should be benevolent and humanity, but also acknowledges that it is not always possible and beneficial (Lukas, Smolík, 2008). Machiavelli in his work, for example, states that it is not necessary that the ruler endowed with all good qualities, but it is necessary to make it appear that it has. As the author is a proponent of leadership through deceit and intrigue, triumph of force over intelligence. This approach has been according to Crainer (2000) a daily reality in the industries dependent on internal politics. But Crainer notes, that machiavellian management methods no longer have a place in modern management. Ceases to apply, that the end justifies the means, and in vogue gets gentle art of persuasion. Most managers today understand that business have a different meaning than just maximizing profits. Thus we see a return to the age of intelligence, against which Machiavelli rebelled. In

modern history (19-20 century) were the first concepts based on the thought of leadership as innate ability. These theories are known as “Theory of great personalities” and “Theories of properties” (Steigauf, 2011). In the mid-20th century, are beginning to discover other alternative theories based on researches in the field of leader’s behavior. Part of the researches identify individual leadership styles and in the 60s, was developed the managerial grid model. In response to the Theory of properties was created the Situational theory, while some researchers have merged the situational and property approaches in so called Contingency theory. In the 70s have been discovered Transactional and Transformational theories (Steigauf, 2011). However, researchers focus on leadership until nowadays. Bass (1997) presents approaches based on a charismatic leader. Messick and Kramer (2005), are dealing with concepts of social identity in leadership, theories of exchange between the leader and his followers and the psychodynamic approach to leadership. Other researchers Pearce and Conger (2003) describe approaches based on sharing leadership in the whole group, it is called Shared leadership and includes eighteen partial approaches. Among these approaches belongs e.g. determination of expectations theories, self-leadership, followership, and shared knowledge theories. As another contemporary concept Brown and Trewino (2006) mentioned Ethic leadership. They describe ethical leadership as an approach based on mutual communication between leader and co-workers (Two - Way communication). Important is to support of colleagues and the ability to make good decisions. Specific leader’s traits identified through interviews are honesty, integrity and ethical behavior. They also cite, as essential characteristics kindness and consistent individuality, which are doing fair and balanced decision. Next up authentic leadership which describe leaders as personalities who acquire authenticity (credibility) by using self-confidence, self-acceptance and trusted relationships and actions. The integrity of leader personality is perceived as the observance of moral principles and actions based on them (Gardner et al, 2005). The last mentioned concept in this study is Spiritual leadership. This approach introduces values and behaviors that intrinsically motivate employees who feel, that they are part of a greater whole (Fry, 2003). Reave (2005) explains that it is necessary for the leader to embody the spiritual values that include integrity. Leader is an example of a credible personality that develops these values in society.

For clarity, development of leadership theories in 19th and 20th century is shown in the following table 2, where the main schools of thought are divided, according to Crainer (2000) into nine theories.

Table 2: The leadership development in the 19 and 20th century. Own work in accordance to Crainer (2000). Yammarino et al., (2005), Dansereau et al., (2013).

Name of theory	Description school of thought	Original articles related to described theory
Great personality theory	Theory dominated in the 19th and 20th centuries. It is based on the idea that leaders are born with leadership skills unexplained and unreachable for ordinary mortals.	“On heroes, hero-worship and the heroic”, Carlyle, T. (1888), Some Findings Relevant to the Great Man Theory of Leadership (Borgatta, 1954)
Theory of properties	Effort to trace the characteristics of leaders led to researches focused on personality of people in the leader role. Unfortunately, very few publications that are aimed to define the common characteristics of leaders, reach to the same conclusions.	Social psychology (Bird, 1940) A Research Approach to Leadership Problems (Lewin, 1944) The nature of leadership (Barnard, 1948)
Theories of power and influence	This approach focuses on the networks of power and influence, which leader creates. The underlying assumption is that all roads lead to the leader, but neglect the importance of corporate culture and the role of followers.	A Review of the relationships between personality and performance in small groups (Mann 1959)
Behaviorist theory	The main emphasis is on real activity of leaders, rather than their properties. Among its proponents include creators of managerial grid Blake and Mouton.	A Dynamic Theory of Personality (Lewin, 1935) The functions of the executive (Barnard, 1938), Leadership, membership and organization, (Stogdill, 1950)

Situational theory	Within situational theory, leadership is rather seen as a special type of situation, than a kind of personality. The underlying assumption is that different circumstances require different forms of leadership.	Situational behavioral approach to the study of educational leadership Hencley (1973)  Educational administration: Theory, research, and practice (Hoy & Miskel, 1987)
Contingency theory	Contingency theory is based on the situational theory and tries to pick situational variables, that could better determine a suitable leadership style, which is appropriate in the circumstances.	A path goal theory effectiveness. (House, 1971) A critique of the Vroom–Yetton contingency model of leadership behavior (Field, 1979)
Transactional theory	The emphasis is placed on the relationship between leader and followers. There are investigated the mutual benefits arising from the relationship based on mutual exchanges (transactions), where the leader offers some resources or rewards in exchange for e.g. loyalty of followers and their recognition of leader authority.	Leadership. (Burns, 1978), Leadership and performance beyond expectation (Bass 1985) Biography and the assessment of transformational leadership at the world class level (Bass et al, 1987)
Attributional theory	Approach as well called attribution theory, gives new meaning to followership, because it focus on the factors that underlie perception of leadership abilities of leader by his followers.	A Typology of Attribution Leadership Research (McElroy, 1982)
Transformational theory	Unlike transactional models of leadership are based on external stimulating of motivation, this approach is focused on the internal motivation of followers. The emphasis is on the involvement of followers, rather than on their submissiveness. Transformational leader can therefore be characterized as proactive and innovative visionary.	Leadership. (Burns, 1978), Leadership and performance beyond expectation (Bass 1985) Biography and the assessment of transformational leadership at the world class level (Bass et al, 1987)

#### 4 Discussion and conclusions

People needed to organize and manage the work of many individuals since time immemorial. Usually there was a leader, who planned and coordinated activities. Leader acts according to his own experiences and proven advices from elders. This approach was common when it was necessary to e.g. build monumental buildings in the antiquity or middle ages.

In search of historical and economic context is identified a crucial historical fact, which had a huge impact on the development of management science. It was marginalist revolution in 1871. In this new economic paradigm created by the marginalist, figure of the capitalist disappear and disintegrates in the role of rentier, entrepreneur and manager (Holmann 2001). So it is for the first time when economic science officially meets the figure of manager. There were consequently a number of approaches that deal with effective management e.g. Taylor's principles, Ford's experience in the automotive industry or the Baťa factories in Czechoslovakia.

The history of leadership also has very deep roots. Particularly mentioned the period of the first theories of ancient Greece, a specific view of Niccolo Machiavelli in the 15th century, and the emergence of many theories in the 20th century.

According to (Bláha, 2013) management and leadership are constantly evolving and move closer together. Although the concept of leadership overlaps significantly management, these approaches are based on different tools application in business environment, that should be used appropriately to achieve a balance among them.

The aim of this study was to provide an overview of ideas and theoretical approaches in the field of development of leadership within management. The goal was to determine the theoretical approaches that have shaped the perceptions of management and leadership in such form as they are currently understood.

Development of management theory was described especially from the middle ages until nowadays. With special focus on development in 20th century, where was almost every decade new theory created.

Given the focus of the future research on the application of the leadership concept in the context of human resource management, attention was paid to the development of leadership as well. Again with emphasis on the last century where many new leadership theories were published based on the empirical researches.

This study focus on management as the framework for leadership abilities application. It is appropriate that the person of leader in company, also master corresponding elements of management abilities. Given the interdependence, but also many differences between these two mentioned concepts are discussed the opinions among foremost scientists.

In conclusion, the submitted study deals with the development of management and leadership in the context of historical events and their related scientific theories. Now these two concepts are in business practice considerable overlapping, but use different tools, that should be used appropriately to achieve a balance among them.

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**Primary Paper Section:** A

**Secondary Paper Section:** AB, AH

# BUSINESS MODEL: TOOL FOR THE ELIMINATION OF THE FINANCIAL BANKRUPTCY OF THE COMPANY

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**Abstract:** Each company operates according to some business model, even though it may not be directly defined enterprise and does not always work. Today there is no doubt about the importance of financial instruments in the management of the company as at the running, as well as in the course of business. This article describes the business model, which ensures the financial stability of the enterprise and reduces the risk of the financial bankruptcy. The new Business model was created based on the research, which was conducted in eleven start-ups and fourteen mature companies.

**Keywords:** Business model, tool for financial management, finance

## 1 Introduction

Business model as a tool for financial management of the company has to be part of the whole system, which we call business plan. Elaborating a business plan goes, in today's world of reviewed and in detail described business activities, without saying. Considering advanced information technologies, there is also a lot of tools. This topic has been covered in many book publications, or comments on web sites. There are also specialized companies that focus on applying them in praxis.

Although many failures, and repeating mistakes in high rates together with operating of companies for high number of companies. The aim of this article definitely is not to look for mistakes in elaborating the business plan, analyzing its parts and creating conclusions from these analyzes. We are not searching, which part of the business plan most often causes its failure. We claim that the business plan should be simple and mostly it should have clearly defined aim. This aim should be in maximal rate respect with the reality of outside world and not become just a simple idea from area of fantasies and illusions. These facts raised in us a thought of tool that could early and clearly take these plans into reality. Each business plan has to be supported by well elaborated tool for financial management of the company. As a model for achieving this aim, we have created specific type of business model, which is based on three basic frameworks of financial system. All these frameworks contain key to revealing if the plan and planned strategy are able to succeed. If there will be sufficient financial resources of each emerging company, that means cash obtained from customers, suppliers, investors, or all three together and if it would be possible to transform them into potentially prospering and sustainable company.

## 2 Literature overview

### 2.1 Business model

Although the term Business model got attention of academics and experts only recently, it was part of expression of businessmen for longer period of time and its origins can be found already in publications from Peter Drucker (Veit, 2014). Despite of increasing number of literature about this topic, there is no equal definition of it (Veit, 2014; Afuah, 2004; Mullins, 2010; Johnson, 2008; Teece, 2010; Chesbrough, 2002; Zoot, 2010; Demil, 2010; Wirtz, 2010; Casadesesus-Masanell, 2011; McGrath, 2010; Yunus, 2010; Shafer, 2005; Margaretta, 2002; Osterwalder, 2010; Watson, 2005).

Concepts of Business models differ in degree of details and complexity of showcasing corporate sources and processes inside of the company or also related sources and processes in its surroundings (Magretta, 2002). The range goes from difficult and maximalist models, for example based on Osterwalder –

Pigneur (2010), Watson (2005). Chesbrough (2002) continuing by models covering key sources and processes, for example models of Zotta and Amita (2010) end ending with simple and partial models, for example McGrath (2010). The degree of complexity and details of showcasing does not have to be essential condition of quality.

### 2.2 Financial management

Financial management plays in the life of a company one of the vital roles (Hessler, 2002). Without good financial management the company can survive only for a short time in competitive environment (Pallis, 2014).

Jiang (2013) defines financial management as an active activity of managers aimed to gaining required volume of monetary resources and capital, their allocation in different items of assets and distribution of profit in order with goals of the financial plan. Drucker holds opinion that in reality a company can contribute to common welfare only if it's highly profitable (Galagan, 1998).

### 3 Methodology

There was conducted a quantitative research from January to April 2016, which was based on researching emerging and longer period established companies, and their tools for financial management. The research took place in Czech Republic, in South Moravia region. The total number of companies that were included in this research was 25. Based on the examination of longer period established companies, we have defined Business model for financial management of emerging companies.

Empirical evidences are based on qualitative data gathered through combination of standardized, structured survey with qualitative, partially differentiated interview, based on which it is possible to clarify how respondents interpret certain facts.

Qualitative research of companies that are established for longer period was focused on individual parts and systems, which they used for management of financial flows and for designing into basic architecture creating business model. Qualitative research of emerging companies was focused on the rate of using this business model during entry on the market.

For purpose of qualitative research we had available management of eleven emerging companies and fourteen of established companies.

The low amount of respondents and also focusing on quality enabled us, as research consultants, to gather data personally.

### 4 Discussion

If we want to truly professionally define the possibilities of business model as a tool for financial management of the company, it is vital to first mention the term Business model. The definition is created based on individual parts of our research as we perceive it in relation to process of financial management of the company. Thus as a certain architecture of economic activities and processes based on cash flowing in and out of the company serving for different purposes in the correct time. This whole architecture altogether determines if we earn or lose cash.

We see this architecture as a system, which consists of three basic elements. The result of the research orients on permeability of this model from view of financial flows. The best adjustment of individual elements for the purpose of this permeability gives certainly correct tool for financial management of the company.

Input model is, in principle, oriented on customer. Following and organizing customer potential, precise underpinning of number of customers, their purchasing power, orientation on our offer and satisfying their needs. The company should have a way of monitoring frequency of purchases of individual customers, ability to monitor the price and method of payment and at the same time costs of establishing this process from the company's side.

At the same time within the input model the company has to have correctly adjusted strategy and to it subordinate system for determining the most preferable product lines based on margin cleaned of all other costs. That means to have within this model correct way of determining rate of high and low revenue elements of product mix.

In examining successful companies, which operate on the market for longer time period, we find similar principles of this model within economic and managerial systems for managing financial flows of the company.

Emerging companies, which were subject of the research, did not have this system defined in advance – from the process point of view. It was not included in any parts of the business plan. Plans were generally built on analyzes (e.g. market and product). The idea or the way of working with customer potential based on some system was clearly postponed for later period.

A bit better situation in emerging companies is with orientation and cost structure and gathering information about gross profit for further work on this value. It can be explained by higher emphasis on these values within the business plan. However if we are looking for a tool, which should estimate the correct concept of working with this value within the input model, not even in this area have companies prepared this part of the system in advance.

In emerging companies is a model that we have called model of reserves. To some very small extent it is expressed only in business plan, or in some of its parts. It is expressed mostly in business intention and in sources of financing. That however does not create an integrated system, which shall define what way the company will regulate flow of income against level of costs, and that in percentage of these items in order to create correct amount of reserve.

In already existing companies, which show accounting documents, are items of reserves quite clearly defined within the economic system. This system however is not comparable with our model of reserves, which is related mainly to strategy of the company in the phase of its creation and development.

Dynamics of development of emerging company is because of high number of factors hard to be predicted. It is due to that the model of reserves is directly dependant on model of financial secure and on input model. The correct strategy of these models and their mutual connection should create correctly defined model of reserves. Its system is based in flow of incomes, level of costs in absolute or relative way and serves as background for correct strategy of further planning. The base value of this model is correctly adjusted level of operational costs and correct system for their lowering.

Inseparable part of the model of reserves has to be system for creating investment capital. In well established company the way of saving and using investment capital is bound to operation and results of the company or directly related to plan of developing strategy of the company, for example expansion etc. In case of emerging company we have not seen almost any system for creating a further management of investment capital, nor is it the part of development strategy of the company. We think that in the moment of dynamic and successful development at start of a company, such system should exist. It can be used in case of development or in opposite scenario – in case of hard times of the company.

This model is the most important in emerging company. Or more precisely, it is most visible from the point of view of managing the company – either from inside or outside. It is based on financial capital designed for common operation of the company – from salaries of employees to stock. From accounting point of view this model can be to some degree defined as current assets or current liabilities of the company. This definition is however general only to certain accounting level. For the correct start of the company should this model be prepared very precisely and it should be able to work for example on principle of daily budget and regular assessment and controlling of fulfilling the budgeting rules. Also this model is in close relation with previous models, because it is to some degree driving force of their operation.

As a result of that, we emphasize the connectivity of these models, while even a good elaboration of individual models of emerging companies can result in a fail due to poorly adjusted way of communication.

## 5 Conclusions

The topic of the article was research and comparison of fulfilling the business plan with main focus on its financial management and its supporting systems. In our case we have chosen as a supporting model the Business model, which we have based on our research defined by three models. For basic principles of correct business operation we have compared already established and emerging companies, which focus on customers and their needs, behavior features and patterns.

Based on this information we have elaborated input model, which can be deduced from already operating companies and monitor to what degree do emerging companies work with such model, more precisely to what degree it is a part of business plan.

As the next part of our Business model for financial management of emerging company we have created model of reserves. Thanks to it we have adjusted correct balance of profits to costs in percentages with aim to get as closest as possible to planned strategy. We have oriented also on maximal possible way of lowering costs and included in it a system of storing investment capital for both cases – optimistic and pessimistic development of the company.

Model of financial secure is third and from our point of view the most important model of whole way of financial management of emerging companies. This model, as a part of our Business model, is at the same time one of the most important elements of established company as well. It has however generally already tools for working and monitoring correct operation of financial flows and all related activities. In emerging company we have however such model, as we describe it, found only hardly. Further we paid attention to mutual connection of all described models within whole Business model as a part of basic attributes of properly operating system.

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**Primary Paper Section:** A

**Secondary Paper Section:** AE, AH

# CORPORATE CULTURE AND THE ROLE OF INTERNAL AUDIT

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This contribution is the result of the project VEGA 1/0124/14 „The Role of financial institutions and capital market in solving problems of debt crisis in Europe“.

**Abstract:** Corporate culture is high on audit committees' agendas. It is important to understand what to look for and how to measure something as nebulous and intangible as culture. Latest research shows that organizations are taking an interest in culture like never before; not because they are being forced to, but because they know a healthy culture is integral to their bottom lines, even their survival. Corporate culture is an intangible asset, yet intangibles can be transformed into visible value for the organization in the form of corporate agility, innovation, know-how, staff morale, brand reputation and image. Public and regulatory scrutiny of corporate culture has become even more intense. Internal audit is at the beginning of a long way to find an optimal approach to auditing culture.

**Keywords:** corporate culture, internal audit, corporate agility, innovation, staff morale, brand reputation

## 1 Introduction

An effective culture is one that ensures for organization achieving of the results which wants to achieve, both externally and internally – and in all areas. It's not just about profit and return on investment. It is about achieving the right results in terms of human performance, people being engaged with their work, doing the work they want to do as well as delivering on innovation as well as robust risk management and accounting practices. This paper aims to gather insight into corporate culture and the role of boards; to understand how boards can shape, embed and assess culture; and to identify and promote good practice. It has led the embedding and assurance work stream, looking at measuring and monitoring culture, the role of internal audit and risk management.

### 1.1 Responsibility of Governing Bodies

Corporate governance failure, especially within financial institutions, has been at the core of many of the problems during the global financial crises and numerous corporate and organizational scandals and failures. Many subjects have responded by issuing louder calls for increased regulation and by rethinking of guiding tools of internal audit processes like assurance.<sup>1</sup>

Boards and senior management have the prime responsibility for defining and analyzing organizational culture by promoting the values and the behaviors they wish to see across their organizations. Boards need assurance that a culture of learning from mistakes, rewarding the right behavior and systems and processes that produce the desired behaviors are being embedded across their organizations. A statement of values is not sufficient on its own; boards need to know that "espoused" values are the same as actual values on the ground. Providing assurance to boards around values on the ground is just part of the picture as culture is not merely the articulation of an organization's values. The use of gut feel can play a part in the audit of culture but in the digital age, assurance providers can make much greater use of hard as well as soft indicators to reduce the subjectivity of their findings. Data from internal reporting systems can be aggregated and used to identify trends and reveal issues of which the board may be unaware. The emergence of "big data" provides scope for internal auditors to develop specific skills and work with data analysts to provide insight. Who owns culture in an organization is an issue that boards and senior management need to resolve. It is unclear; otherwise, whom board committees charged with cultural issues should turn to for advice and guidance.

### 1.2 The Role of Internal Audit

Internal audit's role as the "inside-outsider" – being inside the organization but ostensibly independent and objective – is the key to succeeding in the culture assurance sphere. Internal auditors' knowledge and expertise in the organization's internal controls and its compliance programs mean that over time, they can build a well-informed perspective on practices right across the organization. No other function has a mandate to move across the organization in the same way that internal audit does. Internal auditors know which departments experience recurring problems and ones that don't act on, or are sluggish to respond to, audit recommendations. This means that internal auditors are well placed to assess the organization's culture, based on the practices and behaviors they observe.

Internal audit is one of the assurance providers that boards and senior management have turned to with some success, but there is still a long way to go. The positioning and reach of internal audit and the ability to "tell it how it is" are as important as the ability to audit cultural issues. Its role as the inside-outsider is the key to success when providing culture assurance. But audit committee members and senior executives must be open to the idea that, at present, there may be less hard evidence compared to more traditional audits and accept the likelihood of grey areas with differences of opinion. This may entail a change in culture and behavior at the audit committee itself.

Internal audit has a key part to play in assuring boards around culture. But this should not be confused with the idea that internal audit should be the board's sole assurance provider. This is because internal auditors need to have much more than the traditional skillset to succeed in this area. Furthermore, others have a role to play in embedding and assurance. It is critical for internal audit to have strong relationships with other functions across the organization.

#### 1.2.1 Clear Internal Audit's Mandate

It is crucial for the audit committee and any other board committees which are tasked with responsibility for organizational culture to give internal audit a clear mandate, and to write that mandate formally into the audit charter for the organization. In order to audit culture and behaviors, internal audit must become more insightful by developing a deep understanding of the organization and the environment in which it operates. The Institute's Financial Services Code<sup>2</sup> recommends that internal audit should have the right to attend and observe all or part of Executive Committee meetings.

We should not underestimate the fact that any employee has insight into the culture of their organization. It is not difficult to have inkling if there are problems with the corporate culture. Internal auditors can get a sense of culture by being alert to everyday behaviors and keeping attuned to the way the place feels as they walk around the corridors. It is a more organic and informal, but no less valuable, way to keep an eye out for cultural issues. A robust view from the auditor will rely on analyzing a range of data as well as these "corridor" observations. The success of internal audit's role in culture will hinge on convincing others in the organization of the value of its involvement. This perhaps speaks to the culture of internal audit itself. Ultimately, this value will rely on the quality and honesty of conversations internal audit is able to have with management. Internal audit, despite ostensibly being independent, is part of the culture/sub-cultures itself. It needs to be aware of and try to overcome its own biases. The function also needs to demonstrate sufficient accountability, and to have effective mechanisms for

<sup>1</sup> MUCHOVA M., *Basel Committee 2015 Corporate Governance Principles for banks*, Proceedings of Scientific Conference for Doctoral Students and Post-Doctoral Scholarship EDAMBA 2015, pp. 645-653, 2015

<sup>2</sup> *Effective Internal Audit in the Financial Services Sector*, Chartered Institute of Internal Auditors, 2013

communicating their concerns about culture to board members. Therein lie the real challenges.

## 2. The Culture and the Need for Assurance

When organizations fail, any subsequent review or post-mortem tends to attribute the failure to culture. Almost every corporate scandal of the last century will, in part, be due to certain cultural weaknesses – either by having the wrong tone at the top, or by individuals not acting in accordance with the organization's ethics and values. A harmful corporate culture can be detrimental to the long-term health of the company and its employees. Failures are very visible to customers, shareholders and the wider community and can seriously erode confidence and trust. Culture can be the difference between a business that lasts and one that crumples under pressure.

### 2.1 Values

A number of organizations use values as a short hand for the overall culture they are looking for. The values do not tell the whole story about culture; and people must be careful to distinguish between "espoused" values and actual values on the ground. Some corporate values statements and their development have been specifically engineered by boards. Other organizations have developed values, which are not necessarily stated, organically over time. Simply adopting formal values statements makes no difference in itself. Values need to be translated, to be communicated, and to have an impact on behaviors, in order to be able to influence the way business is done.

### 2.2 The Need to provide Assurance around Culture

Boards and senior management need to understand whether the culture they want for their organization is actually the one that exists in practice. Many believe that 'what gets measured gets managed'. In a large number of organizations, the human resources function is charged with measuring the organizational culture (through different tools), while employees are responsible for the actions and behaviors that create the culture.

Assurance providers primarily need to assure boards that the culture they have set is reflected in practice throughout the organization. Assurance providers can also advise on the robustness of the control framework. Internal auditors can, indirectly, help to embed the culture through the way they conduct audit activity; the advice and insight they provide to boards; and through the ways they flag up where the culture is not as expected. This way, the assurance provider can play a role in supporting (or 'carrying') positive cultural traits, or calling out traits that are not helpful. On the flipside, the internal audit function needs to ensure that its own culture does not negatively influence behaviors in the wider organization.

There are a number of assurance providers who can provide such assurance to boards on culture. Much of this work tends to fall to internal audit (both in-house and outsourced) or external consultants. It is worth noting that who assesses culture in an organization is an issue that needs resolving by boards and senior management teams. Lack of clarity on assessment can make it difficult for the audit committee, or other board committee charged with cultural issues, to decide who to turn to for support and advice.

## 3. Values and Culture on Behaviors and Decisions

Values and culture may be the keystone of financial institutions' governance because they drive behaviors of people throughout the organization and the ultimate effectiveness of its governance arrangements.<sup>3</sup> The requirement aligns closely with auditing culture in that in order to develop an audit methodology that is

insightful; auditors need to understand the prevailing culture within the organization.

Structures and processes are important, but how they are made to function is the key. Suitable structures and processes are a necessary but not a sufficient condition for good governance, which critically depends also on patterns of behavior. Behavioral patterns depend in turn on the extent to which values such as integrity, independence of thought, and respect for the views of others are embedded in the institutional culture.

Financial institutions' leaders stress the paramount importance of values and culture in driving behavior. Establishing proper institutional arrangements is relatively easy, but embedding the right culture tends to be much harder. In the best-run of financial institutions, positive values and culture are palpable from the board to the executive suite to the front line. Values and culture drive people to do the right thing even when no one is looking. They are a fundamental aspect of the governance system. Although values and culture cannot always be measured quantitatively, they impact governance effectiveness in powerful ways and therefore should be a major focus for the supervisor. What follows are specific views and recommendations designed to encourage financial institutions board members, executive leaders, supervisors, and shareholders to pay heed to the importance of values and culture and the hard work involved in getting them right:

1. Honesty, integrity, proper motivations, independence of thought, respect for the ideas of others, openness and transparency, the courage to speak out and act, and trust are the bedrock values of effective governance.
2. It is for the board of directors to articulate and senior executives to promote a culture that embeds these values from the top to the bottom of the entity. Culture is values brought to life.
3. Well-functioning boards set, promulgate, and embed these values, commonly in the form of a code, so that directors, senior executives, and all other employees in an entity are fully aware of the standards of behavior that are expected of them.
4. Because of their power to influence behavior and the execution of the financial institutions' strategy, values and culture are essential dimensions of inquiry and engagement for supervisors. Major shareholders or their fund managers should be attentive to the culture of an entity when making their investment decisions and engaging with an investee board.

## 4. Culture and Risk Culture

Risk culture is a term describing the values, beliefs, knowledge and understanding about risk shared by a group of people with a common purpose, in particular the employees of an organization or of teams or groups within an organization. Organizations in all sectors need to take risks to achieve their objectives. The prevailing risk culture within an organization will significantly affect its ability to manage these risks. An effective risk culture is underpinned by enabling and rewarding individuals and groups for taking well informed risks.

An inappropriate risk culture will lead to activities that are totally misaligned with stated policies and procedures or operate completely outside these policies. At best this will hamper the achievement of strategic, tactical and operational goals. At worst it will lead to serious reputational and financial damage. It is difficult to separate out organizational culture and risk culture and just focus on one or the other. Organizational culture both determines and is influenced by risk culture.

There has been much debate in the assurance world about the distinction between the two and perhaps, although not the final word on the matter, the risk culture framework developed by the Institute of Risk Management presents a neat depiction of the relationship. The framework attempts to distil the complex and interrelated set of relationships that influence risk culture. Risk

<sup>3</sup> *Toward Effective Governance of Financial institutions, The Group of Thirty*, ISBN 1-56708-156-8

culture is the sum of multiple interactions between these levels. At the lowest level, each individual's personal predisposition to risk contributes to their ethical stance, how they behave and make decisions. Group behaviors and the underlying organizational culture also influence risk culture.

Fig. 1: IRM's Risk Culture Framework<sup>4</sup>



Source: <https://www.theirm.org/knowledge-and-resources/thought-leadership/risk-culture.aspx>

## 5. Culture and the control environment

### 5.1 Models of culture – hard and soft controls

There are many models that look at the components of organizational culture. None can definitively capture the culture of an organization, nor be a predictor of specific behaviors. Most models make a distinction between what many people describe as hard and soft controls.

Hard controls are familiar as they refer to formal rules and activities that are common place, are tangible and reinforce the desired culture.

The COSO framework for Internal Control refers to the “Control Environment” which incorporates both hard and soft controls. Senior leaders should sponsor activities and initiatives that define, drive and monitor culture. They should seek to improve the control environment this area. Hard controls are the bread and butter of internal audit's remit; procedure, policy, and processes.

Soft controls are harder to define, but concern accompanying culture, behaviors, unwritten rules and attitudes. It is considering both types controls together that auditors can start to get a good picture of the culture.

Hard culture controls include:

- The objectives that are set and how they are communicated throughout the business;
- The success or failure of employees to complete relevant training;
- Data management and analytics;
- Timeliness of reporting of information.

Soft controls are more difficult to describe as they are less tangible than hard controls'. They can be best explained by giving some examples of 'soft controls':

- Competence – being adaptable and a willingness to learn;

- Trust and openness – teamwork, helping and relying on one another to solve problems;
- Strong leadership – direction and leading by example;
- High expectations – striving to improve, to raise the bar;
- Shared values – doing the right thing in the right way;
- High ethical standards – honesty, equality and fairness.

Effective work in relation to culture should help to correct internal control failings before they go awry.<sup>5</sup>

## 5. Conclusion

The governing bodies are the starting point for setting the financial institution's core values and expectations for the risk culture of the institution and their behavior must reflect the values being espoused. A key value that should be espoused is the expectation that staff act with and promptly escalate observed non-compliance within or outside the organization.

The governing bodies of the financial institution promote, monitor and assess the risk culture of the financial institution, consider the impact of culture on safety and soundness and make changes where necessary.

Organizational culture is an important area for internal audit to incorporate into its work. Internal audit can play both a key advisory role, and assurance role as part and parcel of their role in evaluating the risk and control environment with access right across the organization. If the appropriate checks and balances are put in place, and there are cultural issues bubbling up in financial organization, then there are ways to identify and address these before they become a major front page story or the subject of a negative media campaign.

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### Primary Paper Section: A

### Secondary Paper Section: AE, AH

<sup>4</sup> <https://www.theirm.org/knowledge-and-resources/thought-leadership/risk-culture.aspx>

<sup>5</sup> ORGANISATIONAL CULTURE, Evolving approaches to embedding and assurance, [www.iaa.org.uk](http://www.iaa.org.uk)

# THE EDUCATION OF PEOPLE WITH DISABILITIES IN THE CONTEXT OF LABOR MARKET SUCCESS

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**Abstract:** The paper focuses on the education of people with disabilities in terms of their labor market success. At first, the paper describes the theoretical background of the research, and then follows with a presentation of our results. The aim of our research was to identify such common obstacles of the labor market integration of people with disabilities, which arise on the side of these people. In particular, the perception of low or almost no education and inadequate qualification by people with disability, by employers and by workers at labor offices is described.

**Keywords:** person with disability, education, education level, labor market, qualification

## 1 The theoretical background of the research

The following chapter describes the theoretical framework of our research in three subchapters. They discuss both past and present approaches to the education of people with disabilities, and the employment of these people.

### 1.1 The Education of People with Disabilities and the Attitude of Society in the Past

The approach of society to individuals with disabilities and handicaps has changed and developed over time. In fact, in retrospect, it is possible to identify a certain number of stages of development. For example, in Sparta, children with physical disabilities were thrown into the abyss or left in the wasteland. At that time, a prohibition to kill such children was in force only in Israel and Thebes, where people received appropriate employment. The reason for such an approach was probably the need to limit the amount of slaves in society (Sovák 1980 in Lechta 2010). In Athens, Solon's Code of Laws allowed for the killing of children with disabilities, so not even this otherwise progressive legal system provided the disabled with the same rights that able bodied people had. In Ancient Rome, however, the state did not have such a fundamental role in upbringing and education as it had in Greece. Here, it was the family which played a key role, with its aim to raise good citizens. And while the educational ideal of Ancient Rome was a universal education and acquiring civic virtues and impeccable morals, they nevertheless had similar rules about behavior towards the disabled as they did in Greece (Lechta 2010). The approach of the Judeo-Christian tradition, however, is different, and this period is, in fact, understood as the beginning of accepting disabled people. On the whole, the attitude of Judaism towards the disabled can be considered tolerant, since the aim of Judaist education was to achieve eternal life and participate in the life of God. The Christian Middle Ages achieved a symbiosis of the Ancient Greek and Roman tradition with that of Christianity. The aim and meaning of education and upbringing in the Christian tradition was to raise godly people with a faith in Christ. As a result, Christianity unequivocally acknowledged disabled people's right to live in dignity. At the same time, this right was not always respected in practice, particularly at the beginning of the Middle Ages, when newborn children with visible disabilities were still killed, regardless of the explicit prohibition of this practice (Lechta 2010).

The Middle Ages are also called the period of charitable care. The amount of disabled individuals was significant in this period, thanks to the fact that many became impaired through war injuries, improper nutrition or insufficient medical care. The issue of caring about these individuals had close ties with caring about the poor, and in fact those who were not able to find any means of subsistence had a right for charity, and could thus claim alms (Titzl 2000). In other words, it was not expected that

the disabled would appear on the labor market in any role whatsoever.

The beginnings of institutionalized care about disabled individuals reach back to the Early Modern Period. In this period, humans ceased to be the center of an objective order of existence, and became the center of the subjective world of cognition. The idea of universal human dignity came to the fore, and so did the endeavor to promote the rights and freedoms of each individual, including the right to education. It was thus in this period that the first institutes and facilities with special care for the disabled appeared, e.g. the first institute for the deaf (1770), or the first hospital schools for children with physical defects (1780). From the nineteenth century onwards, it is already possible to talk about an organized and purposeful care of individuals with disabilities. Upbringing and education gained an institutional character in Europe in this period, and education became accessible to wide layers of the population. The founding of a large number of special schools and institutions for disabled children is especially typical for the second half of the nineteenth century (Lechta 2010).

### 1.2 The Contemporary Conception of Educating People with Disabilities

Although the present day conditions for educating people with disabilities are more favorable in comparison with those of the earlier periods, it is nevertheless possible to notice substantial deficiencies in the contemporary system of education, which may lead to a low level of education on the one hand, and to an unsuitable qualification on the other. Amongst other shortcomings, there is insufficient support of the disabled at regular primary and secondary schools. At these schools, one often finds an insufficient amount of special teaching aids, a lack of teaching assistants, or even that teachers miss or have an insufficient level of competence in special education. It is a very pressing question, how will amendment 82/2015 of the Czech law of education, which will come into force on September 1, 2016.

Another factor which influences the inappropriate qualification of disabled people is the range of study programs offered at schools for the disabled, as they do not reflect the current needs of the labor market. The range of study programs offered at a secondary level for the visually impaired could serve as an example. Those students who want to study at such a school can choose from the following: Grammar School for the Visually Impaired, Prague; Alois Klár Secondary School, Prague (apprenticeship mainly in crafts with the possibility of a two-year-long follow-up course leading to an immatriculation exam); Jaroslav Ježek School (a two-year non-vocational school); Jan Deyl Conservatory and Secondary School for the Visually Impaired, Prague (subjects: music, singing, tuning pianos and related instruments); Secondary School for the Visually Impaired, Brno (subjects with immatriculation exam: sport and remedial massage, business, social work; apprenticeship: sport and remedial massage, home care, textile and cloth making) (Joklíková in Finková 2012). The highest level of education achieved by disabled people is well illustrated by the data available from the Czech Statistical Office, reflecting the situation in 2013. These data clearly show that the majority of the respondents (both male and female) have only primary and secondary education (either with or without an immatriculation exam), and approximately thirty thousand of them only primary education. In fact, only a small part of them have post-secondary or university education (about 70 000).

### 1.3 The Situation of Disabled People on the Labor Market in Relation to their Level of Education and Qualification

It follows from the above mentioned facts that people with disabilities do not only have an unequal social standing in

comparison to other members of society, but they have a similarly inequitable position in terms of the labor market, as well. This applies to employment, access to education, level of education achieved, accessibility of public spaces and buildings, access to information, or even to healthcare and social security (Michalík in Křhutová 2005). Mareš (2002) labels the marginalization of disabled people as contrary to participation, which can, in extreme cases, lead to a complete exclusion from the labor market. It is important to mention, however, that the disabled are not the only group of people threatened by marginalization: people with lower qualifications, members of ethnic minorities, and socially or demographically endangered groups of citizens are also at risk. Besides disability, marginalization is also linked to age and low levels of education and qualification. Our research is devoted exactly to these two factors. The educational distribution of people with disabilities in the Czech Republic is significantly worse than that of the society as a whole. For example, the percentage of disabled people with a secondary education finished with an immatriculation is only half of that of the population of the Czech Republic as a whole (Kuchař 2007). These problems persist despite an active politics of employment, and a general support of the employment of people with disabilities both by the state and various non-profit organizations.

## 2 Research results

The results of our research, carried out within the scope of a dissertation entitled *The Integration of People with Disabilities at the Labor Market of the Czech Republic*, can serve to form a more complete picture of the issues that the previous chapters described from a theoretical point of view: the past and present conception of the upbringing and education of disabled people, as well as their situation on the labor market.

### 2.1 Research Methods

Our research had a quantitative approach, using data collected between the beginning of November 2012 and the end of January 2013 in the Liberec Region. We chose this region primarily because of the easy accessibility of respondents, as well as in order to minimize the cost and time required for the collection of the data. The main aim of the research was to map and analyze the opinions of respondents about common obstacles of the integration of people with disabilities (hereinafter PwD) at the job market of the Czech Republic.

The topic of our research were common obstacles<sup>1</sup> in the integration of PwD at the labor market. In order to get a more complex picture of the issue, we chose three different groups of respondents using quota sampling, the samples of which were formed by 100 PwD<sup>2</sup> from the Liberec Region, the same amount of employers from the region, and the same amount of workers of regional branches of the Czech Labor Office who were in direct contact with applicants and people looking for jobs.

We created a questionnaire on the basis of our quantitative strategy of research. The questionnaire contained both open-ended and closed-ended questions, some of which were ordinal scale ones, on a five point scale<sup>3</sup>, which allowed us to discern the level of positive or negative attitude of respondents about the various statements and questions in a simple manner.

The empirical data gained were analyzed from the perspective of the various variables and our chosen null hypothesis, and were evaluated with statistical methods. We used Pearson's chi-square test and the Mann-Whitney W-test to test the hypotheses.

<sup>1</sup> Our definition of common obstacles of the integration of people with disabilities was based on Rychtář and Miler's (2008, p. 6–12) taxonomy of barriers and that of the authorial collective of the Social Agency civic organization (2008, p. 17–147), who divided these obstacles into three categories: obstacles on the side of the employee, on the side of the employer, and general obstacles.

<sup>2</sup> Our definition of PwD was based on the legislation effective at the time of research, in other words, we considered those people disabled whom the authorities of Czech social security system classified to have first, second or third grade invalidity.

<sup>3</sup> 1 – most considerable, 2 – very considerable, 3 – moderately considerable, 4 – hardly considerable, 5 – least considerable

In the present article, we present only partial research results of all three research sets, which are not directly related to our main research aim and chosen null hypotheses. We nevertheless believe that the relevance of the data is apparent, and it shows a link between the education (schooling) of PwD and their success at the labor market. Our respondents answered the question “In your opinion, what obstacles appear on the side of a disabled person in terms of their employment?”, where they did not have the chance to answer in a freely formulated manner. Instead, we used a taxonomy of possible answers, each on a five-point scale, based on Rychtář and Miler (2008), and a publication of the authorial collective of the Social Agency civic organization (2008). Below, you can find the answers of respondents to those two obstacles which are relevant for the topic of the present paper, i.e. the education and qualification of PwD.

### 2.2 Analysis and Interpretation of the Data Acquired

#### Analysis of the Data from the First Research Set: PwD

This part of the article contains the results of the answers of respondents to the question “In your opinion, what obstacles appear on the side of a disabled person in terms of their employment?” in terms of low or almost no education (Table 4) and unsuitable qualification (Table 5).

In order to help with a more precise interpretation of the data, we created two transparent tables (Tables 1 and 2) which show the distribution of our research set in terms of the respondents' grade of invalidity pension as classified by the Czech authorities (Table 1), and in terms of their gender and level of education (Table 2). Altogether, the research set contained 100 respondents chosen by quota sampling. The research set contained 22 women getting grade 3 invalidity pension (heretofore IP) (22%), 7 women (7%) getting grade 2 IP, and 19 women (19%) receiving grade 1 IP. Men with grade 3 IP are represented by 26 percent of the respondents (26), those with grade 2 IP by 7% (7), and grade 1 IP men from 19% (19) of the research set. Table 2 shows that there were 45 respondents in the research set (45%) with primary education or with a certificate of apprenticeship, 35 of them (35%) had a secondary education finished with an immatriculation exam, and 20 respondents (20%) had post-secondary or university education.

Table 1 – The Distribution of Respondents (PwD) in Terms of Their Grade of IP

M / F	Beneficiary of grade 3 IP		Beneficiary of grade 2 IP		Beneficiary of grade 1 IP		All categories of PwD	
	(N)	(%)	(N)	(%)	(N)	(%)	(N)	(%)
M	26	26,00	7	7,00	19	19,00	52	52,00
F	22	22,00	7	7,00	19	19,00	48	48,00
<b>Tot</b>	<b>48</b>	<b>48,00</b>	<b>14</b>	<b>14,00</b>	<b>38</b>	<b>38,00</b>	<b>100</b>	<b>100,00</b>

Source: Nádvořníková (2013)

Table 2: The Distribution of Respondents (PwD) in Terms of Their Gender and Education

M/F	Pri m.	Sec. w/o imm.	Sec. w imm. – prof.	Sec. w imm. – gen.	Post -sec.	Univ.	Total
M (N)	4	21	9	4	5	9	52
M (%)	7,69	40,38	17,31	7,69	9,62	17,31	100,00
F (N)	4	16	16	6	2	4	48
F (%)	8,33	33,33	33,33	12,50	4,17	8,33	100,00
<b>Tot (N)</b>	<b>8</b>	<b>37</b>	<b>25</b>	<b>10</b>	<b>7</b>	<b>13</b>	<b>100</b>
<b>Tot (%)</b>	<b>8,00</b>	<b>37,00</b>	<b>25,00</b>	<b>10,00</b>	<b>7,00</b>	<b>13,00</b>	<b>100,00</b>

Source: Nádvořníková (2013)

The development of society since 1989, or more specifically its attitude to the education of people with disabilities, is partially visible also in the representation of the research set in Table 3, where a change in the level of education in terms of the respondents' age is clearly visible. In the 18 – 26 age category, almost 26% (8 people) of the respondents have post-secondary or university education, in the 27 – 39 age group, in as many as 39% of them have this level of education (i.e. 11 of them), while at the opposite extreme of the age spectrum, 0% (0) have this kind of education. We are, of course, aware of the fact that a whole range of other factors influenced these results, for example population trends, the number of people accepted at universities and the capacity of these institutions, potential students' standing on the "cadre list" before 1989, the attitude of society to schooling and education as such, and many others. Yet, it can be stated that, in general, even this distribution is relevant in itself.

Table 3: The Distribution of Respondents (PwD) in Terms of Age and Level of Education

Age in yrs.	Prim.	Sec. w/o imm.	Sec. w imm. – prof.	Sec. w imm. – gen.	Post-sec.	Univ.	Tot.
18 – 26 (N)	3	8	11	1	4	4	31
(%)	9,68	25,81	35,48	3,23	12,90	12,90	100,00
27 – 39 (N)	1	11	3	2	3	8	28
(%)	3,57	39,29	10,71	7,14	10,71	28,57	100,00
40 – 49 (N)	4	7	7	2	0	1	21
(%)	19,05	33,33	33,33	9,52	0,00	4,76	100,00
50 – 59 (N)	0	5	0	5	0	0	10
(%)	0,00	50,00	0,00	50,00	0,00	0,00	100,00
60 and over (N)	0	6	4	0	0	0	10
(%)	0,00	60,00	40,00	0,00	0,00	0,00	100,00
Tot (N)	8	37	25	10	7	13	100
Tot (%)	8,00	37,00	25,00	10,00	7,00	13,00	100,00

Source: Nádvořníková (2013)

Table 4 shows a summary of PwD respondents' opinions about "low or almost no education" as an obstacle on the side of PwD. It is apparent from the results that the perception of the level of education as an obstacle of success at the labor market differs in terms of the respondents' age. For example, in the highest age category of people over 60, 100% of the respondents (10) see this factor as the most considerable one or a very considerable one, while at the other end of the age spectrum (18 – 26), "only" 52% of the respondents (16) attribute the same levels of seriousness to this obstacle. It can be understood as a positive sign that in younger age groups (under 49), there are always some respondents who assess this obstacle as the least considerable one, so in other words they do not consider this as a serious problem. Fifteen respondents of the 100 in total (15%) chose this option in total. From the point of view of relative frequency, the finding in the 50 – 59 age group is very interesting, since 60% of the respondents (6) find low or almost no education as the most considerable problem in the labor market success of PwD, but at the same time, 40% of them (4) do not find this obstacle as hardly considerable.

Table 4: PwD Respondents – Low or Almost No Education

Age in yrs.	1	2	3	4	5	Total
18 – 26 (N)	6	8	2	10	5	31
(%)	19,35	25,81	6,45	32,26	16,13	100,00
27 – 39 (N)	7	5	3	5	8	28
(%)	25,00	17,86	10,71	17,86	28,57	100,00
40 – 49 (N)	3	5	6	5	2	21
(%)	14,29	23,81	28,57	23,81	9,52	100,00
50 – 59 (N)	6	0	0	4	0	10
(%)	60,00	0,00	0,00	40,00	0,00	100,00
60 and over (N)	2	4	4	0	0	10
(%)	20,00	40,00	40,00	0,00	0,00	100,00
Total	24	22	15	24	15	100
(%)	24,00	22,00	15,00	24,00	15,00	100,00

1 – most considerable, 5 – least considerable

Source: Nádvořníková (2013)

It follows from the data listed in Table 5 that inappropriate qualification as an obstacle on the side of PwD is seen as the most considerable problem (answer "1") primarily by the older generation, since in the 50 – 59 age group 60% of the respondents (6) chose "1" as their answer, and in the over 60 category 40% (4), whereas at the opposite end of the spectrum (18 – 26) only less than 10% (i.e. 3 respondents) chose this option. Inappropriate qualification was seen as the least considerable problem by 4 (i.e. 13%) of the youngest respondents, and at the same time 6 of the 27 – 39 age interval, which means almost 22% of the respondents in this category. This can be considered a positive finding, even if the previously mentioned obstacle (i.e. low or almost no education) was seen by the age groups of 18 – 26 and 27 – 39 in an even more positive light, since there, answer "5" (i.e. the least considerable) was chosen by 16 respondents (almost 27%) from these two age groups. In a whole, it is possible to say, however, that all age groups see this obstacle as a considerable one, since answer "1" (i.e. the most considerable) or answer "2" (i.e. very considerable) were chosen by at least 40% of the respondents in all age groups.

Table 5: PwD Respondents – Unsuitable Qualification

Age in yrs.	1	2	3	4	5	Total
18 – 26 (N)	3	13	3	8	4	31
(%)	9,68	41,94	9,68	25,81	12,90	100,00
27 – 39 (N)	6	5	3	8	6	28
(%)	21,43	17,86	10,71	28,57	21,43	100,00
40 – 49 (N)	0	9	10	2	0	21
(%)	0,00	42,86	47,62	9,52	0,00	100,00
50 – 59 (N)	6	0	1	3	0	10
(%)	60,00	0,00	10,00	30,00	0,00	100,00
60 and over (N)	4	4	0	0	2	10
(%)	40,00	40,00	0,00	0,00	20,00	100,00
Total (N)	19	31	17	21	12	100
(%)	19,00	31,00	17,00	21,00	12,00	100,00

1 – most considerable, 5 – least considerable

Source: Nádvořníková (2013)

### Analysis of the Data from the Second Research Set: Employers

The second research set was made by quota sampling from the total number of employers of the Liberec Region. It was formed by employers who had their headquarters in the Liberec Region or belonged to the Liberec territorial jurisdiction of the regional office of the Czech Social Security Administration in Ústí nad Labem, and at the same time had a certain amount of employees<sup>4</sup>. We evaluated the opinions of employers about the already mentioned two obstacles on the side of PwD in relation to how long the given employer is present on the labor market.

Our basic research set was formed by 1 employer present for less than a year on the labor market (Jablonec nad Nisou), 12 employers present for 1 to 3 years (6 Semily, 1 Liberec, 3 Jablonec nad Nisou and 2 Česká Lípa), 18 of them active on the labor market for 4 to 6 years (3 Semily, 8 Liberec, 2 Jablonec nad Nisou, 5 Česká Lípa), 14 employers present for 7 to 9 years (9 Liberec, 1 Jablonec nad Nisou and 4 Česká Lípa) and 55 of them with a labor market presence of more than 10 years (8 Semily, 25 Liberec, 14 Jablonec nad Nisou and 8 Česká Lípa).

It is apparent from the results listed in Table 6 that employer respondents perceive the obstacle of “low or almost no education” on the side of PwD in differing ways in relation to the length of their presence on the labor market. Employers with a longer period of activity on the labor market see this obstacle as a more serious one: while almost 38% (5 respondents) of those employers who are present on the labor market for a short time (0 to 3 years) assess it as hardly considerable or the least considerable, in the group of employers with a presence for more than 10 years “only” 20% (i.e. 11) of the respondents rates it as hardly considerable or the least considerable. It is noteworthy that at the same time at the opposite end of the grading scale answer “1” (the most considerable) was chosen by 30% (4) of the respondents in the 0 to 3 years group, but employers in the 4 to 6 and 7 to 9 years group see this problem as the most considerable in 11% (2) and 7% (1) of the cases respectively. However, those employers who spent more than ten years on the labor market were again more skeptical, since approximately 24% (13) of them classified this obstacle as the most considerable one.

Table 6: Employer Respondents – Low or Almost No Education

Presence on the labor market in yrs.	1	2	3	4	5	Total
0 – 3 (N)	4	2	2	3	2	13
(%)	30,77	15,38	15,38	23,08	15,38	100,00
4 – 6 (N)	2	4	9	3	0	18
(%)	11,11	22,22	50,00	16,67	0,00	100,00
7 – 9 (N)	1	5	5	1	2	14
(%)	7,14	35,71	35,71	7,14	14,29	100,00
10 or more (N)	13	16	15	5	6	55
(%)	23,64	29,09	27,27	9,09	10,91	100,00
Total (N)	20	27	31	12	10	100
(%)	20,00	27,00	31,00	12,00	10,00	100,00

1 – most considerable, 5 – least considerable  
Source: Nádvorníková (2013)

In the case of the second obstacle (inappropriate qualification of PwD) (Table 7), the connection between the seriousness of this obstacle and the length of the employer's presence on the labor market is again visible. Those who were present for a short period (0 to 3 years) perceive this obstacle to fall between the categories of the most considerable one and moderately considerable in “only” 23% of the cases (3 respondents), whereas all the groups present for 4 or more years see this issue at those levels of seriousness in at least 79% of the cases in all categories (i.e. 14 respondents or 83% in the 4 – 6 years category, 11 respondents or 79% in the 7 – 9 years category, and 44 respondents or 80% in the category with a presence of 10 years and over).

Table 7: Employer Respondents – Inappropriate Qualification

Presence on the labor market in yrs.	1	2	3	4	5	Total
0 – 3 (N)	1	1	1	9	1	13
(%)	7,69	7,69	7,69	69,23	7,69	100,00
4 – 6 (N)	1	11	3	3	0	18
(%)	5,56	61,11	16,67	16,67	0,00	100,00
7 – 9 (N)	1	2	8	1	2	14
(%)	7,14	14,29	57,14	7,14	14,29	100,00
10 or more (N)	12	13	19	4	7	55
(%)	21,82	23,64	34,54	7,27	12,73	100,00
Total (N)	15	27	31	17	10	100
(%)	15,00	27,00	31,00	17,00	10,00	100,00

1 – most considerable, 5 – least considerable  
Source: Nádvorníková (2013)

### Analysis of the Data from the Third Research Set: Workers of the Labor Office of the Czech Republic

Due to its large homogeneity, only one quota criterion was used for the third research sample: working at one of the contact points of the Labor Office of the Czech Republic (hereinafter LO) in the Liberec Region, in other words the local office in Liberec (36 respondents, 36%), in Jablonec nad Nisou (26 respondents, 26%), in Semily (18 respondents, 18%) and in Česká Lípa (20 respondents, 20%). We evaluated the opinions of the workers of the LO about the two obstacles on the side of PwD discussed in this article in relation to the workers' age (Tables 8 and 9) and in the verbal discussion, some results are also examined in connection with the length of their employment at the LO.

The results of the answers of workers of the LO (Table 8) show that this group of respondents is the most skeptical about “low or almost no education” of PwD, since all age groups classify this obstacle in categories ranging from the most considerable to moderately considerable in at least 88% of the cases. Of the total number of 100 respondents, only 5 (5%) classified this obstacle as hardly considerable or the least considerable: 1 respondent (3%) in the category of 27 to 39 years old workers and 4 respondents (12%) in that of people between 40 and 49. From our other research results it is also possible to conclude that respondents between 40 and 49 are “the most optimistic” about the obstacle discussed here. In most cases those workers belonging to this age group choose these answers who worked at the LO for 10 or more years at the time of the collection of data: 5 of them (15%) identified this obstacle as something between the least considerable to moderately considerable.

<sup>4</sup> A differentiation on the basis of the number of employees was chosen for legislative reasons (law 435/2004 on employment, as amended – obligation to employ PwD to the extent of 4% of the total amount of employees) and in accordance with the division of the statistical data of the Czech Statistics Office.

Table 8: LO-worker Respondents – Low or Almost no Education

Age in yrs.	1	2	3	4	5	Total
18 – 26 (N)	5	5	1	0	0	11
(%)	45,45	45,45	9,09	0,00	0,00	100,00
27 – 39 (N)	5	20	6	1	0	32
(%)	15,63	62,50	18,75	3,13	0,00	100,00
40 – 49 (N)	3	19	7	3	1	33
(%)	9,09	57,58	21,21	9,09	3,03	100,00
50 – 59 (N)	7	15	2	0	0	24
(%)	29,17	62,50	8,33	0,00	0,00	100,00
<b>Total (N)</b>	<b>20</b>	<b>59</b>	<b>16</b>	<b>4</b>	<b>1</b>	<b>100</b>
<b>(%)</b>	<b>20,00</b>	<b>59,00</b>	<b>16,00</b>	<b>4,00</b>	<b>1,00</b>	<b>100,00</b>

1 – most considerable, 5 – least considerable

Source: Nádvorníková (2013)

In the case of the second obstacle (inappropriate qualification) (Table 9), the attitude of LO workers is even more pronounced: 99 out of the total 100 (99%) classified this obstacle as something between the most considerable and moderately considerable, even if we have to stress that, on the other hand, “only” 6 of them (6%) perceived this as the most considerable obstacle. And once again, respondents between 40 and 49 are the most optimistic, since only 11 respondents (33%) in this age group classified this obstacle as the most considerable or very considerable, while always at least 50% of the respondents of the various other age groups see this obstacle as the most considerable or very considerable. In terms of their length of employment at the LO, this obstacle is seen as the most problematic by those who worked 6 – 7 years as LO-workers (55% of them, i.e. 5 respondents, chose categories “1” or “2”), while the lowest amount of respondents choosing the same two categories were in the group of people working at the LO 8 to 9 years (23% of the category, i.e. 3 respondents).

Table 9: LO-Worker Respondents – Inappropriate Qualification

Age in yrs.	1	2	3	4	5	Total
18 – 26 (N)	4	2	5	0	0	11
(%)	36,36	18,18	45,45	0,00	0,00	100,00
27 – 39 (N)	0	16	16	0	0	32
(%)	0,00	50,00	50,00	0,00	0,00	100,00
40 – 49 (N)	1	10	21	1	0	33
(%)	3,03	30,30	63,64	3,03	0,00	100,00
50 – 59 (N)	1	11	12	0	0	24
(%)	4,17	45,83	50,00	0,00	0,00	100,00
<b>Total (N)</b>	<b>6</b>	<b>39</b>	<b>54</b>	<b>1</b>	<b>0</b>	<b>100</b>
<b>(%)</b>	<b>6,00</b>	<b>39,00</b>	<b>54,00</b>	<b>1,00</b>	<b>0,00</b>	<b>100,00</b>

1 – most considerable, 5 – least considerable

Source: Nádvorníková (2013)

### 3 Conclusion

On the basis of the data described above, it is possible to conclude that the two obstacles on the side of PwD discussed in this article (i.e. “low or almost no education” and “inappropriate qualification”) were perceived as the most limiting by workers of the LO. On the whole, a low level of education was seen as something between the most considerable limiting factor to a moderately considerable one by 78% of responding employers, 61% of PwD held the same opinion, while these classifications were chosen by 95% of LO workers responding. Our findings about the second obstacle discussed in this article are similar:

inappropriate qualifications were classified as the most serious problem to a considerably serious problem by 73% of responding employers, 67% of PwD interviewed and 99% of responding workers of the LO. These results can be interpreted in various ways, but it can be considered a positive finding that of all analyzed samples, PwD themselves perceive these obstacles as the least burdensome. On the other hand, it is apparent that the education and achieved qualification of PwD are still serious problems and hinder their success at the labor market, as evidenced by the negative attitude of LO workers about these obstacles on the side of PwD.

On the basis of the data reproduced above, it is also possible to reach the conclusion that in connection with the changing attitude of society towards PwD, our respondents belonging to this group are convinced that they can study and educate themselves both at regular and specialized schools, and will be able to do so in the future as well. At the same time, they are rather skeptical about that the study and training programs on offer are able to react in a flexible manner to the needs of the labor market.

We can also suggest some practical measures on the basis of our findings, which would help to achieve a higher level of integration of PwD at the labor market. For example, a more universal application of bilan de compétences or career counseling with PwD, creating a long term plan of action which is continuously updated, as it is done in Germany or Scandinavia, and which includes, amongst others, positive recommendations, a study plan, and proposals for requalification and vocational rehabilitation if necessary. Finally, society remains indebted to PwD in terms of the absence of a sophisticated system of early prevention and interdisciplinary intervention, or social counselling provided from the appearance of the disability or, if necessary, from early childhood.

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# SELF-ESTEEM SUCH AS EMOTIONAL AND BEHAVIORAL COMPONENT OF SELF-SYSTEM

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grant VEGA 1/1092/12: The Horizons and risk behavior in college students.

**Abstract:** Past and even present interest in the problem of the self-system and the self-esteem or personal regulation led to numerous constructions, expressing various aspects of the SELF. The self use to be characterized as a multi-factor hierarchical structure of the knowledge and ideas about the self from the point of view of the content, in which the self-esteem use to be perceived as a global self-worth. The authors of the paper analyze particular levels of the SELF with the emphasis on the self-esteem. They introduce some partial results of an experimental research on the self-esteem of Slovak university student depending on the basic demographical data and within the relation to their smoking/non-smoking habits.

**Keywords:** self-esteem, self, research

## 1 Introduction

The awareness of my own SELF is present in every living and the behavior having the motivation, aim, or human will. The ability to perceive and understand the self forces the subject to be more responsible, controlled, active, goal seeking as well as sense your own competence or awareness of your own handicap. The self experience spans into your own past, presence and future. Resulting social human behavior use to be the intersection of the influence and the saturation of social needs within interpersonal relationships, and on the other hand, it's an image of unique characteristics and individual needs of its bearer.

The man works during his ontogenetic development for having his personal concept in a congruence with behavioral reactions and expectations of social environment. "Jatstvo" (the Self) becomes the important determining and regulating element of personality. The self-creation and the creation of my own subjectivity takes place in particular place and time. Mentioned process is not just rational, but even transcendent. It exceeds categorically understood personal being. Based on the rational knowledge and the possibility to freely make a decision, think, behave, man crosses the limits of physical and biological dependency, is able to change not only the world, but even himself. In principle, it's about the identification of personal presence demanding on the expression of approval in the relation to himself. Thus, human self-reflection forms within the close interaction of the facts that man already knows about himself and what he finds from the others – "social function". Tyrer and Casey (in Katsching, 1997, p. 55) understand a social function as "a level where the individual operates in his social context, while the character of his working moves from the self-preservation and the activities necessary for survival, till the social relationships within the society".

## 2 Social-psychological context of the Self

Jatstvo is a general idea of the self. It is the expression of a complex relation to himself and the result of understanding the basic characteristics and features of an individual personality. The self-esteem of jatstvo use to be considered dually. The duality of the SELF is manifested either in the modem SELF as a subject of the activity and the living (is connected with the moment of the presence and the presence of the consciousness) or in the modem Self as a subject, object of self-knowing ("known", the idea of the self, self-appearance, characteristics, status, self-worth). Social-psychological view of the problem of the SELF is rather focused on the research of jatstvo as an object. The result of the development and the personality growth is manifested by fully developed and structured Self. We can find a wide spectrum of the terms related to the Self within psychological terminology: self-concept, self-system, self-image, self-worth, self-evaluation, self-presentation, self-esteem.

Self-concept is most often determined as a "mental representation of the Self, saved in a memory as a cognitive structure created in the process of the interaction of the individual with social environment" (Blatný, Osecká, Macek, 1993, p. 445). It's the factor of psychic regulation of the behavior and the tool for orientation and stabilization of the activities at the same time. In the strict sense of the word, self-esteem is dynamic, unstable construct representing the system of the personalities at the level of knowing. Hartl and Hartlová (2000, p. 524) define the self-concept as an "idea of the self, how the individual sees himself". The emphasis is moved to the elements of knowledge, in contrast to the self-esteem consisting of evaluative and descriptive dimensions. The aspects of the self-concept are cognitive, emotional and conative. Cognitive aspect is related to the content and the structure of the self-perception and how the self-knowledge is organized. Emotional aspect expresses emotional relation to the self (is shown in personal evaluation, self-esteem). Conative element is related to outer expression of the Self (as a man presents himself in the contact with the others or how is he influenced by his "Self experience" in current social behavior).

Self-image is, as well as a self-concept, a mental representation of perceived subjective characteristics and competences appearing in the early period and modify during the whole life, while they significantly influence the actual level of living and behavior of an individual. Dynamicity and multi-functionality are the basic characteristics of the self-image. It means that self-image is not homogenous structure, but consists of various number of fields significant for an individual. Argyle, in his book *Social Interaktion* (1976, p. 88), underlines the connection of self-image with the reality that "the man is still considered by the others and therefore learns to predict evaluative actions and prepare for them. Consequently, he perceives himself by these terms and got the self-image".

Self-system represents the personification of the Self or what the person says if he talks about himself. It's about comprehensive identification of all the aspects of thinking, prediction, analysis of the self. Controversial tendencies appear in the form of inadequate underestimation or overestimation of the self in the self-system. Argyle (1976, p. 54) identified the following sources of the structure "Self", "me" from the point of view of social interactions: a) the reaction of the others, b) comparison with the others, c) activity of (social) roles, d) identification with the models.

Self-worth is the product, the result of social comparison (Festinger, 1954), it is the subject to the changes, depends on situational factors and has its non-recurring, interpersonal and interpretational context. The personalities with a high self-worth have more complicated structure of the Self significance, don't behave anxious or depressive, are not willing to move extremely too often in emotional reactions to the evaluative feedback of the environment. People with a low self-worth tend to a lowered limits of a self-assurance, demand continuous acceptance of their worth.

Self-efficiency as the knowledge of self-effectiveness is an important factor of auto-regulative structure of the man. It is the expression of universal confidence in the ability of an individual to balance his hard life conditions and challenges. Representative experience (as a result of observation of others) is important in creating the self-efficiency. Regarding the self-efficiency, we distinguish two types of expectations: a) expectation of the efficiency focused on behavior efficiency rate leading to a particular goal, b) expectation of the results related to the expectation whether the behavior leads to expected goals. High rate of self-efficiency minimizes negative emotional states. The change of its level can essentially influence the living and behavior of an individual.

*Self-esteem* as a basic part of self-worth is determined by wide spectrum of influences. It's a psychological construct of perception of the self, how the man globally considers his self-worth. Nákonečný (1998) considers self-esteem to be the key aspect of the Self (jatsvo), expressing an ego-relational motivation. According to Smékal (2004, p. 108), the self-esteem is considered to be a specific sense of the Self, in terms of self-esteem (pride) or degradation. Stated sense depends on how the man is conscious of his position in the world and how he perceives his influence on the others.

Self-esteem is created as a result of interpersonal and social comparison and as a result of self-appraisal based on the watching of your own activity. Social comparison emphasizes that self-esteem is partially a consequence of individual comparison of the self with the others and the creation of positive or negative self-approach.

Originally, self-esteem was understood as the relation between personal success and well accomplished external requirements. Currently, Rosenberg's (1965) definition of self-esteem – as stable sense of the self-worth – is used more often.

The way, how to understand the self-worth the best, is a possibility to deal with the sources that supply it. Greenwald (2000, In: Gajdošová, 2003, p. 217) states four sources of the origin and the creation of subjective value consciousness.

- a) Achievement – stresses competency as the first source of the self-esteem
- b) Approval by the others – feedback of the community
- c) Lack of faults in executed activity, self-activity
- d) Lack of defects

Ellison (2001) states the similar characteristics of the self-worth and the self-esteem. It's about an image characteristics (habit, outlook treatment in comparison to others), achievement (what an individual is able to do and perform in the confrontation) and the state (social level of how high an individual climbed the social scale of social evaluation of the successfulness).

Tafarodi and Swann (1998) identified two dimensions of global self-esteem of self-competence and self-liking. They presume that they express two mutually dependent but different self-attitudinal dimensions that create a self-esteem. Self-consciousness of the self as a competent person identifies generalized experience of self-efficiency and power, self-liking, generalized experience of the self-worth of the self as a social object. Self-competence is an evaluative experience, practice of the overall competence, internally positive self-awareness, as effective and capable. It comes from the consciousness of the decision making and wanting and is relatively independent of the surrounding. Self-liking is the value of the personality, inner side of the man, self-assessment as a social entity with the reflection of own internalized standards of the good and the evil.

High personal competences are accepted and widely appreciated in the Western culture. They make the status of the man. Highly-competent people look forward a greater respect and appreciation of the others. The sense of a personal dignity, awareness of respectability increase their self-esteem. Expressing the appreciation by the others is a partial source of self-liking, the experience of the self-worth. It's generally presumed that it's normal that people having really high competences possess high self-judgment as well and have social reasons to like themselves. Dimensions of competence and self-worth act as an independent variables, thus, can be consistent, but even contrary. According to some authors (Schimel, 2001, In: Gajdošová, 2003), self-esteem is based on particular fields that have been sensitive, injured, activated during the life or accepted in particular term. They demand constant process of assessing, observation and control towards external or internal standards.

Self-esteem is closely related to some other personal characteristics, mainly to oppression rate, dominant emotional

customization and temperament dimension of unstableness – stableness (Macek, 2003). Extroverts and stable personalities have higher rate of self-esteem than introverts and unstable personalities. Extraversion and neuroticism influence the way how the man presents the self-esteem externally. High rate of extraversion is related to the tendency to talk about yourself in a positive manner (it's expressed with honesty, responsibility, esteem and love feelings towards yourself and the others) and high neuroticism correlates more with the tendency not to resist the acceptance of negative assessment (Blatný, 2001).

Blatný and Osecká (1998) advise of a high self-esteem and its connection with the dominance over its environment and they state that mentioned relationship is independent of situational variables and is applied at the time of mental balance living as well as in the situations of increased exhaustion (they believe that extraversion effects on the increase of the self-esteem indirectly through the dominant behavior). Depending on the sex (higher in case of men), hostility increases the self-esteem.

Robins and Trzesniewski (2002) dealt with the research of the development of the self-esteem during the life of a human. They found out that its standard is changed during the life depending on physical growing of an organism during the teenage, cognitive fall in older age, the changes in social environment and other influences. It's relatively high during the childhood, it decreases in adolescence (mainly in case of girls), grows in adulthood and finally decreases deeply in old age. The researchers assume that children have increased self-esteem because of insufficiently developed critical thinking, non-objective or biased view of the self. The self-esteem decrease goes on during the adolescence. Body changes, higher education degree transition, development of abstract thinking and deeper understanding of unrealized opportunities and unfulfilled expectations are the main reasons. Self-esteem gradually grows until the 60th year of age in adulthood. It changes the social position and increases the status of an individual in personal and even work life that causes the growth of self-worth. There's rather tendency of decrease caused by dramatic changes within the relationships, social roles, in psycho-somatic behavior of a man. Interesting finding is the fact that there are individuals holding stable level of self-esteem towards others during all their life. It means that the one who possesses a high level of self-esteem towards other people keeps this relative level in a certain age during all his life.

### 3 Research

We did a research within a research program VEGA 1/1408/04 through which we were looking for the level of self-esteem depending on the basic demographic data as well as self-esteem correlation in the relation to smoking habits. The research has been made by 819 university students focused on technical and social education from 2 universities of Košice. An average age of a respondent was 20,5 year and had unequal representation. Data has been executed by statistical program SPSS, version 11.0.

#### 3.1 Research Methods

Personal correlates of self-esteem were searched depending on the sex and experiences with cigarette smoking. We used 2 questionnaires. Smoking questionnaire and Self – esteem Scale (10 item uni-dimensional Rosenberg's XXX, 1965) through which we find a global relation to self-esteem (respondents expressed their approval with 5 positive and 5 negative statements related to their approaches to themselves). Total score varied from 10 to 40.

#### 3.2 Results and interpretations

We present measured values of a self-esteem in the next tables (table no. 1, 2). Sex and smoking status were distributional criteria.

The Question: 1. I'm satisfied with myself. 2. Sometimes I think I'm not doing well. 3. I think I don't have a lot of good qualities. 4. I can handle the things as good as the others. 5. I cannot be proud of anything. 6. Sometimes I feel useless. 7. I'm at least as worth as the others. 8. I would like to esteem myself more. 9. Sometimes I think I shouldn't be born at all. 10. I love myself.

Table 1: Self-esteem – gender differences

	G	N	A.M	S.D.	S.E.	F	Sig.
1.	M F	340 469	2,22 2,28	,634 ,573	,034 ,026	1,155	0,283
2.	M F	339 466	2,36 2,35	,676 ,637	,036 ,029	1,907	0,168
3.	M F	337 463	2,02 1,98	,542 ,500	,029 ,023	1,309	0,253
4.	M F	337 468	1,84 2,00	,563 ,539	,036 ,024	16,102	0,000 ***
5.	M F	340 466	2,97 3,13	,730 ,656	,396 ,304	0,060	0,807
6.	M F	340 467	2,71 2,63	,740 ,681	,040 ,031	2,389	0,123
7.	M F	339 470	1,63 1,62	,577 ,534	,031 ,246	2,907	0,089
8.	M F	336 461	2,27 2,17	,794 ,801	,043 ,037	0,657	0,418
9.	M F	340 468	3,46 3,38	,784 ,815	,042 ,376	1,147	0,285
10.	M F	335 462	1,98 1,94	,618 ,577	,033 ,026	0,640	0,424

G=gender, M=masculinity, F=femininity

N=812 \*\*\* p&lt;0,001

Acquired results of the self-esteem of university students didn't confirm too big differences among the sexes (F-test p<0,331).

Overall average score of the self-esteem of women was 23,52 and of men 23,49. We found the highest measured average score in quotation no. 9 – “*Sometimes I think I shouldn't be born at all*” of men (3,46) and of women (3,38%). Almost identically, both sexes are aware of the worth of themselves – “*I'm at least as worth as the others*” (averagely 1,63), and also expressed their satisfaction and love to the self (satisfaction 2,24; love 1,96).

F-test (p<0,001) confirmed highly significant differences on the behalf of men in the review of their competency “*to act the good as the others*”. Averagely, 1,84 men and 2,00 women believed in this.

Table 2: Values of self-esteem related to smoking status (F-test)

	Smoking status	N	AM	S.D.	F	Sig.
1.	1 <sup>st</sup> gr.* 2 <sup>nd</sup> gr.* 3 <sup>rd</sup> gr.	216 265 219	2,17 2,32 2,24	0,62 0,59 0,58	4,305	0,014*
2.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	214 363 219	2,44 2,32 2,34	0,70 0,61 0,65	2,655	0,071
3.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	212 361 218	1,93 2,02 2,00	0,56 0,50 0,49	1,886	0,152
4.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	214 364 218	1,94 1,95 1,89	0,59 0,52 0,55	0,806	0,447
5.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	217 361 219	3,05 3,06 3,09	0,76 0,65 0,68	0,156	0,856
6.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	216 364 218	2,70 2,60 2,73	0,73 0,69 0,70	2,954	0,053
7.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	217 364 219	1,63 1,64 1,61	0,57 0,51 0,59	0,179	0,836

8.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	213 358 217	2,29 2,12 2,26	0,77 0,80 0,79	3,717	0,025*
9.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	217 364 218	3,36 3,41 3,47	0,75 3,41 3,47	0,999	0,369
10.	1 <sup>st</sup> gr. 2 <sup>nd</sup> gr. 3 <sup>rd</sup> gr.	212 359 216	1,93 2,00 1,91	0,57 0,58 0,61	1,664	0,194

n=800

p&lt;0,05

Explanation: 1<sup>st</sup> gr. = non-smokers, 2<sup>nd</sup> gr. = “ex-smokers” that used to smoke in the past but they don't smoke right now, 3<sup>rd</sup> gr. = smokers

### 3.3 Results and Discussion

We compared the results of non-continual questionnaire of smoking with data of continual scale of self-esteem by statistical analysis (F-test) what enabled us to qualify if a measured differences between the group averages were only accidental or statistically significant. No significant differences were found in parametric procedure, in case of non-parametric were found some.

We assumed that the rate of presence and level of cigarette consumption will decrease with the increase of the rate of self-esteem in 3 reviewed items (i.e. they reached the lowest score): “*I can handle the things at least as good as the others*” (1,89), “*I'm at least as worth as the others*” (1,61), “*I love myself*” (1,91). The answers that suggest the lowest rate of self-esteem were following: “*I cannot be proud of anything*” (3,09), “*Sometimes I feel useless*” (2,73), “*Sometimes I think I shouldn't be born at all*” (3,47).

Comparing the self-esteem in subcategories (non-smokers, ex-smokers, smokers), only two of ten self-esteem factors were statistically confirmed as disruptive.

The most satisfied in the first item (“*I'm satisfied with myself*”) were smokers (2,24%); statistically significant difference (p<0,014) has been measured between the first – non-smoking and the second – ex-smoking group. Non-smokers (A.M. 2,17) were more satisfied than ex-smokers (2,32).

We got the similar result in quotation no.8: “*I would like to esteem myself more*”, there we can find the significance of the differences at the level of 5% of the competence (p<0,025) in the first two subgroups, while the number of ex-smokers who thought in this way was higher than non-smokers (an average score of non-smokers – 2,29 non-smokers and 2,12 experimenters).

Just above the level of statistical significance (p<0,053) appeared the statement of the self-uselessness. Both non-smokers and smokers stated almost the same (average score of 2,70 and 2,73 in smokers). The most useful were experimenters. Significant differences were not measured in the item: “*Sometimes I think I'm not doing well*”, (p<0,071). Smokers approached an average values the most (averagely – 2,34). Thus, it's questionable whether the presence of smoking university students is the demonstration of devious effort to self-realization or useless way of presenting the self-esteem.

Mentioned partial results of the research show the relevant task of personal components filling the health and psychical quality of life. Healthy life-style doesn't assume risky and endangering behavior. Slovak university students already have it inside of their behavior. Self-esteem as an emotional item of self-system influences the intensity and stability of living states, play an important role in development of an individual and together with other personal components participates in the structure organization of the personality and its behavioral expose.

#### 4 Conclusion

Thinking about a various dimensions of the quality of outer world enables the man to better understand his own inner world. Categories such as usefulness, self-esteem, sense of personal dignity or conscience that are connected by the consciousness of the self-worth cross the scope of a pure psychological reflection and have its ethical, philosophical, cultural-historical and sociological dimension.

Global self-evaluation expresses overall summary sense of the self-personality. The researchers confirm that global self-evaluation is not just a simple summary of particular evaluations, but I determined by recent emotional setting of the person to a great extent, is its worth orientation, existential sense.

Reasonable self-esteem becomes an inner filtering zone, decisive of the success or the failure in life. At the same time, it's even the indicator of how comfortably and healthy an individual will feel in his life, how the others will feel in his company. On the other hand, tend to what does overreach the man and his egocentrism – following not only his own goals, but even the respect to other man and his needs, respect and the help the other, is one of the way offering the man an experience of disinterestedness of the good, usefulness, sense and the mission in his own life and feed even the experience of the self-worth – self-esteem.

Self-worth, self-experience of living and conscious of the self, as well as the relationship to self-personality are a unique characteristics of a human psychic giving subjective sense and principal dimension to human life. The need to keep a suitable self-esteem and positive relation to the self use to be expressed as an inclination to so-called benefaction that means an effort to see myself as an affective and competent person. If an individual is evaluated positively, he look at the situations happening around him more positively and applies his really living sentiments even in the situations of various life difficulties. Subjective sense of healthy self-esteem gives him an inner force and necessary energy to solve even hard and difficult situations directly, without any disposition, blaming and resignation. The man is the object and the subject of his self-reflection at the same time.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM, AN

## KNOWLEDGE TRANSFER RESISTANCE OF MATURE WORKERS

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**Abstract:** This article aims to identify the causes of resistance from mature workers to share knowledge with the less experienced colleagues. Due to the broad scope of the associated problems, the study focused exclusively on culturally determined barriers to knowledge transfer. In addition, the author included a design for a set of instruments to overcome such barriers in company practice. Barriers to knowledge transfer were categorized according to their association with teamwork, communication, attitude to change and the relationship of authority in the company.

**Keywords:** knowledge management, intergenerational knowledge transfer, barriers to knowledge transfer.

### 1 Introduction

Mature workers are a specific group of employees in Polish business practice. To begin with, this particular segment of the working population is already quite large and follows a rapidly growing trend. Furthermore, a large proportion of mature workers approach the retirement age or are already past the formal retirement threshold. The combined effect of those factors is that Polish companies will soon suffer the loss of a large base of experienced employees.

With each departure, companies have to bear the consequences of losing a sizeable portion of their knowledge resources; and if the departing employee is a mature worker, the upshots are particularly grave. Mature workers are typically a group of employees with long history of employment in the company. From the employers' viewpoint, their departure may result in irreparable loss, since those employees often represent unique abilities and inimitable qualifications. To alleviate the associated risks, it may be useful for companies to identify the most valuable knowledge resources in order to prevent their loss in a foreseeable future. However, this solution comes with many limitations, and those limitations are predominantly linked to the resistance of mature workers to take part in intergenerational transfer of knowledge.

This paper represents an attempt to identify the reasons for the observed resistance to share knowledge. Due to the broad scope of the associated problems, the study focuses exclusively on culturally determined barriers to internal knowledge transfer, i.e. those that are directly related to the organisational culture. In addition, the author made an attempt to postulate a set of methods and instruments that may prove effective in overcoming this type of resistance on the part of mature workers.

### 2 Cultural determinants of knowledge transfer resistance

The significance of knowledge retention is attested by the fact that – as shown in analyses – the most valuable company knowledge resources are often in the hands of the limited few of the employees (7). The key factor to be addressed in the context of designing an effective knowledge transfer strategy is to determine the scope of meaningful knowledge held by mature workers – this is a prerequisite for an effective design of the intergenerational knowledge transfer process.

The correlations between culture and the employees' propensity to share knowledge are quite profound. Culture may serve to support various activities associated with knowledge transfer, increase employee motivations to share knowledge, or even form strong convictions among mature employees of the obligation to share knowledge with less experienced colleagues. On the other hand, culture may also be a source of some of the most entrenched barriers to knowledge transfer and the reason for failures in this respect (2).

The reasons for knowledge transfer resistance on the part of mature employees may be categorised according to organisational behaviours identified as the most important factors in the context of knowledge management in organisations (3). In this study, the reasons for resistance were identified based on the responses to electronic questionnaire survey conducted among employees from companies operating in the Lower Silesia and Great Poland regions of Poland.

#### 2.1 Teamwork-related reasons for knowledge transfer resistance

Teamwork is widely considered as a fundamental form of work organisation and a prerequisite for market success. This area is attributed with such properties as belonging, group awareness, shared responsibility for common objectives, and cooperation (6). All of the above are thought to be of particular significance in the context of knowledge transfer.

Compared with their younger colleagues, mature workers are more likely to display problems in teamwork cooperation, mostly attributed to low levels of interpersonal skills. When asked for reasons for such attitudes, they often emphasise previous work experience with companies that value individual work involvement. In addition, they also report their concern that – after passing the sum of their knowledge to younger colleagues – they would be of no further use to the company. To overcome this barrier, it may be useful to emphasise the climate of trust within the organisation through long-term commitment to such values as support, good communication, mutual respect, fair treatment and predictability.

Some of the respondents made references to old age stereotypes or seemingly outdated knowledge. It appears that such perception of mature employees may hamper their motivation to share knowledge. Without proper appreciation for their input, they lack the opportunities (or the will) to share their rich and valuable knowledge with younger generations of employees.

Reasons for resistance	Suggested remedies
Low level of interpersonal skills; Lack of trust towards associates and co-workers; Perception of associates as rivals; Stereotypes and prejudices related to old age and outdated knowledge.	Training of interpersonal skills; Trust-based workplace relations; Building shared attitudes through teamwork; Rewarding the knowledge-sharing behaviours; Building proper atmosphere; Emphasis on equality.

*Source: own research based on empirical findings.*

#### 2.2 Communication-related reasons for knowledge transfer resistance

Communication involves passing of information from one person to another, and its effectiveness can be measured by the degree of correspondence between the meaning derived by the recipient and the message intended by the sender (4.). One of the most important reasons for knowledge transfer resistance in this area is the language gap. Mature employees often report their problems in understanding the language of the younger generations – particularly their ubiquitous use of English terms. On the other hand, the inexperienced employees face a similar problem of comprehending the professional jargon used by their older colleagues. To overcome this barrier, it may be useful to employ basic instruments that ensure clarity of communication messages passed between the two groups. Empathy in understanding the viewpoint of the other party, the use of questions for clarification and precision, postponing the pending decisions to ensure proper weighting of arguments – these are some of the most effective methods for improving clarity of communication exchanges (8).

The top-down approach to communication used in many companies does not form incentives for mature workers to share their knowledge, particularly with respect to information that may result in negative consequences for the sender. Employees are reluctant to share 'bad news' out of fear of reprisal from their superiors; they often voice their concern for futility of such action or think that their opinion will be flouted. This barrier can be overcome by insistence on introducing two-sided communication. At the same time, it may be useful to provide space for informal exchange of knowledge, with employees at all levels of the organisational structure and professional expertise feeling secure to freely exchange information and opinions.

Mature employees' resistance to share knowledge may also result from discrepancies in perceiving certain phenomena or problems. Such contrasting perceptions are often a product of differences in accumulated knowledge and expertise. This problem can also be addressed by the use of empathy as a method of gaining insight into the opposing viewpoints.

Another important barrier is the communication noise, i.e. any disturbances in message transmission that accompany the exchange of communication from the sender to the recipient. These include any disorganising or disorienting factors that hamper proper communication. Mature workers often report their problems in apprehension, mostly age-related. If the communication noise cannot be eliminated altogether, the problem may be alleviated by the insistence on improving message clarity (8).

Reasons for resistance	Suggested remedies
Language gaps, low quality of communication; Dominance of the top-down approach to communication; Differing perceptions; Age-related susceptibility to communication noise.	Formulation of clear and common language of exchange; Regular trainings and meetings, personnel rotation; Emphasis on clarity of communication exchange; Providing space for informal exchange of knowledge; Insistence on two-sided communication.

Source: own research based on empirical findings.

### 2.3 Power-related reasons for knowledge transfer resistance

Power in a company setting refers to potential for influencing other members of the organisation. The chances of effective influence are in proportion to the level of the recipient's dependency on the power holder (6). The respondents of this study often emphasised their fear of disturbing proper relations with their superiors. Distanced managers with propensity for autocratic behaviour may find it hard or even impossible to properly motivate their subordinates to share valuable knowledge with others.

Many respondents voiced their perceived lack of formal support for accumulation, retention, development, application and transfer of knowledge. This problem may be overcome by instilling the attitude of appreciation of knowledge and its role in effective management – particularly among the higher ranks. In a more practical dimension, it may be useful to incorporate knowledge management practices as part of the general business strategy.

The resistance to share knowledge with younger colleagues may also be related to the perception of knowledge as a source of power. Mature workers may be apprehensive that – by sharing their knowledge – they risk the chance of losing a power position that rightfully belongs to them as long-term employees with extensive experience. Another barrier emphasised in many responses was the fear that strong involvement in knowledge-sharing activities would bear the risk of revealing knowledge deficiencies in other areas, to the effect of undermining their existing power status. A good approach to eliminating this kind of barriers is to increase employees' awareness of the wide spectrum of benefits to be gained from proper management and – particularly – sharing of knowledge.

Reasons for resistance	Suggested remedies
Power distance; Lack of support for knowledge management; Perception of knowledge as a source of power; The fear of revealing knowledge deficits; The fear of making errors.	Increasing the awareness of benefits to be gained from knowledge sharing; Training of managerial skills and competences; Incorporating knowledge management as part of the company's general strategy; Emphasis on those forms of communication that best suit the knowledge transfer purposes.

Source: own research based on empirical findings.

### 2.4 Resistance associated with employees' attitude to change

Changes are a natural process and an inevitable element of company operation. The fear of changes among employees is typically a result of previous negative experiences – and long-term employees are particularly well-acquainted with the company's past problems. The resistance to change is particularly strong when the potential effects are perceived as detrimental, harmful or destructive. In anticipation of the resistance to change associated with knowledge sharing, managers should – in the first place – resolve any doubts and reservations that may arise, particularly the fear of losing their jobs to younger colleagues.

Another important reason for resistance in this respect is the fact that change may disturb previous routines and regimens. In the context of resolving the reluctance to share knowledge founded on general resistance to change, it may be useful to focus on increasing the awareness of mature workers that the intergenerational transfer of knowledge is an ambitious goal and a challenge, with good potential to elevate their existing status in the company structure.

Reasons for resistance	Suggested remedies
The fear of job loss; The need to redesign the existing routines and regimens.	Building an atmosphere of trust; Setting goals and presenting them as challenges.

Source: own research based on empirical findings.

### 3 Conclusions

The wide and ever-growing population of employees past the age of 50 represents a great challenge for managerial cadres in Polish companies. They are faced with the task of preserving and transferring valuable knowledge held by mature workers with years of experience in the field. This knowledge is often a prerequisite for retaining company market position and competitive advantage. For this reason, managers should focus on those activities that reduce the natural resistance of mature workers to share knowledge with younger colleagues. Proper recognition and elimination of the most important reasons for such resistance will not only help improve knowledge transfer processes, but also stimulate the involvement of mature workers in the ripe stage of their career development. Apart from the obvious benefit of retaining valuable knowledge, this approach may also help the company retain the services of mature workers well past the formal retirement threshold.

The mature workers' resistance to share knowledge may result from a number of factors. Cultural determinants are only a small section of the broad spectrum of potential sources of resistance. Therefore, each case should be studied and diagnosed individually, and particular attention should be paid to those cases which represent an interplay of many sources of resistance. The list of potential methods and solutions for resolving resistance to share knowledge is by no means complete. Each company faced with similar problems needs to analyse the problem in detail, and utilise the results of such analyses to identify the most effective methods of addressing the mature workers' resistance to share knowledge.

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**Primary Paper Section:** A

**Secondary Paper Section:** E, H

# FAILURE OF THE CONTROL MECHANISMS IN US BANKS DURING THE CRISIS AND SPREAD OF THE FINANCIAL CRISIS INTO THE WORLD THROUGH STRUCTURED PRODUCTS

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**Abstract:** The aim of this paper is to explain the role of structured products, particularly CDOs (Collateralized Debt Obligation) and its modifications to the rise of the international financial crisis since 2008. In that year, a large investment group Lehman Brothers went bankrupt, which rocked the global capital markets, and subsequently a negative sentiment about the quality of loan portfolios was extended, especially of mortgage banks in the US, which by means called moral hazard, increased the value of mortgage loans. The capital guarantee of the largest mortgage banks and insufficient control of federal authorities resulted in the uncontrolled growth of unsecured mortgages and growth of CDO emissions that were linked to these loans. Granted state aid supplies needed liquidity to the banks through emergency programs.

**Keywords:** structured product, role, interconnectedness of capital markets, CDO, VAR.

## 1 Introduction

The aim of this paper is to explain the role of structured products, particularly CDOs and its modifications to the development of the international financial crisis since 2008.

The work is based on the following assumptions:

1. Structured financial product is by its nature a complex financial instrument, carrying a significant risk to the buyer (investor), particularly CDO, where the underlying asset consists of either an individual or entire packages of mortgage loans.
2. The financial problems of US banks, which were related to their loan portfolio. Decline of market capitalization was demonstrated on a sample of the largest US banks. Some banks were forced to be adopted by the federal authority, some have managed to withstand this situation and some ended their existence.
3. Interdependence of capital markets, namely the stock indexes DJI, EuroStoxx50 and NIKKEI that represent the capital market in the US, Europe and Japan during the crisis spread since September 2008 - December 2009, with the assistance of the VAR model with the application of shock (crisis).

## 2 Structured products

Structured financial products, as their name suggests, have a certain structure, which is dependent on many parameters. These products are concisely defined by Federal Reserve Bank of Chicago, which defines such products as: "Unlike derivatives, whose value depends on underlying assets are structured products hybrids that share elements of direct debt instruments and derivatives. Rather than to pay out a fixed or floating coupon, the interest payments of these tools are adjusted to countless possible indicators and courses."<sup>1</sup> Structured products are created through the so-called securitization of assets, which is the process by which this transition of assets (such as bank loans granted) on securities (so-called ABS = Asset-Backed Securities) occurs, which are intended for further trading. For this purpose it is necessary to establish a so-called Special Purpose Vehicle (SPV hereinafter), which is essentially an investment bank, and through this SPV issue coupons, which will be bought by other investors. These coupons include e.g. granted loans. As the granted loans are repaid, the bank

gradually repays coupons on vouchers to investors, but it does carry the potential risk that the granted loans will not be repaid. This risk is delegated to the investors themselves.

### 2.1 General risks of structured products

Duis Risks of these products are not largely different from the general risks associated with other financial instruments.

The most important common risks are:

- **Credit risk (issuer risk):** This risk is linked to the issuer's inability to honor its commitment. An investor or buyer of the product eliminated the risk that is associated with the underlying asset (with some kinds of these assets in the portfolio), but still faces the risk that arises from insufficient capital strength of the issuer. Currently, the vast majority of issuers of structured products are large banks of investment nature. Ways to reduce this risk is to diversify the portfolio with the aim to spread the risk to different issuers.
- **Currency risk:** This risk involves e.g. denomination of structured product in other than domestic currency. For example, while depreciation of the currency, the value of investment in such product decreases. The opposite situation can be a currency revaluation where there is a foreign exchange gain. Structured products - IRS etc. have currency swaps that can mitigate this risk to some extent, but this way of ensuring through financial derivatives is very expensive and by its very nature it is the initial loss.
- **Market risk:** This risk is associated with price movements on capital markets. The essence of this risk is the development of market prices versus our expectations. For example, a bond is inversely related to interest rates. When interest rates fall, prices of bonds grow and vice versa when interest rates rise, the prices of bonds fall. Investors abandon their positions and buy bonds with higher yields, thereby push bond prices up.<sup>2</sup>

### 2.2 Structured product CDO

By securitization of mortgage loans a structured product called CDO (Collateralized Debt Obligation) was originated, which was emitted by large mortgage banks and sold on the capital market. The purpose of these financial products was to obtain funds by selling packages of mortgage loans with long maturities, and thus earn twice (in interest on the principal of mortgage loans and from the emission of these products). The price of these CDOs was created on the stock exchange and was traded at market prices.

CDOs are divided into several types:

- **Collateralized Loan Obligations (CLO):** Underlying asset in this case is an ordinary loan provided to ordinary citizens, businesses, and cities.
- **Commercial Real Estate (CRE CDO)** Underlying asset are realities.
- **Collateralized Bond Obligations (CBO)** Underlying assets are corporate bonds that are complemented by the bonds of emerging countries.
- **Structured Finance CDOs (SFCDO):** Underlying assets are assets covered by tangible fixed assets.<sup>3</sup>

As is apparent from the very characteristics, these structured products are very risky, because underlying asset are loans, mortgage loans and other assets with long maturities, or a complicated appreciation of quality. The issuer of these products

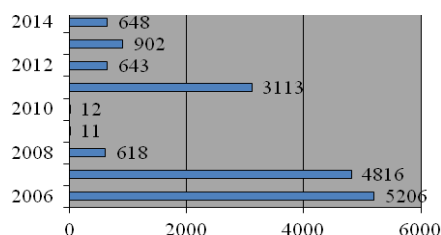
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<sup>2</sup> SVOBODA, Martin a David ROZUMEK. *Investiční certifikáty*. Praha: Komise pro cenné papíry, 2005. ISBN 80-239-5317-6, s. 7-8.

<sup>3</sup> REJNÚŠ, Oldřich. *Finanční trhy*. 2., rozš. vyd. Ostrava: Key Publishing, 2010. *Ekonomie* (Key Publishing). ISBN 978-80-7418-080-4, s. 610-613.

transfers the risk to the purchaser, and thus deprives potential losses. The problem was that these were large tranches of billions of volumes and such emissions only other banks, pension funds, mutual funds and similar could afford to buy. Furthermore, the managers of these issues not only merged various loans and created the CDO, but they also combined them into several CDO packages and created so. CDO<sup>2</sup>, CDO<sup>3</sup> i.e. CDOs that contained one or two other CDOs where the underlying assets were e.g. corporate bonds or government bonds. These combinations logically resulted in complicated valuation and thus the investment mistakes occurred when investors had very little information about the true structure of these structured products.

Fig. No. 1: The value of worldwide CDOs issued in the period 2000-2010 (in mil. USD)<sup>4</sup>



From this graph results that the largest volumes of emission of these products occurred in 2006-2007. The largest volume of emissions was in the year 2006. In 2008 there was a sharp reduction in emission volumes of these structured products. A rapid decrease in the amount of these emissions is, in my opinion, caused by a loss of confidence in these products, which recorded greatest losses in the times of crisis, since the mortgage market in the US collapsed due to defaults on mortgage loans (subprime). The biggest mortgage lender Fannie Mae, Freddie Mac was placed under government control, and the US National Bank (FED) provided the capital to rescue the US mortgage market.

### 3 The financial problems of US banks

After the collapse of financial giant Lehman Brothers in September 2008, problems with bad loans began to relate to investment and mortgage banks, which applied what is called moral hazard before the crisis, which is something that we can incorporate into the mechanisms of expansion of the mortgage crisis in the US to Europe, though it is not directly related to this. This moral hazard related to the irrational behaviour particularly of banks. With the securitization processes and the emergence of CDOs and other products this moral hazard swelled to enormous proportions. The U.S. Securities and Exchange Commission (SEC) has allowed investment banks to raise debt, enabling to raise the leverage of 15 : 1 to 40 : 1, which means that a very small decrease in assets values would mean a catastrophic loss.<sup>5</sup>

Tab. No. 1: The largest US bank by market capitalization (in millions of dollars)<sup>6</sup>

Name of the bank	2006	2009
Citigroup	286 337	17 016
Bank of America	251 872	68 660
JP Morgan Chase	172 872	148 484
Wachovia Corp.	114 542	Bankruptcy
Merril Lynch	82 235	Takeover
Fannie Mae	130 456	Takeover
Freddie Mac	145 754	Takeover
Morgan Stanley	80 553	31 307

<sup>4</sup> Its own design, data taken from Board of Governors of the Federal Reserve System. Global CDO Issuance, Annual Rate. Federalreserve.org [online]. [2016-04-04]. Available: <http://www.federalreserve.gov/pubs/inf/2010/1010/inf1010.htm>.

<sup>5</sup> MUSÍLEK, Petr. *Trhy cenných papírů*. 2., aktualiz a rozš. vyd. Praha: Ekopress, 2011. Ekonomie (Key Publishing). ISBN 978-80-86929-70-5, s. 230.

<sup>6</sup> INTERNATIONAL MONETARY FUND. Resolution of Banking Crises: The Good, the Bad, and the Ugly. *Imf.org* [online]. 2010. s. 35. [2016-01-04]. Available: <http://www.imf.org/external/pubs/ft/wp/2010/wp10146.pdf>.

The above table shows a rapid decline of the market capitalization or market value of all major banks in the US. From this list three largest mortgage banks were forced to submit to state or private surveillance (bailouts of the US government and Fed into these banks), in the case of Fannie Mae a private investor Warren Buffet bought a shareholding in this bank, and thus provided the necessary liquidity. This method of remediation was in my opinion not morally correct because it was not followed by any penalty or sanction by the competent authorities of the US Securities and Exchange Commission, the US government or the Fed, and the CDO emissions were not prohibited in the future. This gave the signal to Europe and European banks that were buying toxic assets in the form of bonds of indebted countries, to risk more, because their home country will rescue them on the principle of "too big to fail", which later happened.

### 4 Structured products

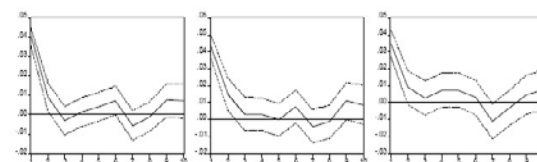
This chapter of the paper deals with the interdependence of global capital markets, since it is assumed that the interconnectedness of these markets is one of the mechanisms of spread of the crisis from the USA to Europe in 2008-2009. The capital market creates the pillar of the economy in developed countries, a place where investors seeking investment opportunities and businesses and other entities seeking capital for their business meet. Connectedness or depth gives a measure of the ability of capital market to react to the situation in the economy and in geopolitics. This interdependence will be confirmed or disproved by a simple VAR (The vector autoregression is an econometric model used to capture the linear interdependencies among multiple time series).

Model using the following assumptions and parameters:

- Equation:  $y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + c + \varepsilon_t$ . ( $y$  = vector of endogenous variables,  $A$  = matrix of coefficient  $c$  = vector of coefficient,  $\varepsilon$  = vector of innovation,  $p$  = order of delay of market response).
- Breusch-Godfrey test: The elimination of autocorrelation and heteroskedasticity.
- White's test and test Jarque-Beta: To test the normality of residues.
- The time series are stationary.
- The time series was selected from the period from September 2008 to December 2009, so that it reflects the period in question. Monthly frequency (total of 16 data).
- For input data stock market indexes are used: The US Dow Jones (DJ), which includes 30 highest-quality shares on the US stock market, European EuroStoxx50 containing shares of the 50 largest companies in Europe and the Japanese Nikkei.

The goal of this VAR model is to estimate connectivity using endogenous variables, i.e. a set of equity markets, and then on the basis of shocks within the vector of innovation. For calibration of this model is important the choice of delay (the reaction of stock markets), and this delay does not include autocorrelation and heteroskedasticity (= dispersion is dependent on a parameter, it is not autonomous).

Fig. No. 2: VAR reaction of DJI, Eurostoxx and Nikkei on crisis (from left to right) for the period January 2008 - December 2009<sup>7</sup>



<sup>7</sup> Own processing (created with the help of the econometric program Eviews6) Input data (development of stock exchange indexes) taken from Patria. *Patria: Indexy* [online]. [2016-04-01]. Available: <http://www.patria.cz/indexy/home.html>.

From this graph results the symmetry of motion curves in positive values, and also in minus values. Curves are evolving in parallel almost equally. This indicates that the interconnectedness between these significant global capital markets is high and they respond to economic changes that have occurred in this period (the fall of the investment group Lehman Brothers, the collapse of structured CDO products).

## 5 Conclusion

The aim of this paper is to explain the role of structured products, particularly CDOs and their modifications to the development of the international financial crisis since 2008.

This paper deals with the following assumptions:

1. Structured financial product is by its nature a complex financial instrument, carrying a significant risk to the buyer (investor), particularly CDOs, where the underlying asset consists of either individual or entire packages of mortgage loans.
2. The financial problems of US banks, which were related to their loan portfolio. Decline in market capitalization was shown on a sample of the largest US banks. Some banks were forced to be adopted by federal authorities, some have managed to withstand this situation and some ended their existence.
3. Interdependence of capital markets, namely of the stock indexes DJI, EuroStoxx50 and NIKKEI that represent the capital market in the US, Europe and Japan during the crisis since September 2008 - December 2009, with the assistance of the VAR model with the application of shock (crisis).

First assumption was confirmed as structured products, namely CDO and its modifications are complicated because there is no known specific structure of the underlying asset. Underlying asset of these products may be either individual mortgage loans, packages of mortgage loans, but also the government or corporate bonds.

The second assumption was confirmed. CDOs were emitted in the United States and the buyers were mainly US investment banks, as evidenced by a rapid decrease in the market capitalization of all major US banks and the takeover of three banks representing mortgage market in the US. The federal government and the Fed took control of the banks (Freddie Mac, Fannie Mae) and deprived them of so. toxic assets.

The third assumption was confirmed through VAR method and simulations of shock (Lehman Brothers bankruptcy) for the period from September 2008 to December 2009. This shock has spread through the capital mechanisms and poor sentiment among investors to European and Japanese stock exchanges.

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**Primary Paper Section:** A

**Secondary Paper Section:** AH, AE

# DIVERSITY OF ENTERPRISES' FINANCIAL SOURCES AMONG THE EUROPEAN UNION MEMBER STATES

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**Abstract:** The main purpose of the paper is the analysis of enterprises' financial sources between the European Union Member States. At first, it was made the consideration about the importance of financial sources in achieving enterprises aims. Therefore, using measures of position was made the diagnosis of the significance and acquisition by the EU enterprises financial sources in the past months (in relation to 2015). Next, it was examined the diversity of enterprises' financial sources among the European Union Member States. In that area was applied cluster analysis on the base which was isolated space groups. The studies were based on data from Survey on the Access to Finance of Enterprises for 2015 year. The results of research provide to the conclusion about relatively similar differentiation between the European Union countries in the area of enterprises' financial sources significance and their acquisition in the past six months (in relation to 2015 year).

**Keywords:** enterprise, financial sources, the European Union, region development.

## 1 Introduction

Functioning of enterprises in the turbulent environment require taking actions that enable adaptation to changes. In this regard, the essential attention should be put on proper financial sources selection. In its issue financial sources might be regarded as the significant determinant of the aims realisation that provide to increase of enterprises' competitive position.

The main aim of this article is the analysis of enterprises' financial sources between the European Union Member States. The special regard was put on such enterprises' financial sources as: retained earnings or sale of assets, grants or subsidised bank loan, credit line, bank overdraft or credit cards overdraft, other bank loan, trade credit, other loan, debt securities, equity capital, leasing or hire-purchase, other sources. As the research tool was implemented measures of position and cluster analysis which was used for create matrix clusters distances. The studies used data from Survey on the Access to Finance of Enterprises for 2015 year.

## 2 Financial sources as the essential component of enterprises' decisions

Among human resources capital and real capital the financial capital constitutes the principal part of enterprises' aims realization because the implementation of the various business activities depends on the availability of financial sources. In consequences, financial sources might affect on the enterprises value. In its issue gathering adequate financial capital might provide to enterprises growth<sup>1</sup>. Noticeable significance of financial sources is especially seen in proper investment activity, which improve enterprises' adaptability to environment changes<sup>2</sup>.

Simultaneously, the issues connected with enterprises' financial sources impact on regions development. In this respect financial capital constitutes an important determinant of regional growth<sup>3</sup> and its investment climate<sup>4</sup>. In this context, the availability of proper financial sources for enterprises might improve regions value.

## 3 The methodology of undertaken research

The studies were concentrated on the analysis of enterprises' financial sources in the European Union Member States scope. The examinations were covered two aspects: the relevance of particular financial source for enterprises and the acquisition selected financial sources by enterprises in the past six months (in relation to 2015).

The research were consisted of two parts. Firstly, it was made the diagnosis of the financial sources' significance for enterprises from the EU as well as their level of financial sources acquisition in the past six months (in relation to 2015). In this regard the examinations were based on measures of position. Secondly, it was made the comparison of enterprises' financial sources between the European Union Member States. In that area was applied cluster analysis which was used for the identification the space groups characterizing enterprises' financial sources in the EU Member State perspective.

To the examinations were chosen the following variables:

- $x_1$  – the significance of retained earnings or sale of assets for enterprises from particular Member State of the European Union,
- $x_2$  – the significance of grants or subsidised bank loan for enterprises from particular Member State of the European Union,
- $x_3$  – the significance of credit line, bank overdraft or credit cards overdraft for enterprises from particular Member State of the European Union,
- $x_4$  – the significance of bank loan (excluding subsidised bank loans, overdrafts and credit lines) for enterprises from particular Member State of the European Union,
- $x_5$  – the significance of trade credit for enterprises from particular Member State of the European Union,
- $x_6$  – the significance of other loan for enterprises from particular Member State of the European Union,
- $x_7$  – the significance of debt securities for enterprises from particular Member State of the European Union,
- $x_8$  – the significance of equity capital for enterprises from particular European Union Member State,
- $x_9$  – the significance of leasing or hire-purchase for enterprises from particular Member State of the European Union,
- $x_{10}$  – the significance of factoring for enterprises from particular Member State of the European Union,
- $x_{11}$  – the significance of other sources of financing for enterprises from particular Member State of the European Union,
- $x_{12}$  – the acquisition of retained earnings or sale of assets as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{13}$  – the acquisition of grants or subsidised bank loan as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{14}$  – the acquisition of credit line, bank overdraft or credit cards overdraft as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{15}$  – the acquisition of bank loan as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{16}$  – the acquisition of trade credit as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{17}$  – the acquisition of other loan as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{18}$  – the acquisition of debt securities as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{19}$  – the acquisition of equity capital as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,
- $x_{20}$  – acquisition of leasing or hire-purchase as a financial source in the past six months (in relation to 2015) by enterprises from particular European Union Member State,

<sup>1</sup> Sierpińska, M., Jachna, T.: *Ocena przedsiębiorstwa według standardów światowych*. Warszawa: Wydawnictwo Naukowe PWN, 2004. ISBN 83-01-14206-5. pp. 286.

<sup>2</sup> Zygmunt, A.: *The financial sources of investment activity – a case of Polish enterprises*. AD ALTA Journal of Interdisciplinary Research. Volume 5, Issue 2, 2015, ISSN 1804-7890. pp.89; Zygmunt, J.: *Analiza wpływu finansowania zewnętrznego na działalność inwestycyjną przedsiębiorstw*, [in:] Fortlicz, S.: *Metody ilościowe w ekonomii i zarządzaniu*. Wrocław: Zeszyty Naukowe Wyższej Szkoły Bankowej we Wrocławiu nr 20/2011, 2001. ISSN 1643-7772. pp. 476.

<sup>3</sup> Makiela, Z.: *Przedsiębiorczość i innowacyjność terytorialna. Region w warunkach konkurencji*, Warszawa: Wydawnictwo C.H. Beck, 2013. ISBN 978832555368. pp. 16.

<sup>4</sup> Kogut-Jaworska, M.: *Instrumenty interwencji lokalnego w stymulowaniu rozwoju gospodarczego*, Warszawa: CeDeWu, 2008. 978-83-7556-108-1. pp. 28.

$x_{21}$  – the acquisition of factoring as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU,

$x_{22}$  – the acquisition of other sources as a financial source in the past six months (in relation to 2015) by enterprises from particular Member State of the EU.

Between variables used for the research is the correct correlation dependence.

Variables in question were employed to creation the matrix ( $X=[x_{ij}]$ ), which constitute the basis for the comparison of enterprises' financial sources in the EU Member State perspective. Next, it was made the standardization of the define matrix under to the following formula<sup>5</sup>:

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{S_j}, \text{ when } x_j \text{ is stimulant} \quad (1)$$

or

$$z_{ij} = \frac{\bar{x}_j - x_{ij}}{S_j}, \text{ when } x_j \text{ jest destimulant} \quad (2)$$

where:

$z_{ij}$  – standardized diagnostic attribute  $x_{ij}$ ,

$$\bar{x}_j = \frac{1}{n} \sum_{i=1}^n x_{ij} \quad (3)$$

$$S_j = \sqrt{\frac{1}{n} \sum_{i=1}^n (x_{ij} - \bar{x}_j)^2} \quad (4)$$

Therefore, it was selected the probability measure<sup>6</sup>:

$$d_{ij} = \sqrt{\sum_{k=1}^m (z_{ik} - z_{jk})^2} \quad (5)$$

where:

$d_{ij}$  – taxonomic distance defined as the Euclidean distance in  $n$ -dimensional space between two test objects;  $m$  - the number of attributes (variables);  $i = 1, \dots, n$ ;  $n = 1, \dots, n$ ;  $n$  - the number of objects,  $z_{ik}$ ,  $z_{jk}$  – standardized size of diagnostic attributes.

The probability measure enabled to isolate space groups (the clusters of the first order)<sup>7</sup>, which allowed the comparison of enterprises' financial sources between the EU Member State.

The research were based on the data from Survey on the Access to Finance of Enterprises for 2015 year<sup>8</sup>.

#### 4 The diagnosis of the relevance and acquisition of particular financial source by enterprises from the European Union

The effects of the analysis indicate diversity in the significance of particular finance source for the EU enterprises in 2015 (table 1).

The obtained results emphasised the importance of credit line, bank overdraft or credit cards overdraft ( $x_3$ ) as relatively the most important financial source for enterprises from the Member State of the European Union. The calculations show that for the three quarters of enterprises from the EU the relevance of the financial source in question was higher on average than 50%. This occurrence might resulted from relatively high accessibility of credit for enterprises. Among countries with the highest significance of credit line, bank overdraft or credit cards was noticeable Cyprus, Finland, Ireland, Portugal and Slovenia.

*Table 1. The relevance of the particular financial source for enterprises from the European Union in 2015 (according to the measures of position)*

Quartile	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$	$x_9$	$x_{10}$	$x_{11}$
First	23%	22%	50%	39%	18%	18%	1%	5%	38%	7%	3%
Median	27%	29%	55%	48%	29%	25%	2%	17%	47%	9%	5%
Third	32%	38%	61%	56%	51%	27%	6%	26%	54%	15%	8%

Legend:  $x_1 - x_{11}$  – research variables.

Source: Own calculations based on data from Survey on the Access to Finance of Enterprises: [http://ec.europa.eu/growth/access-to-finance/data-surveys/index\\_en.htm](http://ec.europa.eu/growth/access-to-finance/data-surveys/index_en.htm) [access: 07.03.2016].

The conducted research indicate also relatively high relevance for the EU enterprises such financial sources as leasing or hire-purchase ( $x_9$ ) and other bank loan ( $x_4$ ). In 2015 in more than the half of enterprises the usage of them in the past or consideration about their usage in the future was higher on average than 47%. This situation might result from the relatively high availability of considered enterprises' financial sources. According to the effects of examinations the relatively high significance of leasing or hire-purchase was established in relation to such countries as Belgium, Finland, France, Spain and Portugal while the relatively high importance of other bank loan for enterprises was identified in Finland, Germany, Portugal and Poland.

Simultaneously, the studies highlighted the relatively medium importance for the EU enterprises the following financial sources: retained earnings or sale of assets ( $x_1$ ), grants or subsidised bank loan ( $x_2$ ), trade credit ( $x_5$ ) and other loan ( $x_6$ ) (table 1). That occurrence is seen in the most Member States of the European Union. Additionally, the obtained results allow to the conclusion about relatively low significance of other sources of financing ( $x_{11}$ ) and debt securities ( $x_7$ ) as the EU enterprises' financial source.

Taking into account the acquisition of selected financial sources by the EU enterprises in the past six months (in relation to 2015) the effects of examinations allow to indicate the dominant participation of credit line, bank overdraft or credit cards overdraft ( $x_{14}$ ) (table 2). This occurrence is consistent with observations concerning the high importance of the financial sources in question for enterprises from Member States of the European Union.

*Table 2. The acquisition selected financial sources in the past six months (in relation to 2015) by enterprises from particular Member State of the European Union in 2015 (according to the measures of position)*

Quartile	$x_{12}$	$x_{13}$	$x_{14}$	$x_{15}$	$x_{16}$	$x_{17}$	$x_{18}$	$x_{19}$	$x_{20}$	$x_{21}$	$x_{22}$
First	11%	3%	29%	13%	10%	8%	0%	1%	14%	4%	0%
Median	14%	6%	38%	16%	15%	10%	0%	1%	20%	5%	1%
Third	17%	8%	41%	22%	23%	12%	1%	3%	28%	8%	2%

Legend:  $x_{12} - x_{22}$  – research variables.

Source: Own calculations based on data from Survey on the Access to Finance of Enterprises: [http://ec.europa.eu/growth/access-to-finance/data-surveys/index\\_en.htm](http://ec.europa.eu/growth/access-to-finance/data-surveys/index_en.htm) [access: 07.03.2016].

According to the results of studies for half of the EU enterprises in the past six months (in relation to 2015) the acquisition of credit line, bank overdraft or credit cards overdraft was higher on average than 38%. The conducted research indicate that the highest acquisition of the financial source in question characterized enterprises from Denmark, Finland, Ireland, Italy and Malta.

Moreover, the calculations show that the three quarters of the EU enterprises in the past six months (in relation to 2015) distinguished relatively high acquisition of retained earnings or sale of assets ( $x_{12}$ ), bank loan ( $x_{15}$ ), trade credit ( $x_{16}$ ) and leasing or hire-purchase ( $x_{20}$ ). This occurrence was registered for the majority of Member State of the European Union.

<sup>5</sup> Kukula, K.: *Metody unitaryzacji zerowanej* Warszawa: PWN, 2000. ISBN 83-01-13097-0, pp. 82.

<sup>6</sup> Młodak, A.: *Analiza taksonomiczna w statystyce regionalnej*. Warszawa: Difin, 2006. ISBN 8372516057, pp. 48.

<sup>7</sup> Heffner, K., Gibas, P.: *Analiza ekonomiczno-przestrzenna*, Katowice: Wydawnictwo Akademii Ekonomicznej w Katowicach, 2007. ISBN 9788372468451, pp. 69-72.

<sup>8</sup> [http://ec.europa.eu/growth/access-to-finance/data-surveys/index\\_en.htm](http://ec.europa.eu/growth/access-to-finance/data-surveys/index_en.htm) [access: 07.03.2016].

Furthermore, the results of research emphasised that from the analysed enterprises' financial sources the slightest acquisition in the past six months (in relation to 2015) was related to debt securities ( $x_{18}$ ) and other sources ( $x_{22}$ ). In this respect the effects of studies indicate that the acquisition of financial sources in question by the three quarters of the EU enterprises was lower on average than 1% ( $x_{18}$ ) and 2% ( $x_{22}$ ).

### 5 The examinations results of the enterprises' financial sources diversity among the European Union Member States

The effects of the research enable to isolate the four clusters of the first order, which are differential in respect of the EU enterprises' financial sources significance and their acquisition in the past six months in relation to 2015 (table 3–table 7).

According to the obtained results the most numerous was the group I, which comprise of the fourteen European Union Member States (table 3–table 4). In comparison to the other space groups enterprises from the countries in question distinguish relatively high significance of equity capital, debt securities and factoring as a financial sources. Moreover the isolated countries characterise relatively high acquisition of leasing or hire-purchase and debt securities by enterprises in the past six months (in relation to 2015).

Within the group I the highest similarity in enterprises' financial sources significance and their acquisition in the past six months (in relation to 2015) occurred between Austria (2) and Germany (12) (table 3).

Table 3. The presentation of the first order clusters (the group I – part 1)

		I group								
Country symbol		1	2	3	5	8	10	11	12	
Variables	x <sub>1</sub>	27%	26%	20%	34%	20%	29%	32%	24%	
	x <sub>2</sub>	34%	32%	22%	41%	12%	28%	31%	33%	
	x <sub>3</sub>	55%	58%	51%	46%	54%	65%	53%	55%	
	x <sub>4</sub>	50%	50%	61%	45%	30%	60%	65%	49%	
	x <sub>5</sub>	36%	21%	35%	17%	17%	34%	26%	15%	
	x <sub>6</sub>	22%	22%	21%	21%	17%	32%	14%	25%	
	x <sub>7</sub>	4%	1%	2%	11%	2%	2%	7%	1%	
	x <sub>8</sub>	14%	10%	20%	30%	51%	16%	21%	14%	
	x <sub>9</sub>	47%	49%	32%	46%	48%	63%	48%	59%	
	x <sub>10</sub>	10%	6%	8%	17%	7%	21%	15%	6%	
	x <sub>11</sub>	5%	5%	8%	6%	5%	3%	6%	4%	
	x <sub>12</sub>	15%	17%	12%	16%	10%	16%	18%	15%	
	x <sub>13</sub>	8%	7%	5%	6%	3%	6%	8%	8%	
	x <sub>14</sub>	37%	41%	36%	26%	43%	49%	33%	38%	
	x <sub>15</sub>	19%	23%	25%	15%	11%	18%	25%	20%	
	x <sub>16</sub>	20%	13%	14%	7%	10%	22%	8%	10%	
	x <sub>17</sub>	10%	11%	8%	9%	6%	13%	5%	12%	
	x <sub>18</sub>	1%	0%	0%	3%	1%	0%	2%	0%	
	x <sub>19</sub>	2%	1%	2%	4%	4%	1%	2%	2%	
	x <sub>20</sub>	23%	25%	14%	18%	30%	28%	23%	36%	
	x <sub>21</sub>	6%	4%	4%	6%	4%	10%	10%	4%	
	x <sub>22</sub>	1%	1%	1%	1%	0.2%	0.2%	1%	1%	
Summary of the closest elements		1-2	2-12	1-3	1-11	1-19	1-27	1-22	1-5	
Minimal taxonomic distance		2.16	2.20	3.50	3.93	3.15	3.04	3.40	3.93	

Legend: 1 – EU-28, 2 – Austria, 3 – Belgium, 5 – Croatia, 8 – Denmark, 10 – Finland, 11 – France, 12 – Germany.

Source: Own calculations based on data from Survey on the Access to Finance of Enterprises for 2015 year: [http://ec.europa.eu/growth/access-to-finance/data-surveys/index\\_en.htm](http://ec.europa.eu/growth/access-to-finance/data-surveys/index_en.htm) [access: 07.03.2016]

The study shows that enterprises from mentioned countries financed their activity mostly embracing credit line, bank loan, bank overdraft or credit cards overdraft and leasing or hire-purchase. The importance of above financial sources for enterprises from Austria and Germany was relatively higher on average than 49% and was also followed by the high level of their acquisition in the past six months (in relation to 2015).

Table 4. The presentation of the first order clusters (the group I – part 2)

I group							
Country symbol		13	19	22	23	26	27
Variables	$x_1$	17%	29%	23%	23%	25%	27%
	$x_2$	49%	30%	39%	53%	49%	41%
	$x_3$	31%	51%	55%	67%	66%	51%
	$x_4$	53%	47%	43%	58%	57%	59%
	$x_5$	63%	28%	49%	53%	36%	51%
	$x_6$	17%	15%	17%	25%	23%	24%
	$x_7$	36%	2%	1%	3%	5%	2%
	$x_8$	27%	24%	8%	2%	30%	4%
	$x_9$	31%	35%	57%	61%	53%	41%
	$x_{10}$	15%	8%	12%	18%	19%	14%
	$x_{11}$	3%	3%	2%	4%	7%	8%
	$x_{12}$	7%	15%	13%	6%	12%	13%
	$x_{13}$	5%	8%	11%	7%	7%	9%
	$x_{14}$	15%	41%	42%	41%	36%	32%
	$x_{15}$	14%	22%	21%	17%	18%	23%
	$x_{16}$	38%	16%	38%	23%	6%	23%
	$x_{17}$	9%	7%	8%	7%	10%	10%
	$x_{18}$	21%	0%	0%	0%	1%	0%
	$x_{19}$	2%	5%	2%	0%	1%	1%
	$x_{20}$	11%	24%	34%	15%	24%	12%
	$x_{21}$	5%	6%	7%	8%	10%	8%
	$x_{22}$	0.2%	0.8%	0.3%	0%	0.5%	1%
Summary of the closest elements		5-13	1-11	5-28	1-26	10-26	23-26
Minimal taxonomic distance		8.51	3.93	4.69	3.65	4.10	3.78

Legend: 13 – Greece, 19 – Luxembourg, 22 – Poland, 23 – Portugal, 26 – Slovenia, 27 – Spain, 28 – Sweden.

Source: See table 3.

Moreover, in the framework of the group I should be emphasised the relatively high similarity in the range of financial sources significance and their acquisition by enterprises between EU-28 (1) as a general and such countries as: Austria (2), Belgium (3), Croatia (5), France (11), Luxembourg (19), Poland (22) and Spain (27). Apart from the relatively high significance and acquisition in the past six months (in relation to 2015) of credit line, bank loan, bank overdraft or credit cards overdraft and leasing or hire-purchase the highest similarity between enterprises from the countries in question and EU-28 (1) as a general was noticeable especially in the relatively high importance of retained earnings or sale of assets and grants or subsidised bank loan.

Furthermore, the results of research allow to indicate the slightest similarity (in the range of the graph I) in enterprises' financial sources importance and acquisition scope between Croatia (5) and Greece (13). This occurrence is mainly seen in the differential significance of trade credit and acquisition of retained earnings or sale of assets and trade credit in enterprises from mentioned countries.

The conducted examinations allow to underline the group II as the second the most numerous group of countries distinguished in the enterprises' financial sources and their acquisition in the past six months (in relation to 2015) scope (table 5). The group II consists of the seven European Union Member States, which characterize relatively low significance of grants or subsidised bank loan as enterprises' financial sources and simultaneously relatively high importance of other loan and other financial sources (table 5). It should be also highlighted that in respect to the other space groups, enterprises from the countries belonged to the group II distinguish relatively high acquisition (in the past six months) of retained earnings or sale of assets, other loans and leasing or hire-purchase as a financial source.

Table 5. The presentation of the first order clusters (group II)

IV group							
Country symbol		9	15	17	18	21	24
Variables	$x_1$	29%	39%	22%	35%	15%	27%
	$x_2$	14%	29%	14%	16%	10%	27%
	$x_3$	23%	69%	43%	45%	59%	61%
	$x_4$	32%	53%	32%	33%	44%	38%

x <sub>5</sub>	26%	68%	16%	27%	33%	29%	58%
x <sub>6</sub>	26%	25%	35%	31%	32%	34%	28%
x <sub>7</sub>	2%	6%	2%	0%	1%	2%	7%
x <sub>8</sub>	9%	21%	33%	16%	25%	11%	17%
x <sub>9</sub>	54%	43%	56%	45%	43%	44%	50%
x <sub>10</sub>	15%	9%	5%	14%	7%	11%	13%
x <sub>11</sub>	7%	6%	12%	9%	13%	9%	7%
x <sub>12</sub>	16%	27%	11%	17%	9%	14%	20%
x <sub>13</sub>	2%	8%	2%	2%	1%	2%	7%
x <sub>14</sub>	15%	50%	23%	27%	41%	36%	39%
x <sub>15</sub>	6%	17%	13%	11%	12%	13%	15%
x <sub>16</sub>	13%	51%	9%	20%	22%	16%	44%
x <sub>17</sub>	13%	10%	17%	13%	10%	18%	12%
x <sub>18</sub>	0%	1%	0%	0%	0%	0%	1%
x <sub>19</sub>	1%	2%	9%	1%	3%	1%	3%
x <sub>20</sub>	23%	22%	35%	18%	21%	17%	31%
x <sub>21</sub>	10%	5%	3%	7%	4%	5%	9%
x <sub>22</sub>	1,5%	1,8%	1,9%	2%	2,6%	2%	2%
Summary of the closest elements	9-18	18-24	21-24	17-21	18-29	15-29	
Miminal taxonomic distance	3.68	3.35	4.52	5.71	4.51	3.89	

Legend: 9 – Estonia, 15 – Ireland, 17 – Latvia, 18 – Lithuania, 21 – Netherlands, 24 – Romania, 29 – United Kingdom.  
Source: See table 3.

On the basis of the undertaken studies the highest similarity on the range of group II was indicated between Lithuania (18) and Romania (24). Enterprises from mentioned countries characterize mostly the very similar significance of other financial sources and enterprises' acquisition retained earnings or sale of assets and debt securities in the past six months (with respect to 2015).

According to the achieved results the third cluster of the first order include the fourth of the EU countries (table 6).

Table 6. The presentation of the first order clusters (group III)

II group					
Country symbol		4	7	14	25
Variables	x <sub>1</sub>	35%	31%	23%	27%
	x <sub>2</sub>	29%	33%	29%	25%
	x <sub>3</sub>	57%	49%	44%	59%
	x <sub>4</sub>	48%	42%	24%	39%
	x <sub>5</sub>	25%	17%	13%	29%
	x <sub>6</sub>	26%	28%	17%	26%
	x <sub>7</sub>	1%	1%	2%	1%
	x <sub>8</sub>	2%	3%	1%	3%
	x <sub>9</sub>	44%	50%	38%	53%
	x <sub>10</sub>	7%	8%	5%	7%
	x <sub>11</sub>	5%	2%	9%	3%
	x <sub>12</sub>	11%	15%	8%	9%
	x <sub>13</sub>	4%	10%	9%	3%
	x <sub>14</sub>	34%	28%	22%	38%
	x <sub>15</sub>	14%	16%	7%	12%
	x <sub>16</sub>	10%	7%	4%	13%
	x <sub>17</sub>	10%	12%	8%	9%
	x <sub>18</sub>	0%	0%	0%	0%
	x <sub>19</sub>	0%	0%	0%	0%
	x <sub>20</sub>	16%	17%	14%	18%
	x <sub>21</sub>	2%	4%	1%	3%
	x <sub>22</sub>	0,6%	1,0%	3,1%	1%
Summary of the closest elements		4-7	4-25	7-14	
Miminal taxonomic distance		3.11	2.37	5.74	

Legend: 4 – Bulgaria, 7 – Czech Republik, 14 – Hungary, 25 – Slovakia.  
Source: See table 3.

The space group in question distinguish countries with relatively high significance for enterprises of retained earnings or sale of assets and other loan. On the other hand, the group III characterise the relatively low importance of trade credit and debt securities as enterprises' financial sources as well as the relatively low acquisition of factoring and retained earnings or sale of assets in the past six months (in relation to 2015).

Moreover, the study shows the highest similarity (in the group III premises) between Bulgaria (4) and Slovakia (25). Mentioned countries have particular close importance of such enterprises'

financial sources as: other loan, debt securities and factoring. Furthermore, above countries characterize the very similar enterprises' acquisition of other sources. Additionally, the slightest similarity occurred between Czech Republik (7) and Hungary (14), especially in leasing or hire-purchase significance for enterprises.

The results of examinations allow to conclude that the fourth cluster of the first order contains the three countries similar in terms of the EU enterprises' financial sources significance and their acquisition in the past six months (in relation to 2015) (table 7).

Table 7. The presentation of the first order clusters (group IV)

III group				
Country symbol		6	16	20
Variables	x <sub>1</sub>	29%	25%	30%
	x <sub>2</sub>	29%	56%	37%
	x <sub>3</sub>	64%	61%	76%
	x <sub>4</sub>	56%	56%	54%
	x <sub>5</sub>	71%	51%	67%
	x <sub>6</sub>	21%	15%	19%
	x <sub>7</sub>	2%	3%	9%
	x <sub>8</sub>	29%	2%	20%
	x <sub>9</sub>	25%	27%	31%
	x <sub>10</sub>	19%	7%	9%
	x <sub>11</sub>	4%	3%	2%
	x <sub>12</sub>	12%	16%	17%
	x <sub>13</sub>	3%	15%	9%
	x <sub>14</sub>	39%	47%	52%
	x <sub>15</sub>	16%	25%	22%
	x <sub>16</sub>	41%	22%	45%
	x <sub>17</sub>	7%	7%	8%
	x <sub>18</sub>	0%	1%	1%
	x <sub>19</sub>	1%	0%	4%
	x <sub>20</sub>	7%	8%	11%
	x <sub>21</sub>	11%	5%	5%
	x <sub>22</sub>	0%	0,2%	0%
Summary of the closest elements		6-20	16-20	
Miminal taxonomic distance		4.92	4.52	

Legend: 6 – Cyprus, 16 – Italy, 20 – Malta  
Source: See table 3.

Apart from the other space groups the mentioned cluster of the first order is characterized by the relatively high significance for enterprises of grants or subsidised bank loan, credit line, bank overdraft or credit cards overdraft, bank loan and trade credit while the relatively low importance of other sources as enterprises' financial sources. Moreover, the countries belonged to the fourth group distinguish the relatively low acquisition by enterprises of other loan, leasing or hire-purchase and other sources (in the past six months).

## 6 Conclusions

The conducted studies connected with the EU enterprises' financial sources significance and their acquisition provide to several conclusion. First of all, the results of research emphasise the relatively high significance of credit line, bank overdraft or credit cards overdraft, other bank loan and leasing or hire-purchase as the enterprises' financial source. Simultaneously, this occurrence is expressed in relatively high acquisition of sources in question by enterprises from Member States of the European Union in the past six months (in relation to 2015). The relatively high acquisition and relevance for enterprises was stated in relation to retained earnings or sale of assets and trade credit, while the usage of factoring and other financial sources was identified as relatively slight.

Moreover, the conducted research indicate the similar differentiation in term of enterprises' financial sources significance and their acquisition in the past six months (in relation to 2015 year) between the EU countries.

The genesis of above appearances might result from the similar enterprises' functioning conditions within the European Union.

Furthermore, the occurrences in question might arise due to the similar impact of the factors affecting the enterprises' financial sources selections.

The complexity of enterprises' financial sources issues requires undertaking further research. They should focused especially on the identification of particular determinants, which impact on the EU enterprises' relevance and acquisition of particular financial sources. Furthermore, it is advisable to recognise the determinants typical for particular the European Union regions which might affected on enterprises' financial sources and, in consequences, on the value of enterprises and regions.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## **E BIOLOGICAL SCIENCES**

EA	MORPHOLOGICAL GAME PARKS AND CYTOLOGY
EB	GENETICS AND MOLECULAR BIOLOGY
EC	IMMUNOLOGY
ED	PHYSIOLOGY
EE	MICROBIOLOGY, VIROLOGY
EF	BOTANY
EG	ZOOLOGY
EH	ECOLOGY - COMMUNITIES
EI	BIOTECHNOLOGY AND BIONICS

# IMMUNOPROPHYLAXIS OF SECONDARY ALVEOLAR ECHINOCOCCOSIS BY A IMMUNOSTIMULATION RIBOTAN COMBINED WITH ANTIGEN PROTOCOLEX CELLS OF ECHINOCOCCUS MULTILOCULARIS

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**Abstract:** To assess the protective efficiency of immunization against secondary alveolar echinococcosis, with an antigen from *Echinococcus multilocularis* protoscoleces in combination with Ribotan immunostimulation, an assay was carried out on 48 white outbred mice. The use of immunostimulation in combination with specific antigens for the immunoprophylaxis against experimental alveolar echinococcosis has a synergistic effect on the treatment.

**Keywords:** Immunostimulation, alveolar echinococcosis, antigen, *Echinococcus multilocularis*, immunoprophylaxis, experimental

## 1 Introduction

Alveolar hydatid disease (AHD), is a parasitic zoonosis resulting from *Echinococcus multilocularis* s.l., a tapeworm that belongs to the class Cestoda, family Taeniidae. AHD is found worldwide, mostly in northern latitudes in central Europe, Russia, China, Central Asia, Japan, and North America. The life cycle of these parasitic tapeworm requires two mammalian hosts. First - definitive host, such as foxes and dogs (and other canids) in which the adult or strobilar phase develops in the small intestine, and second - intermediate host, in which the alveolar stage develops in different organs in the body by tumor-like or cyst-like metacestode. The larval stage of *Echinococcus multilocularis* causes alveolar echinococcosis, the serious helminthozoonosis with a high mortality in patients with late treatment [Wilson, 1995]. Alveolar echinococcosis is a serious disease has a significantly high fatality rate.

The therapy of this disease represents an important problem. Scientific search for effective means of protection against this deadly disease is conducted throughout the world. *E. multilocularis* induces parasite-specific cellular and humoral immune response in intermediate host [5]. Cell-mediated immune response depending on interaction of macrophages and T lymphocytes is regarded as protective against *E. multilocularis* infection [10]. Also in the scientific literature there are sufficient data on the effectiveness of various adjuvant agents such as Freund's adjuvant, aluminum hydroxide, BCG vaccine and others. These drugs are used in vaccines against parasitic infections, including larval hydatid disease [3, 6, 8, 15]. There is a lot of references to strengthen the body's resistance to helminth infection in the application of non-specific immune stimulating agents [9; 13]. Application of immunomodulatory substances could improve host immune status during *E. multilocularis* infection and limit the growth of the parasite [4]. The combination of specific and non-specific stimulation means provides natural resistance and increased immunoreactivity to specific antigens *E. multilocularis* [2].

In our study, we focused on the study immunoprophylaxis activity of immunomodulatory Ribotan in complex excretory-secretory antigen of protoscolex cells of *Echinococcus multilocularis* in enhancing of the host antiparasite defence in alveolar echinococcosis. Also we evaluated the protective effect immunostimulant Ribotan in experimental secondary alveolar echinococcosis of albino outbred mice.

## 2 Material and methods

To assess the protective efficiency of immunization against secondary alveolar echinococcosis, with an antigen from *Echinococcus multilocularis* protoscoleces in combination with Ribotan immunostimulation, an assay was carried out on 48 white outbred mice, males, weighing 20–25 g. These were divided into four groups of twelve mice each. Mice were kept under a 12-h light/dark regime at room temperature (21±3°C) and 50–60% relative humidity on a commercial diet and water. The experimental protocols complied with the current Russian ethics law.

*E. multilocularis* metacestodes (an Asian genotype circulating in the Central region of Russia; strain provided by Department of immunodiagnostic and cellular technology, All-Russian research institute of fundamental and applied parasitology of animals and plants of name K.I. Scriabina, Moscow, Russia) was obtained from the wild foxes (*Vulpes vulpes*) [1] and was passaged in our laboratory by intraperitoneal injection of laboratory albino outbred rats *Rattus norvegicus*

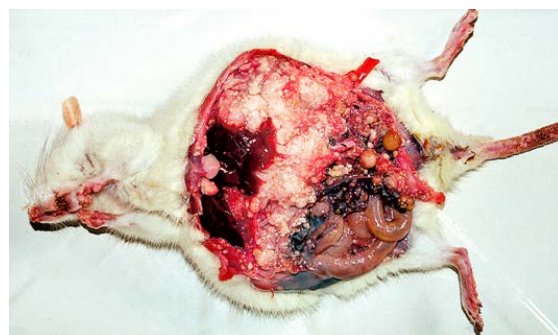


Fig. 1 Secondary alveolar echinococcosis of albino laboratory donor- rat 6 months post infection (p.i.) by intraperitoneal injection protoscoleces *Echinococcus multilocularis*

Figure 1 presents results of intraperitoneal injection protoscoleces *E. multilocularis* after 6 months post infection. We can see that the intraperitoneal infection leads to the development biggest larval stages (alveolar metacestodes) in different organs as tumor-like or cyst-like formations.

Parasite cysts were isolated 6 months post infection (p.i.) and cut into pieces in sterile 0.9% NaCl with antibiotics, 8 µg/100 ml Gentamycinum (Paneco-ltd, Russia), and passed through a nylons mesh using apertures ranging №033. Protoscoleces obtained after the last filtration were subjected to grinding and homogenization. Primary cell cultures were obtained by gentle hand-homogenization and passed through nylons cell mesh using apertures ranging from 220 to 50 µm.



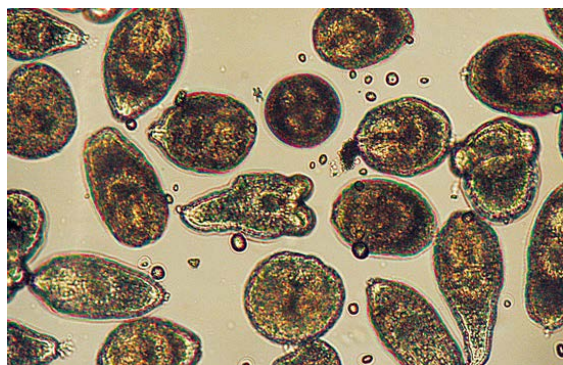


Fig. 2 Protoscolexes of *Echinococcus multilocularis*

The figure above shows isolated from cysts protoscolexes of *Echinococcus multilocularis* before their homogenization.

The antigen was isolated from the metabolism products of *Echinococcus multilocularis* protoscolexes cells, cultured in RPMI 1640 medium (Sigma-Aldrich, Germany) enriched with 6% fetal bovine serum. Culturing cells were performed in 6-well culture plates placed in a Heraeus CO<sub>2</sub> incubator under conditions of high humidity, temperature of 37 °C and a CO<sub>2</sub> level of 5% [11].

Ribotan is a complex immunostimulator consisting of a mixture of low-molecular-weight, 0.5 — 1.0 kD, polypeptides (at least 10 mcg/ml) and low-molecular-weight RNA fragments (at least 105 mcg/ml). This drug is a broad spectrum of biological activity: Ribotan stimulates natural resistance factors, leucopoiesis, migration and cooperation of T- and B-lymphocytes, as well phagocytic activity of macrophages and neutrophils. It accelerates the formation of post-vaccination immunity, increases its intensity and duration, increases immunological efficacy of vaccines. Ribotan increases lysozyme content, properdin antibody levels, induces the synthesis of interferon [14]. Designed by organization "Closed Joint-Stock Company of Research and Production firm veterinary and fur center" Vetzverotsentr, Moscow, Russia.

The efficacy of immunoprophylaxis was evaluated by the cyst development in infected mice. *E. multilocularis* cysts were isolated from sacrificed mice and parasite cysts were weighed and proved pathogenicity of metacystodes by a biological test on other mice.

The mice were immunized via two subcutaneous injections, administered with a ten day interval between them. The formulations consisted of antigen protein (60 µg) and/or Ribotan (5 µl) in 0.2 ml of sterile 0.9% NaCl per injection.

Table 1. Details of the experimental evaluation of the protective properties of the complex formulation against secondary echinococcosis

The formulations in 0.2 ml of sterile 0.9%NaCl per injection	Number of group	Number of animals per group	Units of <i>E. multilocularis</i> protoscolexes per mouse
ribotan (5 µl)	group 1	12	750 ± 50
antigen protein (60 µg)	group 2	12	750 ± 50
antigen protein (60 µg) and ribotan (5 µl)	group 3	12	750 ± 50
0.2 ml of sterile 0.9% NaCl.	group 4	12	750 ± 50

The above table 1 presents the details of the evaluation of the experiment protective properties of complex drug against secondary echinococcosis. The group 1 mice were treated with the Ribotan formulation only. The group 2 mice were treated

with the Ribotan and antigen formulation. The group 3 mice received the antigen formulation only and the group 4 mice were the control, receiving only 0.2 ml of sterile 0.9% NaCl. After a 20 day regimen, the groups were inoculated with a dose of 750 ± 50 units of *E. multilocularis* protoscolexes per mouse.

After 90 days of incubation, the mice were euthanized and dissected for evaluation.

### 3 Results and discussion

Evaluation of the data of the experiment shows that all drugs used to stimulate the body's defensive response of mice against *E. multilocularis* with varying degrees of protective effect. Data of the experiment are presented in Table 2.

Table 2. Representative data for calculation evaluation the protective efficiency of immunization against secondary alveolar echinococcosis with Ribbon immunostimulation in combination an antigen from *Echinococcus multilocularis* protoscoleces

The formulations in 0.2 ml of sterile 0.9%NaCl per injection	Number of group	Number of animals per group	Number of infected animals	Evaluation the protective efficiency of immunization	Protective efficiency
ribotan (5 µl)	group 1	12	7	The majority of mice infected in this group showed fertile parasite metacystodes.	41,7%
antigen protein (60 µg)	group 2	12	5	metacystodes with diameters of up to 2 mm were found, but there were no egg	58,3%
antigen protein (60 µg) and ribotan (5 µl)	group 3	12	1	singular metacystodes in the liver, with no infective egg elements	91,7%
0.2 ml of sterile 0.9% NaCl.	group 4	12	12	all mice were infected, showed fertile parasite metacystodes in this group	0 %

The above table shows that the maximum protection against the *Echinococcus multilocularis* infection was obtained in mice immunized with the combination of antigen and Ribotan (91,7%). Only one mouse in this group showed singular metacystodes in the liver, with no infective egg elements. This was proved by a biological test on other mice.

The mice immunized with the protoscolex antigen only showed a protective effect of 58,3%. In 5 mice from this group, metacystodes with diameters of up to two mm were found but there were no egg elements. The protective effect in the group treated with Ribotan only was less than 41,7%. The majority of mice infected in this group showed fertile parasite metacystodes.

The protective effect in the group treated with sterile 0.9% NaCl was 0%. All mice were infected in this group, showed fertile parasite metacystodes.

Research results presented below graphically.

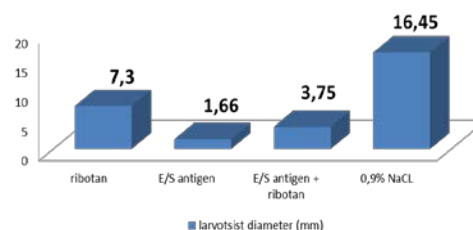


Fig. 3 The results of measurement dimensions of metacystodes of secondary alveolar echinococcosis on 90 days post infection (p.i.), in mm

Figure 3 shows the results of measurements parasite cysts size in millimeters.

We can see that the largest diameter metacestodes achieved in the fourth control group received of sterile 0.9% NaCl. In the first group of mice that received the experimental treatment using "Ribotan" metacestod's diameter was in 2.25 times less than in metacestodes in the control group. Metatsetod's diameter in the second and the third groups of mice was 9.91 and 4.39 times less than the control group, respectively.

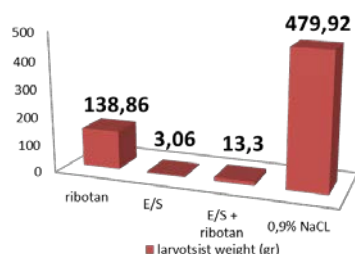


Fig. 4 The results of measurement of larvotist's weight in experimental secondary echinococcosis on 90 days after infection in grams.

The above figure 4 presents the results of measurements of larvotist's weight in grams. We can see that the maximum weight of larvotist achieved as in the fourth control group receiving saline. Larvotist's weight in the first group (receiving only immunomodulator) was 3.45 times lower than in the control group. Flyweight larvotist observed in the second group receiving excretory-secretory antigen in a dose of 60 µg of protein per mouse. Larvotist's weight in the third group (treated with a complex formulation) was 36.03 times less than in the control group.

However, only weight and size don't give a complete picture of the protective protection products. The presence of pathogenic elements in secondary larvotists that can cause infestation in the secondary - intermediate hosts is one of the most important factors in evaluating the protective effect of complex immunization formulations. Infective material obtained in the course of the experiment from the experimental mice we studied by bioassay in other laboratory mice.

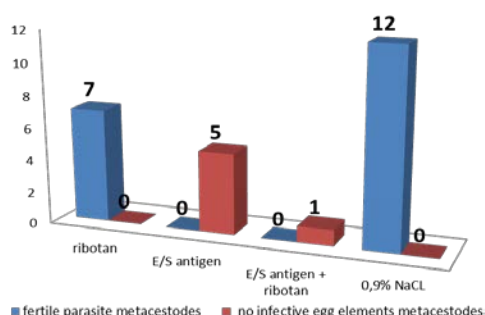


Fig. 5 Comparative results between the presence of mature pathogens and non-invasive elements in metacestodes in secondary experimental echinococcosis.

Figure 5 presents results of the comparison between the presence of invasive pathogens and undeveloped elements in metacestodes in the secondary echinococcosis. There are significant differences between metacestodes with no infective egg elements and fertile parasite metacestodes. The greatest positive influence of immunoprophylaxis showed complex application excretory-secretory antigen (60 µg) and Ribotan (5 µl). In this group (group 3) only one mouse developed singular metacestodes in the liver, which didn't contain infective egg elements. The use of the E-S antigen had a positive effect too. The number of animals having developed larvotists was higher in this group than in the group 3. But these metacestods were small and didn't contain the same elements invasive. Application

immunomodulatory ribotan (experimental group one) led to a decrease in the number metatsetods, but all the elements were fertile and invasive. But the highest number of mature pathogens developed in group 4 (control). All mice were infected in this group, all showed fertile parasite metacestodes.

The main objective of this work is evaluation the protective efficiency of immunization against secondary alveolar echinococcosis, with an antigen from *Echinococcus multilocularis* protoscolexes in combination with Ribotan immunostimulation.

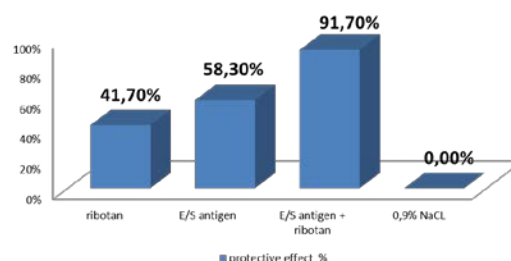


Fig. 6 protective efficiency of immunization against secondary alveolar echinococcosis.

Figure 6 presents results of evaluation the protective efficiency of immunization against secondary alveolar echinococcosis. We can see that the maximum protective effect was achieved in the third group in the with application an antigen from *Echinococcus multilocularis* protoscolexes in combination with Ribotan immunostimulation.

Application of Ribotan or E-S antigen separately, didn't show strong protective effect.

#### 4 Conclusion

Our experiment showed that the use of immunostimulators in combination with specific antigens for the immunoprophylaxis against secondary alveolar echinococcosis has a synergistic effect on the treatment. Thus, in all the experiments it was clearly demonstrated the advantage of the drug complex comprising the specific antigen and immunostimulating agents, to achieve the best protective effect.

Our data are actually not inconsistent with the results of other researchers which have used various immunomodulating and adjuvant agents. That enhance the immunogenicity of antigens as a means of increase potentiation animal body defense mechanisms against helminthiasis [12, 6, 7, 16, 18].

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## DEFORMATION ANALYSIS OF FLEXIBLE WHEEL IN THE HARMONIC DRIVE

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VEGA 1/0515/13, Draft design layout and architecture of intelligent implants, KEGA 021TUKE-4/2015, Development of cognitive activities focused on innovative educational programs in the engineering, construction or modernization of specialized laboratories designated in logistics and inter-operational transfer.

**Abstract:** The harmonic gearing unquestionably include among a prospective technology. It is about spur gearing where the meshing is achieved by the flexible deformation of one of the wheels. As a result of this deformation the shape of the flexible wheel changes from its original state resulting in incorrect meshing with the teeth of the opposite profile wheel. The deformation of the shape of the flexible wheel is the result of collision and interference, as well as the contact rate, occurring during the meshing of the flexible wheel with the rigid one. This transfer reaches some excellent properties such as great transference number in one stage, a sufficiently large effectiveness of a great kinematic accuracy and wide application. The disadvantage of a harmonic gear is that they are sensitive to the torsion oscillations, design complexity and reduced service life of the elastic wheel.

**Keywords:** Harmonic drive, elastic gear, finite element methods (FEM), model, deformation analysis

### 1. The Harmonic gear

The harmonic gearing (Fig.1) is basically a differential gear with a train of spur gears where the mesh is achieved by the flexible deformation of one of the meshing wheels. Flexible wheel 1 has outer gearing, solid wheel 2 has internal teeth. Both wheels have the same module and pitch. Flexible wheel has less teeth than a solid wheel.

The first speciality rests in the fact that in gear and thus and the transmission at the same time a greater number of teeth involved. The greater the of load be will transmit flexible member team will grow and its deformation and therefore a greater number of teeth will huddle in toothed.

The second peculiarity the harmonic gearing rests in that, due to changes in shape of the elastic wheel from the load, or due to the choices an shape of the wave generator there is a change a very the small the relative movement between the teeth, the contained the with in toothed engagement. The third particularity is also conditional on the design of the flexible wheel rests reduce of angles of pressure of kinematic pair of wave generator - of the flexible wheel, as reflected by the reduce friction of sides this pair in compared catch cam - satellite in the planet gear. The principle of harmonic gear (Fig. 1).

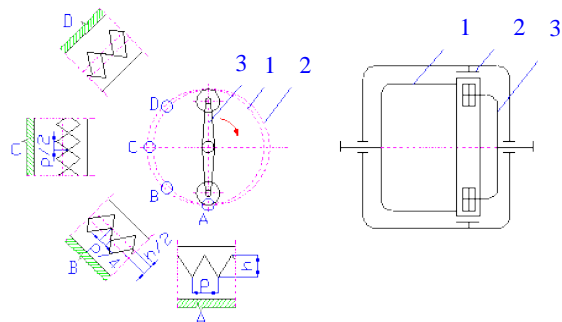


Fig. 1 Harmonic drive 1 - flexible Wheel, 2 - solid sprocket, 3 - wave generator

### 2. Types of generator

Types of the wave generator:

- Four-cylinder generator - every deformation – wave – of the flexible wheel is created by two cylinders.

- The multiple-cylinder generator – enables the ensurance of the required shape of the flexible wheel deformation in all its circumference, while the load of individual cylinders will differ according to the deformation zone of the respective cylinder.
- A disc generator – creates waves with a greater curve radius.
- A cylinder generator- a kinematic bond between a cylinder generator and a flexible member can happen via frictional or rolling kinematic pairs. The cam of the generator can be in the shape of a circle, ellipse, logarithmical spiral, evolute or other curved line.

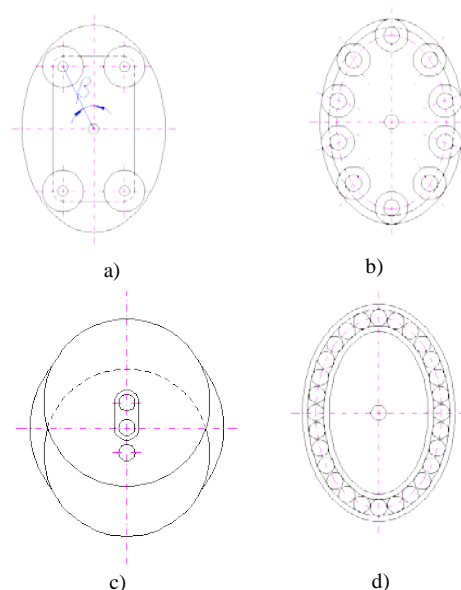


Fig. 2 a) four-cylinder generator , b) the multiple-cylinder generator c) a disc generator, d) a cylinder generator

### 3. Elastic deformation of the wheel and its impact on gearing

The existence of a flexible wheel in harmonic gear box of that are deforms at work, need a special approach to the investigation in the mesh in this gear. Above all, it is necessary to show the influence of the deformation flexible of the wheel on the shape of teeth. Flexible the wheel is to during operation straining very negative.

The following are the main stresses:

- Deformity Stress induced by the generator
- Stress induced/generated by the transmitted load
- The elastic deformation of the harmonic wheel may be twofold.

As a result of the adverse stress the flexible wheel is the limiting part of the load-bearing capacity of the harmonic gears. The elastic deformation of the harmonic wheel may be:

- Free form deformation, is where the harmonic wheel is deformed by the cylinders of a smaller cross-section. A harmonic wheel deforms into an approximately elliptical shape.
- The forced deformation, where the shape of a harmonic wheel is given by the shape of the generator of harmonic deformations.

A second case is preferable, because the harmonic wheel can be deformed into any shape. If we want to use involute gearing must have the pitch curve harmonic wheel after deformation in the area of a in mesh the shape circle line.

The deformed shape of the flexible wheel can vary providing two conditions:

- the roller curve of the deformed wheel has to be of the same length as its roller circle before the deformation so that the pitch would remain unchanged,
- the extent of the deformation must not exceed the breaking limit of the flexible wheel under the influence of stress.

The size of deformation of the flexible wheel has a significant impact on the character and quality of the mesh.

In case of radial deformation  $w_o = m$  touching the pitch circles of cogging (Fig.3a)) and flexible wheel cogs mesh with the profile wheel cogs in its full height. If  $w_o < m$ , the pitch circles do not touch (Fig.3b)) and side clearance is created. When side clearance is great, the cogs of the flexible wheel can move within the gaps of the profile wheel without transmitting movement. The stated short-comings are removed by the negative shifting of the tool for working the profile wheel cogs (Fig.3c)). If  $w_o > m$ , the pitch circles cut interfere (Fig.3d)), the interference is removed by the positive shifting of the tool for working the cogs of the profile wheel.

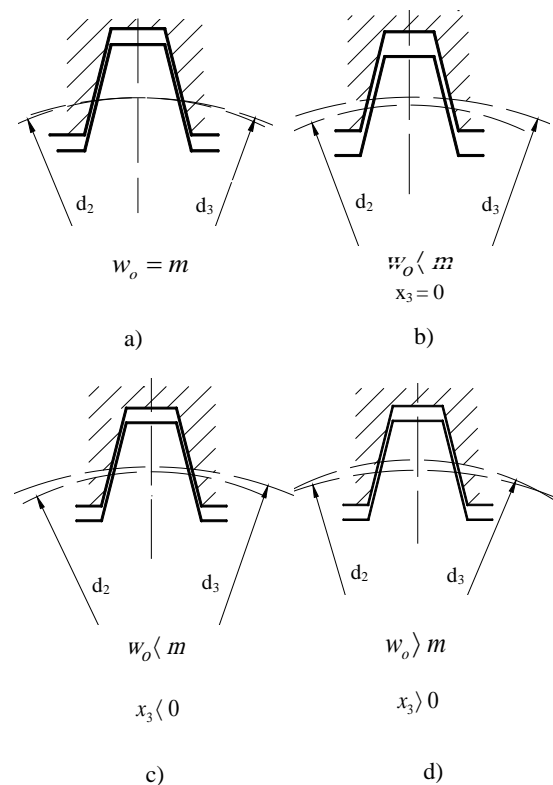


Fig. 3 Variants gearing

$d_2$  – diameter flexible wheel,  $d_3$  – diameter of solid wheel,  $x_3$  – shifting tool during operation teeth the solid wheel.

#### 4. Determination deformation flexible wheel using FEM

Flexible cog-wheel is during operation stressed very negative. The stress from the generator deformation, the load bearing stress and local stress from the cog bending in the cog gaps are present in it. As mentioned before, the deformation alters the cogs' shape and they do not fulfil the correct meshing conditions any more.

The problem of the tooth deformation has been researched by many authors. The older works emerged from the classic theory of elasticity and treated a tooth as a fixed beam. In the experiment conditions the tooth deformation is mostly determined by a static measurement of the tooth deformation

loaded with a constant power or it is determined with the measurement of the divergence during a slow rotation. Currently the finite element method (FEM) is one of the most prevalent numeric methods. Modern program systems FEM utilising the ever-growing facilities of the computer equipment enables to solve even very complicated tasks.

Size of the deformation of the elastic wheel is detected in two cases, namely:

Alternative 1 – if the force emergent from the wave generator is applied in the center of the tooth (Fig. 4).

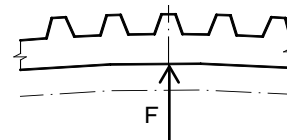


Fig. 4 The applied force in the center of the tooth

Alternative 2 – if the force emergent from the wave generator will operate in the middle tooth gap (Fig. 5).

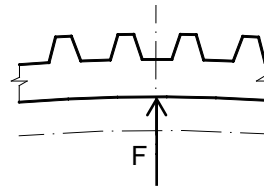


Fig.5 The applied force in the middle tooth gap

#### 5. A creating the geometric calculation model

The gradual processing of individual steps by the Cosmos/M programme created a geometric model of a flexible wheel cog (Fig. 6) – generated using the generating commands to represent the surveyed model which is a  $\frac{1}{4}$  of the flexible wheel with the cog number  $z = 172$ .

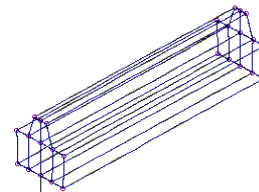


Fig.6 The final form of the tooth before generation

To be able to proceed in solving the static deformation analysis using FEM gearing is necessary, appropriate proposals boundary conditions.

In mechanics flexible bodies can distinguish two types of boundary conditions:

1. Geometric limit conditions
2. Force limit conditions

In case solutions deformation tooth the elastic wheel the harmonic gear using FEM, we select all the displacement and rotation in place solid and the inflexible link zero bond. Bonds were placed on the left side of the model in the direction of the  $y$  axis on the frontal part of the wheel of the  $z$  axis and then on the active part of the wheel in the direction of the  $x$  axis (Fig. 7). Regarding the prescribing of surface forces, has proposed the imposition of force in the place where the action arises the from acting time wave generator.

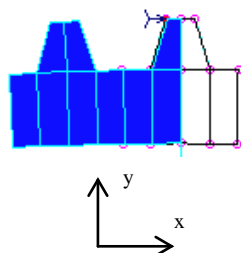


Fig. 7 Bonds were placed on active tooth flank

Other bonds I proposed the active tooth face which is at the moment engaged. The bonds are disposed on both opposite sides of the elastic wheel (Fig. 8) over the full length of the relevant nodes.

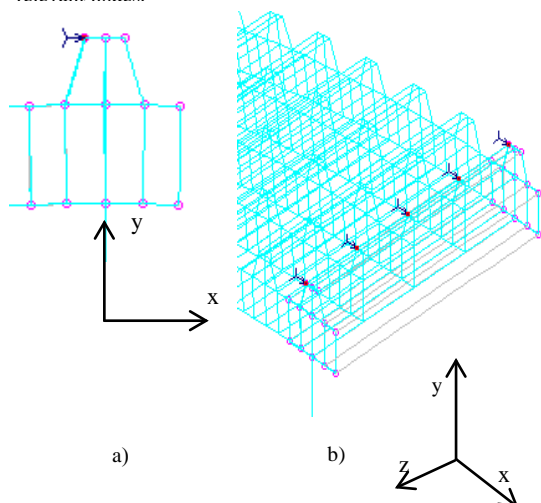


Fig.8 Proposal by shift on active tooth flank  
a) front view, b) view 3

Action of force boundary conditions prescribed surface forces. In this alternative I proposed the force in places where there is the arises action of waves and the generator is stored in the center of the tooth that is engaged (Fig.9). Burdensome strength for flexible wheel the unit. Because my computing model is  $\frac{1}{4}$  of the flexible wheel, the extent of the input force will be as follows:

$$F = 1 \text{ N} - \text{unit force for whole the flexible wheel}$$

onto  $\frac{1}{4}$  the wheel:

$$F = \frac{1}{4} = 0,25 \text{ N}$$

as shown in (Fig. 9) the total force divided into 5 and the value of one will be:

$$F = \frac{0,25}{5} = 0,05 \text{ N} \Rightarrow \text{magnitude of the force I specify at insert forces.}$$

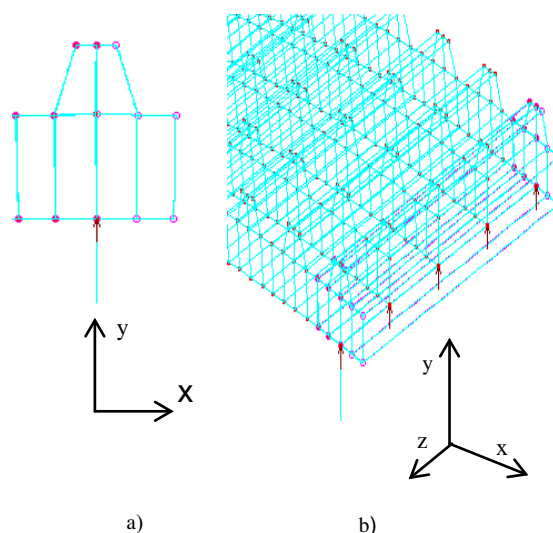


Fig. 9 Deposition the applied force in the middle of the tooth a) Front view, b) 3D view

The following have been defined in a flexible wheel (Fig. 10), we get the final shape of computational geometric model and can convert static calculation.

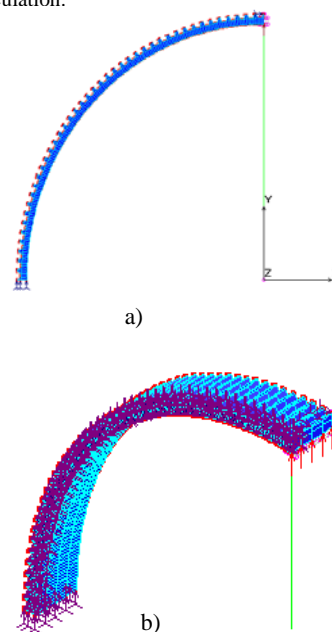


Fig. 10 The final shape of computational geometric model a) front view, b) view 3D

## 6. Reatment of results

Processing of calculated results is important, the final part of the finish calculated finite element method. In tasks of mechanics of deformed bodies are generally the most important results of the nodal displacement, stress and deformation.

To detect displacement, stress and deformation will the use animation. Animation is an easy way representation of the deformed shape of the structure.

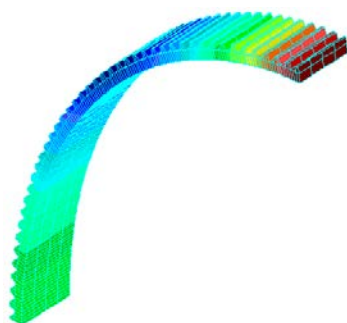



Fig. 11 Deformed shape of the flexible wheel

Tab. 1 Size deformation which with creates from the deformation of elastic wheel

Color resolution	Displacement values when force is applied at the center of the tooth [mm]	Displacement values when force is applied in a notched gap [mm]
	0,082126 0,07552 0,068914 0,062308 0,055702 0,049096 0,042490 0,035885 0,029279	0,0800237 0,073788 0,067338 0,060888 0,054438 0,047989 0,041539 0,035089 0,028640

If we compare the values of the resulting shifts from the coloured area, we discover that smaller values occur when the power generated by the wave generator acts in the middle of the cog gap ( Alternative No.2). As mentioned before, the deformation alters the cogs' shape and they do not fulfil the correct meshing conditions any more. Because the cog's shape after the deformation can be determined using MKP, it is consequently necessary to create a profile that mirrors the profile of the flexible wheel cog after the deformation. This would minimise interference and contact impact.

## 7. Conclusion

The harmonic gearing unquestionably include among a prospective technology. A harmonic gear is basically a differential gear with a train of spur gears where the mesh is achieved by the flexible deformation of one of the meshing wheels. The extent of the flexible wheel deformation is coherent to the character and the mesh quality. The difference lies in the fact that more cogs/teeth participate in meshing and thus also in transmission at the same time. The existence of the flexible wheel within the harmonic gear which undergoes deformation during the process of usage requires a specific approach in the mesh examination of this gear. Processing of computed results is an important part of the final calculation by finite element method Processing calculated results is important, the final part of the calculation by finite element method. The tasks of the mechanics of deformed bodies are generally the most important results of the nodal displacements, stress and deformation.

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## Primary Paper Section: J

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