

Impact of enterprise size and foreign private equity to exploit of Business Intelligence in Slovak construction enterprises

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ABSTRACT : *Planning and management is one of the criteria how to successfully manage the construction enterprise. Currently, there are several support solutions that facilitate decision-making. One of them are Business Intelligence solutions. Several studies indicate that their use have a lot of benefits. Article discusses the issue of exploitation level of Business Intelligence in Slovak construction enterprises. The main objective of this article is to confirm the hypothesis that answers to the following questions: Does the size of the construction enterprise impact on the exploitation level of Business Intelligence in Slovak construction enterprises? And next questions: Does the foreign private equity of the construction enterprise impact on the exploitation level of Business Intelligence in Slovak construction enterprises?*

KEYWORDS -*Business Intelligence, Slovak construction enterprises, exploitation*

I. INTRODUCTION

Currently, information systems are recorded expansion. All fields recorded progress in the use of information and communication technologies. These technologies may represent tools that are helpful for different things [1]. Facilitating of decision-making is one of the purposes for which it can use information systems. A successful enterprise is based on right everyday decisions. These decisions must be supported by facts. Only with correct information and facts, enterprise and managers are able to make the right decision. This applies to every business in every area, not excluding construction. Construction or civil engineering is very difficult to manage. Construction has few specifics. Every construction project is original and unique. Building business requires financial resources. All this increases the pressure on the right decisions. Business Intelligence (BI) represents a tool for decision support.

II. THEORETICAL REVIEW AND PROBLEM STATEMENT

The issue of Business Intelligence is a very hot topic. Implementation and use of Business Intelligence tools has increased. This implies that to do research and to address this issue is more than important. Many authors address the issues of BI associated with its benefits. Eckerson examined in particular the following benefits from the implementation and use of BI [2]: time savings, improve strategies and plans, improved tactical decisions, more efficient processes, the cost savings, to increase customer satisfaction, to increase employee satisfaction, the return on investment (ROI), the increase in sales and an increase shareholder value. Thompson also discloses BI issues related to its advantages and benefits [3]. The author declared the following benefits from the implementation and use of BI: the faster and more accurate reporting, for improved decision-making, to improve the quality of customer service, the increase in sales, the cost savings on IT, the savings of other (non-

IT) costs. On this subject also contributed Howson[4].He reached the following benefits of using BI: the increase in overall business performance, to improve access to data, support of major shareholders of the company, to simplify the user to view data, the return on investment (ROI), the increase in the number of active users of the system and the cost savings. Other authors also address the issues associated with BI and its benefits like Jiruše[5]a Lachlan [6].

In contrast, another group of authors address issues related to barriers that hinder to implement and use BI.Pour define three areas that affect the implementation of BI[7].Sheps in his paper titled "Business Intelligence for Dummies" also specify barriers in implementing BI [7]. Eckerson in its survey focused on not only the benefits but also the barriers in the use of BI[9].Škanta[10]conduct a similar survey in the conditions of the Czech Republic.This issue is also discussed other authors asSabherwal a Becerra-Fernandez [11], Boyer [12], Williams [13], Adelman a Schrader [14].

Other authors conducted a survey focused on the key success factors of Business Intelligence projects.Atre was one of the first researchers who discussed the issue of BI key success factors[15].At the same time in this period they were conducted several researches focused on BI key success factors such as research carried out [2,16, 17]. Authors like Novotny, Pour and Slanský and others have discussed this issue in the Czech Republic[18].In recent years, this issue devoted other researchers asHowson, Arnott, Hwang, Turban et al, Panta, Hawking and Sellitto, Škanta, Yeoh and Koronios, Lachlan, Adelman and Schrader. In the Slovak Republic was the similar research conducted in 2015 by researchers asHabiňáková and Čarnický.

Despite the great interest in this topic, all known surveys were conducted in general. This means that companies have been not differentiated by sector.All findings were universal to all areas of industry and sector.The results of those studies are certainly important, but for a more detailed understanding of each sector, it is essential to conduct a survey of an industry specific.Because each sector has its own specifics, it is necessary to do so for a variety of industries and fields.Construction is typical their particularities and specifics, it also requires a similar survey. Likewise ever it has been carried out research into the use of BI in a particular sector. This paper brings the results of research interested in civil engineering.

III. METHODS OF RESEARCH

In the article they were used empirical methods of investigation and research. Within the empirical methods were used on a larger scale observation, questionnaire survey. The methodological framework during the research includes these activities:

1. Determine the subject and scope of research.
2. Selection of the research group and content.
3. Processing questionnaires for data collection.
4. Data collection.
5. Evaluating data based on the detection levels of importance factors examined.
6. Verify the statistical significance of the results based on the Kruskal-Wallis test.

IV. DATA COLLECTION AND RESEARCH SAMPLE

All data were obtained by questionnaire survey.The questionnaire was designed and distributed in electronic form. Questionnaire was created in online platform FORMEES that permit the questionnaire in electronic form, accessible to him of the selected target group respondents based on the destination address where the questionnaire is placed. This form ensures that the questionnaire can only see no adverse unprofessional person and us respondent.

The survey sample was approached by e-mail with the request to participate in the research. Total were interviewed 1276 of respondents (participants of construction projects). It participated in the questionnaire survey 125 respondents, but only 55 companies completed the entire questionnaire to use in our research It represents a return of 4.31%. Given the scale of the areas examined in the questionnaire survey, it is possible to return to the level of 4.31% is considered as good. Complete the questionnaire contained approximately 2,500 research questions; broken down into research areas of the same nature and its actual completion took approximately 50 minutes.

Main characteristics of research subjects in terms of the size of the company we can see in Figure 1. 34,55% of micro-companies, 30,91% of small companies, 21,82% of medium-sized companies, what constitutes 12,73% of the research sample and 12,73% of large enterprises were participated in research.

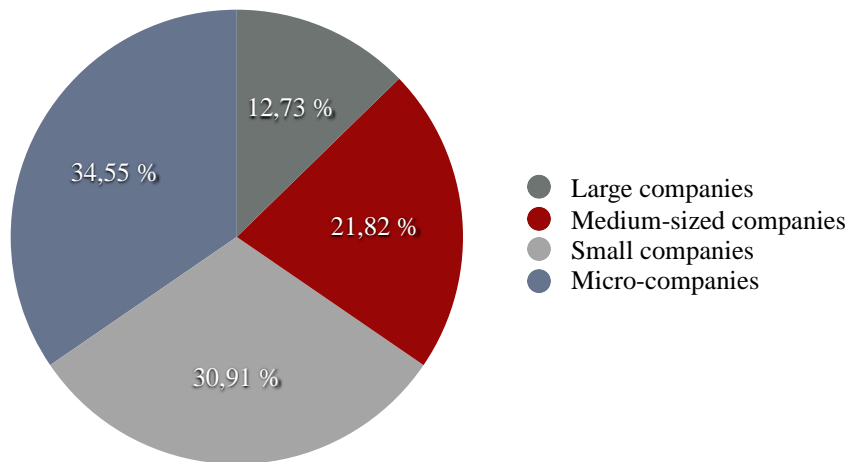


Fig. 1 Characteristics of the research sample by size of construction enterprises

In terms of research objectives it is necessary to comment on the breakdown of enterprises by the owner of the enterprise (or the use of foreign capital) (Fig. 2).

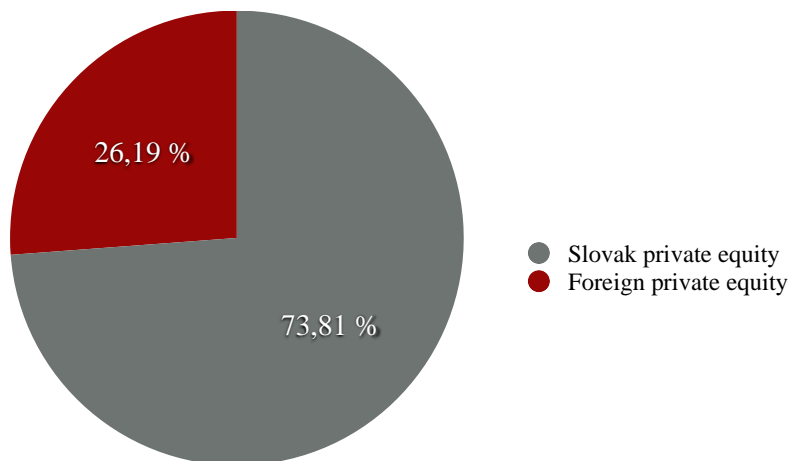


Fig. 2 Characteristics of the research sample by owner of construction enterprises (or the use of foreign capital)

V. DATA PROCESSING AND RESEARCH OBJECTIVES

The obtained data were evaluated based on several statistical methods through software MS Excel and statistics. Research results Processing was based on the descriptive and inductive statistics.

Evaluation of data was based on the use of so-called exploitation rate, respectively impact rate. The range was fixed by Likert scale (1 to 5). Using the measured has been made arithmetic mean of the values for the selected area under consideration.

Statistical significance was tested by Kruskal - Wallis test at the significance level $\alpha = 0.05$. Kruskal - Wallis test (Kruskal - Wallis ANOVA) is a direct generalization of the Wilcoxon two-sample test case for independent samples. Kruskal - Wallis test is similar to the non-parametric one-way analysis of variance [19].

Kruskal - Wallis test is based on the ranks. This is a non-parametric method for testing. Research samples were tested, whether they were of equal distribution. It is used to compare two or more samples dependent on the same or different size [20,21].

The main objective of the research was to verify that enterprise size has a significant impact on exploitation of Business Intelligence in Slovak construction enterprises. In other word, large construction enterprises use Business Intelligence more, than SMEs. That means there are differences between difference size groups of construction companies in exploitation of BI. It comes with the knowledge that large enterprises to a greater extent invest in new technologies. The same situation is in tracking the impact of foreign prime equity on utilization rate at BI.

VI. RESEARCH RESULTS

The survey wanted to build on the results of the surveys conducted in the use of BI in Slovakia. Carried out research mapped the situation in Slovakia as a general. Existing surveys are very important because it referred to the situation and possible directions and expectations of BI in Slovakia. The construction sector was still unexplored, however. The exploitation rate presents level of BI in filed of construction or civil engineering. This step is like the instrument used in the field. The exploitation rate of Business Intelligence in Construction enterprises in Slovakia is 2.54. This is not very high. What do these results mean? Generally, construction field is a sector that has a small level of investment in ICT. Construction enterprises prefer to invest to construction machinery and equipment, not to ICT. As research has shown, the reason is the perception of managers of construction enterprises that ICT don't have added value to the construction and productions. The observation that is very important. The survey shown that 87% of construction enterprise managers in Slovakia said that they prioritize investments in equipment at a construction site before investment to ICT. The value of 2.54 is relatively low. It is important to differentiate and analyze the results. Important is the view of the results according to the classification of enterprises according to their size. There are any differences between the sizes of enterprises? The results are shown in Figure 3.

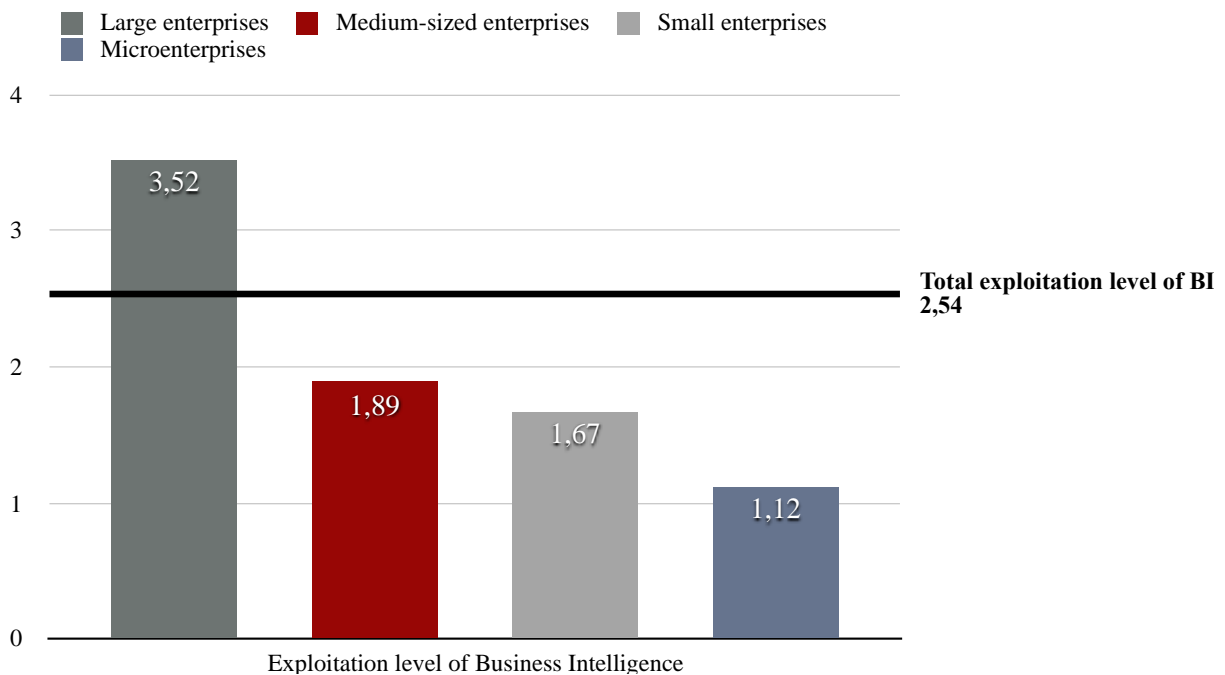


Fig. 3 BI exploitation level in Slovak construction enterprises (Breakdown of enterprises by size)

BI Exploitation level of large Slovak construction enterprises present 3.52. This means significant use. This higher value compared to the average reflects higher investment options of large construction companies in ICT. Small enterprises use this instrument at 1,67 and medium-sized enterprises at 1,89.

Exploitation rate in microenterprises achieved 1,12. They are very low. These results explain that only large enterprises use BI. Other groups this instrument hardly used at all.

These results were then subjected to the Kruskal-Wallis test. Table 1 describes the Kruskal - Wallis test for examining the statistical significance of construction enterprises size impact on the exploitation of Business Intelligence. BI amounted $p = 0,0144$. From that it follows that statistical significance was confirmed a confidence level of $\alpha = 0.05$ and we accept the statement, that enterprise size has an impact on the use of BI in Slovak construction enterprises.

Tab. 1 Results of Kruskal-Wallis ANOVA based on ranking (Breakdown of enterprises by size)

Kruskal-Wallis ANOVA based on ranking, Variable – size of construction enterprise
 $p=0,0144$

	Code	Number of valid responses	Exploitation level
Large enterprises	1	7	3,52
Medium-sized enterprises	2	12	1,89
Small enterprises	3	17	1,67
Microenterprises	4	19	1,12

As part of the research here we are then focused on results in terms of segmentation by utilizing foreign private equity. Enterprises with foreign private equity are larger and they have more financials. The assumption that the representation of the foreign partner will affect the use of Business Intelligence is very probably. The impact of foreign private equity to exploit the BI is described in figure 4.

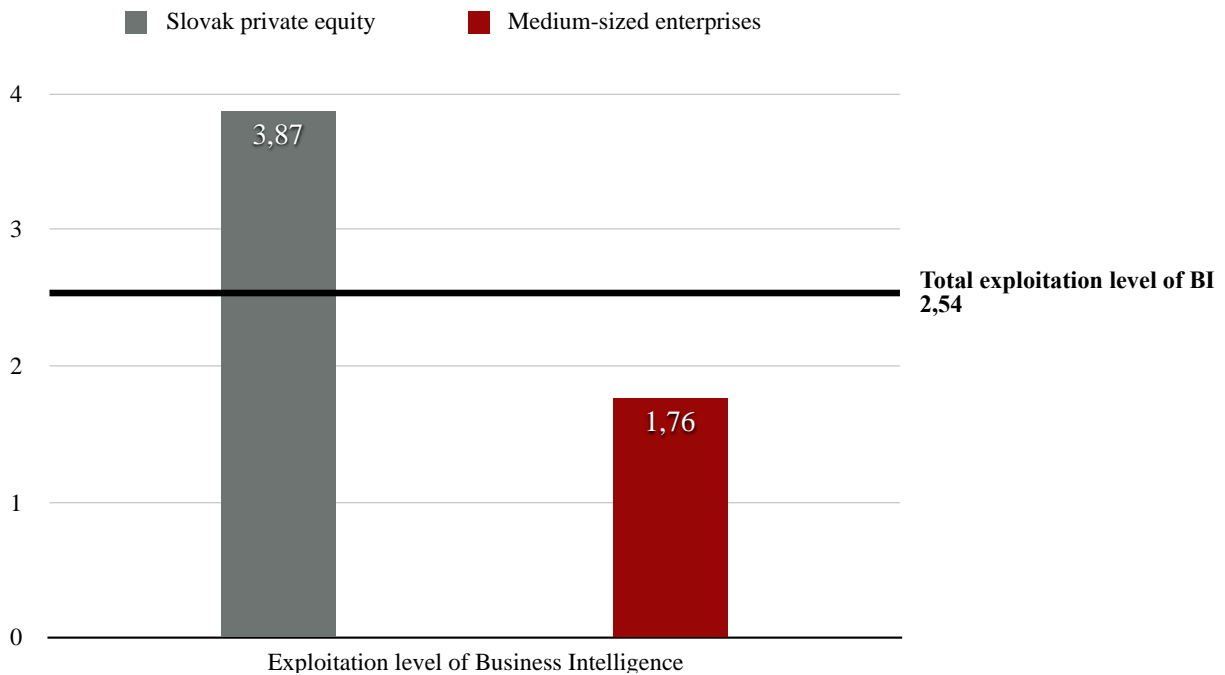


Fig. 4 BI exploitation level in Slovak construction enterprises (Breakdown of enterprises by private equity - owners)

BI Exploitation level of construction enterprises with Slovak private equity achieves 1,76. This means not significant use. The situation is different in enterprises with foreign private equity. These enterprises use this instrument at 3,87. Foreign investors are pushing investment to ICT. That is a big difference between the Slovak construction companies and those managed by foreign partners. Statistical significance was again verified on Kruskal-Wallis test (Tab. 2).

Tab. 2 Results of Kruskal-Wallis ANOVA based on ranking
(Breakdown of enterprises by private equity - owners)

Kruskal-Wallis ANOVA based on ranking, Variable – size of construction enterprise p=0,0256

	Code	Number of valid responses	Exploitation level
Slovak private equity	1	44	3,87
Foreign private equity	2	11	1,89

Table 2 describes the Kruskal - Wallis test for examining the statistical significance of private equity impact on the exploitation of Business Intelligence. BI amounted $p = 0,0256$. From that it follows that statistical significance was confirmed a confidence level of $\alpha = 0.05$ and we accept the statement, that private equity has an impact on the use of BI in Slovak construction enterprises.

VII. CONCLUSION

The exploitation of ICT has several advantages in the construction industry. BI field have been the subject of several investigations, no research has been conducted on a particular sector, for example civil engineering and so on. This research addresses the impact of enterprise size and foreign capital to exploit the BI. Research results demonstrate the impact of these factors on the use of BI in Slovak construction enterprises. Large enterprises generally greater instance do investments to the ICT. That is why these companies also use BI.

In general, large construction enterprises use this instrument. Likewise, companies that use foreign private equity also use BI tools. Small enterprises and enterprises exclusively with Slovak private equity not use this tool. In general, the exploitation rate of BI in construction is not high. Construction companies invest primarily in machinery and equipment.

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