

EXPLOITATION OF ECONOMIC INFORMATION SYSTEMS FOR COST MANAGEMENT IN SLOVAK CONSTRUCTION COMPANIES

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Abstract: Planning and cost management is one of the criteria how to successfully manage the company. This contributes several instruments. One of them are information systems and economic information systems. Several studies indicate that their use have a lot of benefits. Article discusses the issue of exploitation level of economic information systems for cost management in Slovak construction companies. 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 information systems in the cost management of construction enterprises? What is overall the exploitation level of economic information systems for cost management in Slovak construction companies?

1 Introduction and theoretical background

Civil engineering industry is characterized by fragmentation that exists both within individual phases as well as across project phases [1]. Participants from various organizations who are involved in a project phase or in different project phases are facing ineffectiveness and inefficiency in their coordination, collaboration and communication [2]. Cost management is important issue of construction company management [3]. Economic information systems has become a prerequisite to manage companies more efficiently and effectively [4].

Progress of information and communication technologies (ICT) is undeniable in every sector of industry. Economic information system is a complex economic and accounting software for businesses in any area. It allows for a simple and double-entry bookkeeping, and also includes other modules for managing economic agenda [5]. Information economic system (IES) can be defined as a set of people, processes, hardware and software ensuring the collection, transmission, storage and processing of economic data with a view to distribution and presentation of information to users operating in the management system for the needs of their decision-making. This general definition of IES is the basis for different types of IS, in particular, the enterprise information system [6]. It is a system for collecting, receiving, selected and information exchange. Economic information systems usually include some modules, as:

bookkeeping, invoicing, warehouse management, cost management and so on [7].

2 Methodology

According to several studies the exploitation of economic systems leading to cut off overall company costs. As already stated in the introductory part of the article, abroad there are several studies confirming the assumption that large companies use of economic systems at a higher rate. Based on these statements, it was setting objectives of this article, which are described in the section "research sample." Before it is necessary to formulate the basic research problems.

2.1 Problem formulation

In recent years, our environments are driven by changes in society, fast growth by science, technology and knowledge development [8], [9]. Implementation of information systems in enterprises is relatively difficult process. Many studies, which are also mentioned in the introductory part of the article, it appears that larger businesses increasingly using information and communication (ICT) systems in general [9]. ICT is a general term for all systems. Economic systems are one of the ICT. For managing economic agenda they are being used to a greater extent. This includes activities such as:

- Bookkeeping,
- Invoicing,
- Warehousing management,

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- Payroll and human resources,
- Quality Assurance and Control,
- Cost management.

2.2 Research objectives and methods

The issue and the objective of this article are closely related to the issue of the use of economic systems in cost management of construction companies. Theoretical analysis and detection of exploitation level of the different technologies is one of the objectives of my dissertation. Between these ICT include economic systems such as carrier and comprehensive solution of information systems for the management of construction companies and construction project management. The main objective of this article is to confirm the hypothesis that answers to the following:

- Does the size of the construction enterprise impact on the exploitation level of economic information systems in the cost management of construction enterprises?
- What is overall the exploitation level of economic information systems for cost management in Slovak construction companies?

The article also describes the use of economic systems in various economic activities. Based on the above arguments were set as follows hypotheses:

HA1: Company size has a positive impact on the exploitation level of economic systems in the cost management of Slovak construction companies.

H01: Company size has not a positive impact on the exploitation level of economic systems in the cost management of Slovak construction companies.

In other words we can say that large companies will use economic systems to a greater extent. Another hypothesis concerns the overall exploitation level of economic systems for cost management in Slovak construction enterprises.

HA2: The overall exploitation level of economic systems for cost management in Slovak construction companies is good.

H02: The overall exploitation level of economic systems for cost management in Slovak construction companies is not good.

What does it mean good. Exploitation level measured at the 5 level Likert scale. Values above 4, we consider to be very good. Values above 3, we consider to be good. All values below 3 we consider to be not good. This means that overall exploitation level of economic systems for cost management in Slovak construction companies will be more than 3. Due to the nature of the problem and the main objective of the article they were selected appropriate statistical methods that can detect and analyze relationships between variables of interest – correlation and regression analysis. The objective of correlation and regression analysis is a description of the statistical properties of the relationship between two variables.

Within inductive statistics were performed statistical hypothesis tests (tests of statistical significance). Statistical hypothesis testing is a process of verifying the correctness or incorrectness hypothesis using the results obtained at random. When testing the statistical hypothesis of the research have been observed following, generally known steps (www.rimarcik.com).

1. Formulation of the null hypothesis (H_0), which expresses the independence of variables, i.e. absence of a relationship between variables.

2. The formulation of the alternative hypothesis (H_A), which shows statistical dependence variables, namely the existence of a statistically significant relationship between variables.

3. Determining the level of significance (α).

The significance level α is the probability of error of the first kind, which we do, if we reject the null hypothesis (H_0) that actually pays. Was determined significance level $\alpha = 0.05$ (5%).

4. Calculation of test statistics and probability.

The test statistic was calculated from the sample, which has provided the veracity of the null hypothesis (H_0) the probability distribution. P-value is the lowest level of significance, leading to the rejection of the null hypothesis (H_0) - the lower, the more we are convinced that the null hypothesis (H_0) is not true and should be rejected.

5. The decision - reject or not to reject the hypothesis.

It formulated a conclusion statistical test. If $p < \alpha$, i.e. if $p < 0,05$ null hypothesis (H_0) was against the relevant alternative hypothesis (H_A) rejected, which means between variables exists relationship, if $p \geq \alpha$, that is, if $p \geq 0,05$ zero hypothesis (H_0) has been rejected. We did not have sufficient evidence to have argued that there is a relationship between variables. There have been used three degrees values of significance p:

*** $p < 0.001$ - very highly statistically significant relationship

** $p < 0.01$ - statistically highly significant relationship

* $p < 0.05$ - significant relationship

2.3 Research sample and data obtaining

The questionnaire survey featured data collection using the online questionnaire. Link to the online questionnaire was together with an explanatory covering letter sent to respondents in electronic form. The questionnaire titled was created as a system of targeted questions designed for contractor and sub-contractor of construction processes, planners and architects. In order to verify the questionnaire, mainly to test the formulation of clarity of individual items, it was a sample of 42 companies and projects, realized within pre-research. The pre-research is the basis for verification of selected research sample for research in the realization of a dissertation thesis.

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Based on this group of companies, it was subsequently randomized defined research sample. Choice of subjects in the research sample was not limited by other criteria such as occupation of the enterprise, region or company size etc. It can be concluded that the fundamental requirement of ensuring representativeness, the survey sample was complied with.

Main characteristics of research subjects in terms of the size of the company we can see down. Participated in the survey and a questionnaire completed by 5 micro-companies, 10 small companies, what constitutes 23.81% of the research sample, 15 medium-sized companies, what constitutes 35.71% of the research sample and 12 large enterprises, representing 28.57% of the sample (Figure 1).

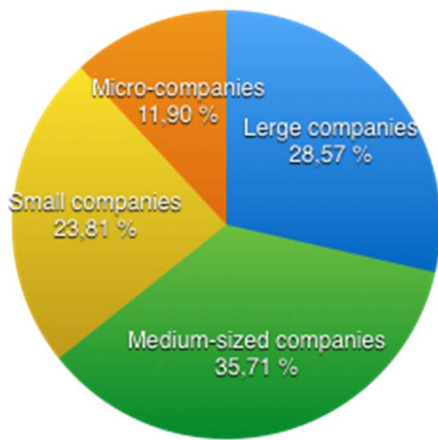


Figure 1 Characteristics of the research sample by size of construction company

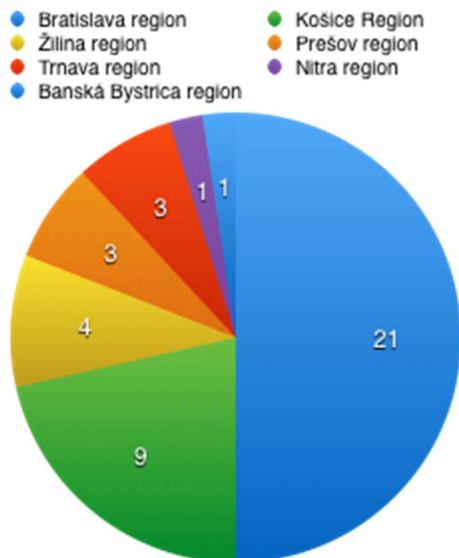


Figure 2 Characteristics of the research sample by region

3 Results

The aim of this survey was to understand and verify the effect of size on the use of economic systems. Endpoints

are compared between companies. It is expected that large companies behave differently in ICT investment as small and medium sized companies (SMEs). The results of the use can be seen in figure 3.

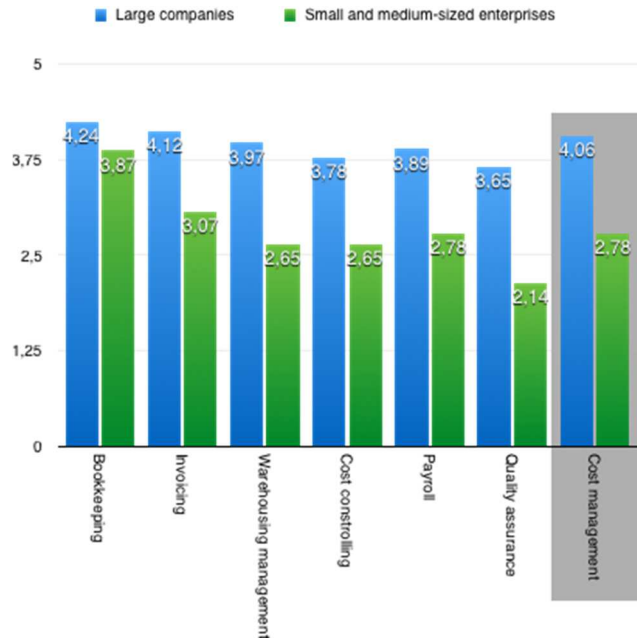


Figure 3 Exploitation level of economic information systems for cost management

As regards the use of economic information systems is the most used bookkeeping module. This is true for both enterprise groups. The trend of using in individual modules of economic information system is very similar. The difference is mainly in the utilization rate. Large companies used each module a greater extent. The most significant difference is in the module of Quality assurance and cost management module. The exploitation level of economic information systems for cost management in large enterprises is 4.06. The exploitation level of economic information systems for cost management in small and medium-sized enterprises is only 2.78. Based on the descriptive statistics we can say that company size has an impact on exploitation of economic information systems for cost management.

Correlation analysis was carried out in the form of correlation matrix, prepared for all variables. To express the degree of correlation dependence between variables in the correlation matrix was used so-called The Pearson correlation coefficient pairwise. Using a two-sided t - test within T - distribution of the test statistic tests were performed statistical significance correlation coefficients.

The hypothesis H1 assumes that company size has a positive impact on the exploitation level of economic information systems in the cost management of Slovak construction companies.. The results of correlation analysis have confirmed the hypothesis H1. For variable was calculated correlation coefficient $r = + 0.407$. Using

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the statistical significance test of the correlation coefficient using two-sided t - test, we have demonstrated a highly statistically significant relationship with the corresponding value of $p = 0.002$, where we note that $p < \alpha$, that is, $p < 0.05$.

To verify another hypothesis is necessary to evaluate the overall scores for the use of economic information systems for cost management. To verify another hypothesis is necessary to evaluate the overall scores for the use of economic information systems for cost management. It is also very interesting to see the relative share of enterprises that exceed a value of 3, which represents good exploitation level.

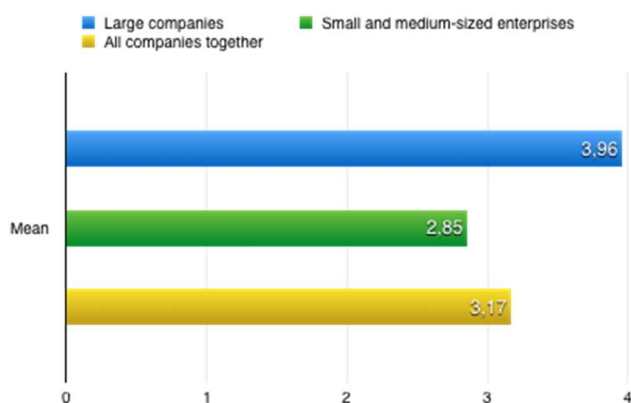


Figure 4 Exploitation level of economic information systems for cost management

Large companies have reached the exploitation level of economic information systems for cost management 3.96. Small and medium-sized achieved the exploitation level of economic information systems for cost management only 2.65. The overall exploitation level of economic systems for cost management represents a value of 3.17. This value is greater than 3. Based on this indicator, we can conclude that the exploitation level of economic information systems for cost management in the Slovak construction companies achieves good level. Relative frequency at individual enterprises is shown in Figure 5.

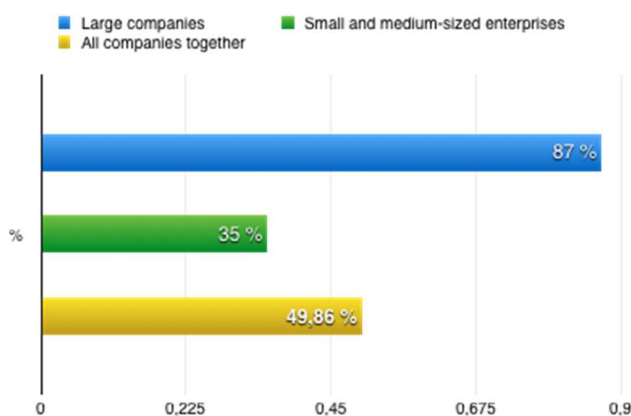


Figure 5 Relative frequency at individual companies

Hypothesis H2 assumes that The overall exploitation level of economic information systems for cost management in Slovak construction companies is good. Based on the research it can be confirmed.

Conclusions

Economic information systems can be seen as a smaller group of information systems used for management of companies in each field. Their benefits are described in various literature. These benefits are indisputable. There are several surveys and studies that address the benefits of using economic information systems. Important it is to monitor the level of use of these systems in various industrial sectors. It is equally important to monitor this parameter in different markets. Both hypotheses in Slovak construction companies were confirmed. Here and opens the way to other markets, and industrial areas. It is necessary to compare these results with other countries. There is also space to move this research, such as the V4 countries that are very similar in some parameters.

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