

Human factor and its role in Business Intelligence projects success

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Abstract: The final result of Business Intelligence project in practice is determined by many factors. In essence, there are two main groups of factors – factors technological and factors personal (organizational). The paper emphasises the human factor and its role in the process of Business Intelligence implementation and use. The purpose of the paper is to examine the impact of a human part on the overall successfulness of Business Intelligence projects in Slovak business practice. Using a Business Intelligence with success doesn't mean just collecting data, it means going further to analyse these data and deliver the right information to the right people. The human factor is exactly what is crucial to data management and to understanding how information ought to be used effectively when doing business activity.

Keywords: Business Intelligence, human factor, sponsorship, Business Intelligence team, corporate culture

JEL Classification: M2

1. Introduction

Institutions operating in today's turbulent and highly competitive environment feel the increasing pressure which forces them to respond almost immediately and in flexible, well-informed and innovative way. Business Intelligence solutions (BI) represent tools, methods and techniques which are strategic for success. They are becoming one of the uppermost priorities for many organizations of today as BI provide significant value by improving effectiveness of a decision-making process.

To ensure the BI project success, the critical role is played not only by the BI technology itself but also by the processes and people who use the available options and tools of the solution in deciding and fulfilling the set goals. Human factor is an integral part of the process of implementing and using BI solutions and one of the key determinants of their success, therefore, it is worth paying attention to it. Personal and organizational factors, and the role that human resources play in the process are the central point of our interest.

2. Literature review

Business Intelligence (BI) applications are supportive tools for decision making. BI technologies help business managers make faster and smarter decisions [1], [2]. "BI applications are used to gain a clearer picture of internal processes, customers, supply chain or financial performance of the organization. They also derive significant value by using BI tools to devise better tactics and plans, respond more effectively to emergencies, and capitalize more quickly on new market opportunities" [3]. To sum up, used and implemented effectively, BI applications allows organizations to improve their business performance and to achieve a competitive advantage.

The overall success of BI projects in practice cannot be evaluated by the company's ability to create and implement a BI solution in due time and within the allocated budget. BI project success depends on the particular values that brings to the company (improved access to data, improved data quality, cost savings, time savings, more active users, etc.) [1], [4].

There is not a clear yardstick for successful Business Intelligence project. One deployment deemed a success may be viewed a failure by another organization, and vice versa. Success is usually measured by end user perception. But the most successful BI deployments don't use return on investment (ROI) as a measure of success [2], [4].

Successful BI solution is usually the result of the right combination of three elements of success [1], [2], [4], [5], [6], [7]:

1. Economic factors
2. Technical (technological) factors
3. Personal and organizational factors

Successful BI solution is not only about collecting data from existing source systems, it means that the available data can be further processed, analysed, and the right information will be provided to the right people. For the efficient management of data and the proper use of the information, the human factor is the key factor.

The software solution itself (technological capabilities and tools) does not guarantee BI project success, if the organization does not have the team of competent and motivated people who are able to assist in selecting, modifying and implementing the solution, and will use its tools correctly in their daily work [8]. Per the author, some features are more important than the technical capability of team members – it is: ambition, determination, initiative, proactive approach, motivation to achieve the best results, flexibility and eagerness for new knowledge and skills, etc. The author also proposes the creation of so-called "hybrid BI workers" – a link between expert IT professionals and ordinary business users, i.e. people who understand the basic processes in the enterprise, and also the BI technology enough to be able to identify a specific problem and solve it by using available technology options.

The greater the extend of BI use in the enterprise, the bigger the importance of communication and cooperation between departments. Interaction and information sharing among various users within the enterprise is one of the key determinants of the success of the entire project [4], [9], [10]. To ensure the cooperation in practice, the steering committee for BI should be set [8]. The committee can be composed of representatives from all business units and functional areas of the company, whose task will be f.e. to set goals and priorities of the project, resolve conflicting interests, identify new opportunities and decide on the allocation of funds.

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In general, people in organizations prevent the changes. The key how to overcome their resistance and ensure success of the project lies in timely preparation and additional support of users before and during the project [10]. It is necessary that the users receive at least a basic understanding of the technology and tools they will use [4].

In BI project a BI sponsor responsible for the outcome should be also involved [1], [4]. The project requires not only appropriate professional management, adequate financial resources and the willingness to invest are required too.

In literature, there are several personal and organizational factors that can be considered crucial for BI project success [1], [2], [4], [5], [6], [7], [11]. Some of them were discussed in this chapter. Based on the literature review and our own previous research experience [12], seven success factors in the category can be determined on which attention will be focused on:

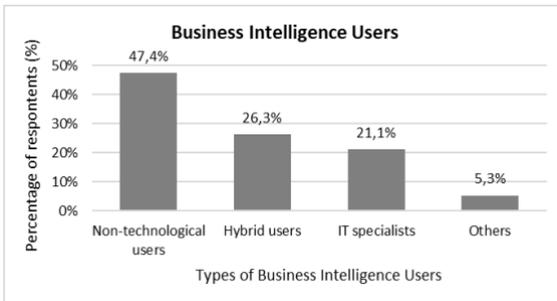
1. Segmentation of BI users (which means user type identification and selection of the right set of BI tools adequate to specific users' needs).
2. Active involvement of a strong sponsor.
3. Support from the executives throughout the company.
4. The right team of skilled and qualified BI workers.
5. Continuous support of users before and during the BI project lifetime.
6. Ensuring communication and cooperation between all participants.
7. Receptive business culture opened to changes.

3. Data and Methodology

The realization of the survey started in January 2018 and is still in progress. The survey is realized via online questionnaire and until now attended by 19 subjects of various sizes and assorted types of economic activities carried out in Slovakia in which Business Intelligence (BI) solutions are currently implemented and used to support decision-making process.

Most of the qualified respondents comprises non-technological BI users (47.4 %), "hybrid" BI users, i.e. business persons with certain technological knowledge and skills (26.3 %), then corporate IT specialists (21.1 %), and others (5.3 %).

Figure 1. Types of Business Intelligence users involved into the survey



The formulation of research problem and the methodology used in the survey is based on the previous survey realized during the period 2014 – 2015 [12]. A research problem has been specified as the analysis of relationships and connections between selected personal and organizational factors of BI and overall success level of BI implementation and use in the management of enterprises in Slovakia.

The problem can be also formulated in the form of two central examination questions:

- What kind of relationship (positive or negative correlation) exists between selected BI success factors and overall success level of BI implementation and use in the management of enterprises in Slovakia?
- Does the relationship exist at a statistically significant level?

Hypothesis H1 – H7 were defined, as follows:

- H1 Segmentation of Business Intelligence users is positively related to the overall (final) success of Business Intelligence implementation and use in the management of enterprises in Slovakia.
- H2 Active involvement of a sponsor is positively related to the overall (final) success of Business Intelligence implementation and use in the management of enterprises in Slovakia.
- H3 Support from all the executives is positively related to the overall (final) success of Business Intelligence implementation and use in the management of enterprises in Slovakia.
- H4 The right team of skilled and motivated BI workers is positively related to the overall (final) success of Business Intelligence implementation and use in the management of enterprises in Slovakia.
- H5 Continuous support of users before and during the BI project is positively related to the overall (final) success of Business Intelligence implementation and use in the management of enterprises in Slovakia.
- H6 Communication and cooperation between participants is positively related to the overall (final) success of Business Intelligence implementation and use in the management of enterprises in Slovakia.
- H7 Receptive business culture opened to changes is positively related to the overall (final) success of Business Intelligence implementation and use in the management of enterprises in Slovakia.

A dependent variable and 7 independent variables have been defined. The dependent variable is the overall (final) success rate of BI implementation and use in facilities in Slovakia. Independent variables are particular personal and organizational success factors of BI.

The dependent variable and independent variables were interval only. In the case of dependent variable, an interval scale was used with the assessment: failed (1) – rather unsuccessful (2) – fairly successful (3) – successful (4) – and very successful (5) implementation and use of BI solution. The answer key in the case of independent variables consisted of an interval of five-point Likert-type scale in the range: no (1) – rather weak (2) – average (3) – quite strong (4) – substantial (5) importance of a particular factor for overall success of BI project (Figure 2).

Figure 2. Personal and organizational success factors of Business Intelligence

Factor	1	2	3	4	5
1. Segmentation of BI users					
2. Active involvement of a sponsor					
3. Support from all the executives					
4. The right team of skilled and motivated BI workers					
5. Continuous support before and during the BI project					
6. Communication and cooperation between participants					
7. Receptive business culture opened to changes					

1 – minimum level of impact on Business Intelligence project success

5 – maximum level of impact on Business Intelligence project success

Based on the nature of the research problem and examination questions, appropriate statistical methods that can detect and analyse relationships between variables of our interest were chosen and applied – correlation analysis. The objective of correlation analysis is a description of the statistical properties of the relationship between two variables. The method was used to examine relationship between each of BI success factors (independent variables) and overall success level of BI deployment (dependent variable). To express the degree of correlation dependence between variables in the correlation matrix, the Pearson correlation coefficient was used. By using a two-sided t – test within T – distribution, tests of statistical significance of correlation coefficients were performed.

4. Results and discussion

The focus research point was the overall rate of Business Intelligence deployment success in Slovak practice. In particular, research has shown the rate of overall success of BI deployment and use in the management of surveyed enterprises (Figure 3).

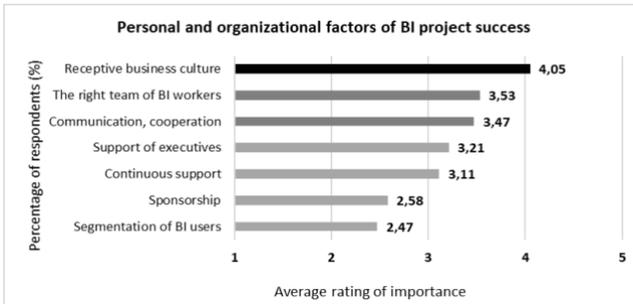
Figure 3. Overall Business Intelligence project success



Up to 21.05 % of businesses rated their BI solution as relatively successful, 36.84 % as successful, 10.53 % of enterprises considered it very successful, and in 31.6 % of cases the project was judged to be rather unsuccessful (26.32 %) or even failed (5.26 %). But consider the contention, that the overall success of BI projects in practice is assessed individually - it depends on the specific value, e.g. the specific end-effects (benefits) businesses want or wait for the implementation and the usage of their own BI solutions.

Then, respondents were asked to assess the level of importance of each factor in the category. Results (average rating of importance) are summed up in Figure 4. – personal and organizational factors of BI project success.

Figure 4. Average rating of Business Intelligence success factors



Rating scale: 1 – No important, 2 – Rather weak, 3 – Average, 4 – Quite strong, 5 – Essential importance of the factor

Based on the survey results, business culture that is opened to changes is rated as the most important factor within the personal and organizational category of success factors (4.05). The right team of BI workers is also fundamental for a successful BI deployment in practice (3.53). For ensuring success, communication and information sharing between users are matter of course too (3.47). According the respondents, another key to achieving success in BI effort is support from all the executives throughout the project duration. Compared to experience from abroad, Slovak companies undervalue the existence of a special sponsor involved in the project – they appreciate the importance of sponsorship only less as the average. Segmentation of BI users into groups and selection of the right set of BI tools adequate to users’ requirements are also not considered as important as could be expected for overall (final) project success – in our survey, the factor reached the smallest rating level of importance (2.47).

Correlation analysis was performed through the correlation matrix (Figure 5.). To express the degree of correlation dependence between variables, the Pearson correlation coefficient (r) was used. As was expected, all independent variables correlate positively with the dependent variable (Succ). Based on the results of tests of statistical significance (p) of correlation coefficients, hypotheses were verified:

H1	r = + 0.773	confirmed	<i>significant at the 0.01 level</i>
H2	r = + 0.558	confirmed	<i>significant at the 0.05 level</i>
H3	r = + 0.482	confirmed	<i>significant at the 0.05 level</i>
H4	r = + 0.500	confirmed	<i>significant at the 0.05 level</i>
H5	r = + 0.604	confirmed	<i>significant at the 0.01 level</i>
H6	r = + 0.297	confirmed	<i>not statistically significant</i>
H7	r = + 0.598	confirmed	<i>significant at the 0.01 level</i>

Figure 5. Correlations

		SF1	SF2	SF3	SF4	SF5	SF6	SF7	Succ
SF1	Pearson Correlation	1	,513*	,197	,442	,349	,371	,411	,773**
	p		,025	,419	,058	,143	,117	,080	,000
	N	19	19	19	19	19	19	19	19
SF2	Pearson Correlation	,513*	1	,290	,607**	,339	,036	,283	,558*
	p	,025		,228	,006	,155	,885	,241	,013
	N	19	19	19	19	19	19	19	19
SF3	Pearson Correlation	,197	,290	1	,384	,204	,355	,598**	,482*
	p	,419	,228		,105	,403	,135	,007	,037
	N	19	19	19	19	19	19	19	19
SF4	Pearson Correlation	,442	,607**	,384	1	,278	,118	,486*	,500*
	p	,058	,006	,105		,250	,630	,035	,029
	N	19	19	19	19	19	19	19	19
SF5	Pearson Correlation	,349	,339	,204	,278	1	-,057	,621**	,604**
	p	,143	,155	,403	,250		,817	,005	,006
	N	19	19	19	19	19	19	19	19
SF6	Pearson Correlation	,371	,036	,355	,118	-,057	1	,148	,297
	p	,117	,885	,135	,630	,817		,546	,216
	N	19	19	19	19	19	19	19	19
SF7	Pearson Correlation	,411	,283	,598**	,486*	,621**	,148	1	,598**
	p	,080	,241	,007	,035	,005	,546		,007
	N	19	19	19	19	19	19	19	19
Succ	Pearson Correlation	,773**	,558*	,482*	,500*	,604**	,297	,598**	1
	p	,000	,013	,037	,029	,006	,216	,007	
	N	19	19	19	19	19	19	19	19

*. Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Succ – Overall (final) success rate of BI deployment in facilities in Slovakia

SF1 – Segmentation of BI users

SF2 – Active involvement of a sponsor

SF3 – Support from all the executives

SF4 – The right team of skilled and motivated BI workers

SF5 – Continuous support of users before and during the BI project

SF6 – Communication and cooperation between participants

SF7 – Receptive business culture opened to changes

5. Conclusions

From the point of view of successful Business Intelligence (BI) deployment, it is necessary to consider several factors and relationships between them. Successful BI solution is not a well-chosen technology only. The human aspect is no less decisive for its right implementation and use in practice. Together with technological factors (BI architecture and tools, data quality...), human factor is also crucial for efficient data management and proper use of the information in the company's further activities.

In the paper, selected personal and organizational factors and their impact on BI project success in Slovak business practise were examined. Receptive business culture supporting decision-making based on facts and data analysis is a mission-critical. BI should be viewed as enterprise-wide solution used in every department of the organization. Before the project begins, company should build awareness and increase knowledge about BI and its possibilities, so that employees would understand how to use BI actively in everyday work. Subsequently, continuous support during the project and adequate financial resources are required. Even though, enterprise-wide executive support is the key to the success of any BI effort, the project requires also a special commitment of one designated leader – sponsor. Facilities successful in their BI efforts should analyse different user groups and provide tools that best fit their particular analytical needs. If they want to succeed, organizations need to build flexible and extensible BI architecture, and choose appropriate BI tools for each type of business user. Skilled and motivated BI staff, together with cooperation and relevant information sharing between all the participants are also needed for a successful BI deployment.

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