

## USING BUSINESS INTELLIGENCE IN DECISION-MAKING PROCESS: AN EMPIRICAL ANALYSIS

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**Abstract:** *Business intelligence (BI) is becoming a very important managerial issue. Its importance has been recognized especially in a development of analytically based decision-making capabilities. The aim of the paper is to present the impact and the importance of BI systems on decision-making process. By using random sample of 68 most successful Croatian companies we provide state-of-the-art of BI in Croatia and recognize future steps that are necessary to improve decision-making practice at various hierarchical levels.*

**Key words:** *business intelligence, decision-making, Croatia*

### 1. INTRODUCTION

Global and competitive environment mitigates points of differentiation and traditional sources of competitive advantage. What is left as a basis for competition is to execute your business with maximum efficiency and effectiveness, and to make the smartest business decisions possible (Davenport & Harris, 2007). To be able to do that, managers are constantly forced to be well informed and knowledgeable about activities happening around and within their organizations. They need to have analytical capabilities in order to be able to process a large amount of information. However, what is also needed is a business intelligence (BI) infrastructure which should make a decision-making process more reliable.

BI can be defined as a process of revealing hidden knowledge from business data collected routinely from everyday business transactions (Panian & Klepac, 2003). It includes collection and dissemination of internal and external data, as well as its transformation into useful information which enable better understanding of the business, ultimately providing useful organizational knowledge. Its main purpose is to provide managers with relevant information in a right format at the right moment.

Although BI as a concept appeared 20 years ago, only recently it has been recognized in a strategic context. Currently dominant knowledge economy forces organizations to invest significantly in their information-processing capabilities as potential competitive advantage (Hannula & Pirttimaki, 2003). There is an increasing interest for the introduction of BI systems into organizations (Popović et al., 2010) because managers realize that information and knowledge have become very important strategic resources.

However, in order to gain benefits from BI through putting an emphasis on information and knowledge creation, a link should be created with the business strategy and top management support. Clear strategic goals and influence from the top should encourage continuous collaboration between IT experts and business people dealing with the issue.

Their collaboration, as well as a practice of collecting precise and timely information, will provide organizations with an opportunity to properly react on market changes and make smart business decisions. BI implementation will enable signals for continuous strategizing and adaptation. Even more, existence of BI philosophy and infrastructure in organizations will support the decision-making at various hierarchical levels.

Today, the most successful organizations have some sort of analytical applications and some BI tools installed although the alignment between the business strategy and the IT infrastructure is missing. Besides considerable evidence that decisions based on analytics are more likely to be correct than those based on intuition (Davenport & Harris, 2007), until now such integrative approach was not emphasized enough in the literature. So, the aim of the paper is to provide empirical results about relevance and current usage of BI in a decision-making process practice of the most successful Croatian companies at various hierarchical levels. Preliminary insights for necessary future steps will be gained by analyzing state-of-the-art in the field.

### 2. RESEARCH METHODOLOGY

Questionnaires were distributed to 200 randomly chosen during May 2008, from the database of The Institute for Business Research of the 500 most successful Croatian companies in 2006. Such an approach was chosen as the authors from their experience assumed that only the most successful Croatian companies have implemented, or are planning to implement, BI infrastructure.

The questionnaire was addressed and mostly fulfilled by CIOs or IT experts because they are the ones mainly involved in handling BI issues inside their organizations. Data collection process was finished in October 2008, until which the research group received 68 completed questionnaires, accounting for a very good 34% response rate. Most of the involved Croatian companies were privately-owned (76%) and large-sized (66%), while there was a small number of state-owned (7%) and small-sized companies (9%).

Measurement instrument consisted of 32 questions which were focused on several following areas: software and BI usage; IT and strategy; top management support; decision-making; performance benchmarking; independent characteristics of respondents and organizations. Answers provided useful nominal and ordinal data which were used in the following analysis. Although such types of data are rather constrained in nature, results were primarily analyzed with descriptive statistics, followed by inferential insights gained by Spearman's rank correlation coefficient.

### 3. EMPIRICAL RESULTS

It is expected that business strategy has a strong positive influence on the success of BI initiative if it is aligned with IT. In the particular survey, strategy was represented with three well-known generic business strategies (Porter, 1985). Most companies reported to have differentiation strategy (55%), a third of them have implemented market niche strategy (35%), while only small part applied low-cost strategy (10%). Results are interesting because, traditionally, BI systems were related to low-cost strategy (allow detailed view of the cost structure), which is very poorly represented in the sample.

Regarding the relationship between the business strategy and the IT, almost 48% of respondents believe that they are in

alignment, 46% of them would characterize it as somewhat aligned, while only 6% said that those two concepts are not aligned at all. Partially, the reason for such good results are years of experience in using BI infrastructure. Almost 52% of observed companies reported that they are using various BI systems for more than 3 years, while only 15% of the sampled companies are using it for less than a year.

Being more specific and focusing on particular types of BI systems, study reveals that 82% of the companies have implemented standardized reports, 63% are using data warehouses, 51% of them have OLAP systems, while data mining and performance management is quite marginal in only 22% and 9% of cases. Although the results show that most of the observed Croatian companies are using some of the basic BI systems, which enlarge the amount of data transformed from transactional system into report pattern and improve efficiency, that is only a first step toward implementing more developed BI systems which offer even higher benefits and effectiveness.

BI initiatives can be implemented only with a significant support received from the top management. In every second company, the top management supports investments in BI projects, while in 38% of cases only a partial support exists. These empirical results only confirm that BI cannot be implemented if it is not strategically positioned and if the top management is not an initiator of such projects. As a matter of fact, it displays that most companies from the sample are planning to introduce some new BI applications in the following year (73%), what confirms that they are aware of the importance of using BI. The same is additionally confirmed with significant positive correlations presented in the table.

	$\rho$	N	p-value
alignment between strategy and IT and top management support	0,246	65	<0,05
alignment between strategy and IT and stage of implementation	0,317	66	<0,01
stage of implementation and top management support	0,379	66	<0,01
improvement efforts and top management support	0,289	65	<0,05

Tab. 1. Spearman's correlation coefficients

The empirical analysis also revealed that information gained from BI systems is satisfactorily used not only at the top, but at various hierarchical levels. Top management used such systems in 53% of cases, middle management in 51%, while lower management levels and business analysts used them in 60% of companies. Such large numbers were not valid at the operational level. Namely, looking at the overall number of employees directly involved in using BI systems, the impression was different because in only 8% of companies more than a half of employees used such information systems, while in 63% of companies they are used by less than 5%.

Very interesting results are gained regarding the nature of decision-making practice. It is known that various decisions at different hierarchical levels can be made more or less intuitively (based on feelings and experience) or rationally (based on the concrete data and information) (Davenport et al., 2010). However, the results show that in most of the observed companies decisions are made by simultaneously combining objective data and information with intuitive feelings and experience. Almost in 60% of cases decisions are made on the basis of data but they are in the same time corroborated with managerial intuition and their previous experience. Even more, 13% of respondents said that in their companies decisions were made exclusively according to the available information. Obviously, there is an evident trend and transition from traditionally ingrained intuitive-based toward a more rational- and analytically-based decision-making supported with BI systems and infrastructure.

Strategic decisions, mostly made by top management, in 46% of companies were supported by various decision support

and/or BI systems. Those were companies which have had completely implemented aforementioned systems for a longer time period. Tactical decisions made by using BI systems were present in 65% of cases, mostly in finance, accounting and controlling – functions that prefer usage of standardized reports. Finally, a new trend of making operational decisions by using BI support is more and more influential where almost half of the companies were making decisions based on data at the lower levels, particularly in marketing, sales and production.

Empirical findings lead to a conclusion that significant part of the observed Croatian companies have already, at least partially, implemented BI system(s). Although such practice represents a great potential for the future, their managers are also aware of the need for a continuous focus on requirements of the BI initiative. This awareness is clearly stated through the existence of future improvement plans where more than 73% of companies are planning to implement new applications in the following year, while only 5% do not have such plans at all.

#### 4. CONCLUSION

Business trends and agility force managers and their companies to acquire new sources of competitive advantage. Importance of having and managing resources has been translated into a need for information availability and their usage. BI has become a very important aspect of decision-making, not only at the top, but at each particular hierarchical level. That is why it needs to be aligned with the business strategy in order to be capable to support analytical decision-making.

In most companies, the alignment between the strategy and the BI is lacking. Without a clear strategy of investment in BI, the initiative is likely to be marginal and ultimately to fail. The most successful Croatian companies have implemented or have started to implement BI systems. Their significant focus is on standardized reports, data warehousing and OLAP systems, while advanced practices like data mining are still very rare. However, future improvement plans are encouraging because most of the companies are planning to continue to improve their BI capabilities.

We should also be aware of the main limitation of the research – a focus only on the most successful companies. This means that average practice and current status of BI in Croatian companies is less optimistic than survey results presented. As the main obstacle to a more widespread and intensive implementation of BI concepts and systems we see a lack of support and understanding from the top management. Although top managers are important users of information gained by BI efforts, they still do not categorize it as a value-added activity. So, future research activities should be focused toward adding more strategic attributes to the BI concept and positioning it among the several most important business initiatives, in order to make managers aware of new business opportunities.

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