

## **Business Intelligence Systems in BiH**

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### **Abstract**

Organizations today are in a great need in using some tools to sustain their existence. BI systems are used to facilitate all the important organizational processes and changes through the organizations in order to achieve their overall goals.

**Purpose:** This paper illustrates the usage of BI systems within a vast variety of organizations in Bosnia and Herzegovina. The special attention was paid on measuring the role of BI analytics and tools which represent key components of BI system.

**Methodology:** The review of literature from 2005 till today served as a basis for developing the survey. The survey was conducted and the results were descriptively analysed.

**Findings:** Results show that BI systems are not well-known among employers and employees, so their usage is on the low level within companies in B&H.

**Keywords:** BI system, BI analytics and tools, B&H

### **1.INTRODUCTION**

In today's business worlds with planning, organizing, and processing activities and full of information, there has been a need for emerging systems which permit legally gathered and publically available data for extraction and analysis into 'business intelligence analytics', in order to provide support for management in better decision-making, the process which aims towards moving from status-quo, improving business processes, and cost and time saving. These systems are called Business Intelligence (BI) systems, and they are developed with an aim to stop illegal reporting activities within the economy. The BI systems can be implemented within any company, which is eager to use 100% of the all data available in the market, but needs to be extracted and analyzed for talented and eager decision makers to use and it and therefore achieve benefits.

The goal of this paper is to present the usage of BI systems and its key components by emphasizing on the companies and organizations in Bosnia and Herzegovina (B&H), where

there are restricted resources, high environmental uncertainty, decomposition of the value chain, the customers who are hard to retain, and aggressive international competitors. Furthermore, this paper will illustrate in which degree companies manage knowledge through the usage and implementation of BI tools.

### 1.1.Literature Review

Stated simply, the main tasks of a BI system include “intelligent exploration, integration, aggregation and multidimensional analysis of data originating from various information resources”. Implicit in this definition, data is treated as a highly valuable corporate resource, and transformed from quantity to quality. As a result, massive data from many different sources of a large enterprise can be integrated into a coherent body to provide ‘360 degrees’ view of its business (Yeoh and Koronios, 2010). Hence, meaningful information can be delivered at the right time, at the right location, and in the right form to assist individuals, departments, divisions or even larger units to facilitate improved decision making (Yeoh and Koronios, 2010). BI model is connected with database and all other external data gathered from different sources, in order to provide historical, current, and future views of business operations. The BI system is a cycling activity (Figure 1) including planning and managing, collection and division of the tasks, data processing and making business intelligence analytics, and therefore the distribution of the final information.



Figure 1 BI cycle

The managerial view of business intelligence (BI) is about the presentation of the right information to the right people at the right time to facilitate their decision making capabilities and to ultimately improve enterprise performance. The technical view of BI usually centers on the process of, or applications and technologies for, gathering, storing, analyzing and providing access to data to improve business decisions (Bose, 2009). These enable the organizations to integrate databases in data warehouses, which represent the core of a well-developed BI system.

Typical BI technologies include business rule modeling, data profiling, data warehousing, online analytical processing, and data mining (DM). The central theme of BI is to fully utilize massive data to help organizations gain competitive advantages (Wang & Wang, 2008). On the other hand, linking it with knowledge management (KM) which represents a set of practices of the creation, development, and application of knowledge to enhance organizational performance (Wang & Wang, 2008), BI and KM improve information usage within the organization. KM and BI, while differing, need to be considered together as necessarily integrated and mutually critical components in the management of intellectual capital (Herschel & Jones, 2005). But BI relies on traditional tools of well-organized data while KM importance lies in its five (The Concours group, 2007) categories: management, culture, structure positions and responsibilities, IT, and metrics. Both of them should be integrated to promote organizational learning and effective decision making.

Competitive pressures have dramatically changed the business landscape, forcing organizations to rethink their decision making and operation styles (CSC, 2008). Today, in the same time it is hard to have and sustain a competitive advantage, keep your shareholders aligned with your goals, find a new ways to perform the company business, and have a strong financial performance. The only option for organizations is to do more with a less, and to manage that by implementing BI systems, to enhance decision-making capabilities and shareholders' value.

Underlying most management decisions are assumed relationships and patterns such as: large customers are more profitable than small customers; "deluxe" products are more profitable than "standard" offerings; training will improve quality or safety; etc. Today, it is assumed that employee learning and growth improve internal process efficiency and effectiveness and therefore customer satisfaction leading to better shareholder returns. DM and statistical analysis techniques are the vehicles for understanding these "cause and effect" relationships (CSC, 2008). The usage of tools such as Balanced Scorecard, the strategic performance management tool, and technologies such as DM and statistical analysis help managers to develop frameworks from simple analyses to complex internal processes, e.g. from analyses of customer behavior to product development, maintenance, quality, and etc.

Today, Business analytics is a simple idea with complex ramifications to leverage the collected wealth of data to create new powerful ways to perform and compete. Business analytics is the new frontier of management science and practice (The Concours group, 2007). BI analytics are used mostly for knowledge discovery, leveraging information and business data, driving business decisions, improving performance and for innovation. The organizations will excel it where they want to compete and have full strength.

The quality of organizational innovative services and company products don't matter. Instead, the capability of an adequate planning structure in place to achieve full performance is important. By allowing enterprises to allocate their most precious (and finite) resources (money and people) in response to changing conditions and objectives, today's enterprise planning solutions facilitate a dynamic planning process that both promotes best business

practices and generates new ones. These solutions provide enterprise planning tools for the organizations to maximize their resources and manage their business strategies (ORACLE, 2008). All these demonstrate that without planning tools management would not be able to predict future organizational performance changes. Through the use of planning tools, managerial and organizational decisions can be performed better on every level by focusing on analysis of information in order to capitalize on business opportunities, optimize resources, and link goals with operational plans.

Nowadays, with available technologic capability, corporations can address many of their most complex business problems and competitiveness (The Concours group, 2007). Competing on analytics entails analytics through the organization and makes analytics and fact-based decisions key elements of corporate business strategy. Analytics has to be translated into day-to-day action, and putting analytics into meaningful action requires both vision and execution (Davenport, 2007). The technology is in a huge progress and competitors are always exploring the new ways to analytically compete and gain greater business capability to enhance organizational performance, and become more successful in financial and technological terms. The executives and employees are willing to adapt changes and start analytics as quickly as possible. They can realize the payoffs, as analytical competitors, and then they become leaders in their industries in any possible term.

Many corporations compete on the basis of their ability to initiate, expand, and maintain relationships with customers. Indeed, customer relationship management is a high potential domain for business analytics, especially the techniques of predictive modeling (The Concours group, 2007). The aim of data analysis is to know more about company's customers, in order to best serve them. The organizations are measuring and managing customer relationship through valuation, 'targeting', retention or customization. All these improve the optimization of customer relationship.

Most companies today have sufficient amounts of data, but lack of their integration and quality. Without qualified data, the needed analytical analysis cannot be created (The Concours group, 2007). The companies must have high quality technologies to support BI analytics through which data can be manipulated, because business takes an action based on its analyses.

The nature of the top benefits and challenges make it clear that today's technology purchasers demand comprehensive and integrated BI and performance management solutions to be able to overcome challenges related to data integration from multiple sources and data quality (AS, 2007).

## **2. Research Methodology**

As a result of literature review, the identified variables are formed as follows: (1) BIA (Business Intelligence Analytics), (2) Management Planning Tools, (3) Organisational competitiveness, (4) Technology, (5) CRM (Customer Relationship Management, and (6)

Competitor's Analytics. Each group includes four statements. To measure the identified statements, a 5-point Likert scale survey was improved and conducted to be able to identify whether organizations in Bosnia and Herzegovina use BI systems, and if so do they manage by using those tools to reach their maximum.

## 2.1. The Sample Space

The participants were kindly asked to fill the demographics information part and to answer the questions in the survey to be able to observe the real situation in their company.

The survey was conducted in person, particularly with each person, and online. On average it took 10 minutes per person to read, think, and give the proper answer.

The importance of this survey lies in the results that will illustrate the real image of companies in B&H, which are technology-oriented in their industries with emphasis on innovation, and that the studies related to this topic were not conducted before in B&H.

## 2.2. Demographics

The survey was completed by 165 respondents. The respondents are from 73 different private, public and governmental organizations. One third of the respondents were females (Table 1).

**Table 1 Gender of the respondents**

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	57	34,5	34,5	34,5
Male	108	65,5	65,5	100,0
Total	165	100,0	100,0	

The mean age of the respondents is 40.15, which means there is an experienced sample (Table 2).

Table 2 Age

	N	Minimum	Maximum	Mean
Age:	165	24	61	40,15
Valid N (listwise)	165			

The positions of the respondents are varying (Table 3). It may be important to note that the majority of the respondents are managers (managers and academic administrators). Academic personnel and officers follow them by 18,8% and 17,6%.

**Table 3 Respondent positions**

	Frequency	Percent	Valid Percent	Cumulative Percent
Academic Administrator	2	1,2	1,2	1,2
Academic personnel	31	18,8	18,8	20,0
Administrative Assistant	3	1,8	1,8	21,8
Assistant	1	,6	,6	22,4
Clerical	2	1,2	1,2	23,6
Doctor	1	,6	,6	24,2
Economist	1	,6	,6	24,8
Expert Associate	17	10,3	10,3	35,2
Lawyer	2	1,2	1,2	36,4
Manager	71	43,0	43,0	79,4
Officer	29	17,6	17,6	97,0
Programmer	2	1,2	1,2	98,2
Psychologist	1	,6	,6	98,8
Social worker	2	1,2	1,2	100,0
Total	165	100,0	100,0	

The survey was conducted in various types of organizations. Table the sample is represented by the respondents from Limited Companies (Ltd.) (46.7%) (77 respondents), followed by Academic Institutions (27.3%), where 45 persons were questioned. Governmental organisations are represented by 23 respondents (17.6%). Furthermore, from banking and finance there were 12 respondents (7.3%).

**Table 4 Type of Organisations**

	Frequency	Percent	Valid Percent	Cumulative Percent
Academic institution	45	27,3	27,3	27,3
Agency	2	1,2	1,2	28,5
Banking and Finance	12	7,3	7,3	35,8
Government	23	13,9	13,9	49,7
Ltd.	77	46,7	46,7	96,4
Public institution	6	3,6	3,6	100,0
Total	165	100,0	100,0	

### 2.3.Descriptive Statistics

The results about BIA section provide a fair support for the statements (Table 5).

**Table 5 BIA agreement level of respondents**

	N	Minimum	Maximum	Mean	Std. Deviation
My company uses business intelligence analytics tools for knowledge discovery.	165	1	5	3.37	1.255
Management of my organization uses business intelligence analytics to leverage our information, business data, such as sales revenue by products and/or departments, or by associated costs and incomes	165	1	5	3.42	1.148
My organization's business intelligence analytics drive our business decision, improve our performance, and lead to innovation.	165	1	5	3.42	1.148
My company's management realizes that business intelligence analytics are essential.	165	1	5	3.53	1.135
BIA	165	1.00	5.00	3.4348	1.06600
Valid N (listwise)	165				

According to Table 6, the managements of organizations are using very little tools to facilitate their planning, and there is a lack of management support on analytical functions.

**Table 6 Management Planning Tools agreement level of respondents**

	N	Minimum	Maximum	Mean	Std. Deviation
My organization can predict future changes, and in the same time implement best methods by using management planning tools.	165	1	5	3.41	1.189
My organization's planning department uses management planning tools to make better decisions on every level.	165	1	5	3.47	1.027
My company uses Balanced Scorecard as strategic performance management tool to help managers to make framework for our semi-standard structured reports.	165	1	5	3.27	1.084
The executive of my organization's management analytical function is closest to our business processes, responsible for our planning process, design, execution, and competitive optimization.	165	1	5	2.97	1.181
Managementplanningtools	165	1.00	5.00	3.2803	.86285
Valid N (listwise)	165				

The respondents slightly agreed about their organizations being competitive (Table 7).

**Table 7 Organisational Competitiveness agreement level of respondents**

	N	Minimum	Maximum	Mean	Std. Deviation
My organizational management, in order to perform specific goals, chooses to compete on the basis of organizational competitiveness.	165	1	5	3.25	1.139
Management of my company and shareholders are aligned with our goals.	165	1	5	3.50	1.124
Our organizational competitiveness is our new way of doing business.	165	1	5	3.20	1.019
The organizational competitiveness allows my company to have a strong financial performance.	165	1	5	3.24	1.077
Organizational competitiveness	165	1.00	5.00	3.2985	.93047
Valid N (listwise)	165				

The companies are observed to be using fairly good technologies (Table 8).

**Table 8 Technology agreement level of respondents**

	N	Minimum	Maximum	Mean	Std. Deviation
My company uses high quality technology that is sufficient integrated in order to measure business performance.	165	1	5	3.51	1.108
My organization has the technologies in place to support business intelligence analytics in the area of business management.	165	1	5	3.45	1.050
The improvement in my organization's performance can be seen in the terms of technology.	165	1	5	3.48	1.045
My firm uses enough good data that can be manipulated through technology.	165	1	5	3.42	1.007
Technology	165	1.00	5.00	3.4667	.91086
Valid N (listwise)	165				

The organizations are giving slight importance to the relationships (Table 9). Especially, they have very fair capabilities to detect consumer behavior.

**Table 9 CRM agreement level of respondents**

	N	Minimum	Maximum	Mean	Std. Deviation
My company has ability to initiate, expand, and maintain relationship with our customers.	165	1	5	3.53	1.305
My company's management optimizes customer relationship through valuation.	165	1	5	3.44	1.201
My company manages customer relationship through the targeting that will lead us to significant revenue growth.	165	1	5	3.39	1.141
My organization uses early warning systems to detect changes in customers behavior that indicates service or retention issue.	165	1	5	3.13	1.129
CRM	165	1.00	5.00	3.3742	1.06232
Valid N (listwise)	165				

According to Table 10, the respondents are neutral on the statement that their competitors are using some BI tools, but they don't consider that their competitors' analytical capabilities



were in a challenging level. Therefore, they do not think that their company's performance can be influenced by the competitors' technologies.

**Table 10 Competitor Analytics agreement level of respondents**

	N	Minimum	Maximum	Mean	Std. Deviation
My competitors jump ahead with analytical capability.	165	1	5	2.62	1.079
The choice of my competitor's analytical tools may affect my company's performance in the market.	165	1	5	2.81	1.096
My competitor's analytics are successful in financial terms.	165	1	5	2.79	1.073
My competitors use analytics to evaluate their efforts in the term of improvement of business objectives.	165	1	5	2.95	1.055
Competitorsanalytics	165	1.00	5.00	2.7924	.96336
Valid N (listwise)	165				

In table 11, it can be seen that the respondents slightly agreed that their competitors jump ahead with analytical capabilities.

**Table 11 All sections agreement level of respondents**

	N	Minimum	Maximum	Mean	Std. Deviation
BIA	165	1.00	5.00	3.4348	1.06600
Managementplanningtools	165	1.00	5.00	3.2803	.86285
Organizationalcompetitiveness	165	1.00	5.00	3.2985	.93047
Technology	165	1.00	5.00	3.4667	.91086
CRM	165	1.00	5.00	3.3742	1.06232
Competitorsanalytics	165	1.00	5.00	2.7924	.96336
Valid N (listwise)	165				

### 3. Discussion

The studies and findings show that B&H companies do not use business analytics for knowledge discovery. Furthermore, their management does not realize the importance of BI analytics which are used to drive business decisions, to improve organizational performance and to create innovative structures.

It is not sure if organizations use management planning tools to predict future changes, and to make better decisions on every level. Furthermore, the executive of analytical function in management position is not the one that is the closest to business processes, and competitive optimization according to the results of the survey.

The companies do not choose to compete on the basis of organizational competitiveness, even if it represents a way to keep organizations viable and successful. The certainty lies in that the management of company and the shareholders are aligned with company's goals.

Most companies use sufficiently integrated technology with the aim to measure business performance, but they do not have the technologies in place to support business intelligence

analytics in the area of business management. The improvement in company performances cannot be seen in terms of technology, and in the same manner they do not use qualified data to be manipulated through existing technologies.

The Customer Relationship Management of the companies is able to initiate, expand, and maintain relationship with their customers. Some of the companies, even in a small portion, manage customer relationship through the “targeting” that may lead them to significant revenue growth, and others are using “valuation” to manage the asset value of their customer relationship. Throughout this survey, it is revealed that many organizations do not use early warning systems to detect changes in customer’s behavior that indicates service or retention issue, even if this could help them to try to retain their customers.

The conclusion led to discovery of the effects that the choices of competitor's analytical tools on the company performance in the market may have, and in that way may give them powerful means to be successful in financial terms. The results indicate that respondents do not have qualified information to estimate whether their competitors use analytics to evaluate their efforts in terms of improvement of business objectives.

#### **4.CONCLUSION**

The final conclusion is that there is a growth in BI market requiring from organizations in B&H to be furnished with BI systems that will give their management support in better decision-making aiming towards improvement and innovation, and in the same time enabling them allocation of resources, better composition of value chain, lower degree of environmental uncertainty, and most of all fair competition with international companies.

Regarding the directions for future studies, it can be underlined that any kind of study is welcomed in this field. There is no enough information regarding it and very few studies to have the BI picture in B&H.

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