

## **The value of Competitive Business Intelligence System (CBIS) to Stimulate Competitiveness in Global Market**

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### **Abstract**

Business Intelligence is the mixture of the gathering, cleaning and integrating data from various sources, and introducing results in a mode that can enhance business decisions making. BIS provide sufficient fundamentals for comparison process. Thus, nowadays, organizations desire to assess and evaluate their assets into Business Intelligence systems, which involve an accurate evaluation to the business value and distinguish it from other organizations using comparable systems. This paper describes and measures the fact that competitive advantage can be gained through Business Intelligence. It evaluates the impact of key factors of typical BIS on improving business performance to survive in competitive market.

**Keywords:** Business Intelligence, Competitive advantage, business and competitive intelligence

### **1. Introduction**

Business decision making is highly complicated process that most business organizations needed to survive in the competitive environment which becomes progressively restraining. This type of competition shows that there is an increasingly needs for informational assistance to facilitate decision makers to produce fast, in time and accurate decisions. Hundreds of organizations have spent large amount of money into the revitalization and enhancing business processes and the augmentation of information systems abilities to achieve competitive advantage over competitors effectively. Accurate and early enough business decisions making process are essential for organizations. With the aim of making accurate decisions, consistent, perfect and on time, information is a desire to be supplied.

Business Intelligence was the most significant key areas for the last twenty years, where organizations were investing a large amount of money (Computer Economics 2008). The impact of earlier access to related and extensive information on business decision making is demanding process, especially when it evaluates and measures this impact on business results as a total. Business Intelligence system can be illustrated as organizational architecture for an incorporated set of operational and decision support applications and databases, which offer different corporation stakeholders with straightforward access to the right information in the right time. Furthermore, it assists the process of data analysis and sharing of the information required to generate the effective and efficient business decision making process (Gangadharan and Swami, 2004).

Business intelligence, through exhaustively analyzing detailed enterprise data, enables organizations to be more convenient and high knowledgeable in their decision-making process via utilizing of data management, data mining and data warehousing, and analytical skills. In other words, BI offers a way to navigate through data to generate information typically by using Online Analytical Processing (OLAP) which provide a way to use querying, analyzing and reporting. Business intelligence is more than being a different phrase of data. It is a system uses various kinds of functions that convert data into something tangible, clear, true and realistic as possible and relied upon in decision-making process.

The business intelligence is the core of the entire enterprise system which is based on series of strategic and tactical management steps implemented by technology that supply data input and use the analytical output to speedily generate high effective and efficient business decision making process. While many corporations attempt to rummage huge of data, it is obviously that BI is as much about missed opportunities as about the ones companies utilizing it. Selecting and manipulating data needs a vigorous infrastructure, efficient data collection pools, and ingenious tool for data mining and data analytics. So therefore it will be feasible to detect hidden trends, purchaser relationships and behavior, selling and opportunities and other essential information.

However, nowadays, the era of globalization, and with the increasing competition in all the fields around the world, the power to aggregate, store, mine, analyze and summarize data can construct or crush an entire organization. Business competitive advantages have been transferred from those with expertise in how to implement new technologies, through those who know how to use technology to improve business processes, increase sharing required information, which leads to increase the level of knowledge. Competitive Intelligence is a systematic process of knowing what the competition is up to and staying one step ahead of them, by collecting, processing, analyzing, and distributing to the high level managers and decision makers the most required information about an organization's external environment. It aims to assure the availability on a timely basis of credible information about the capabilities of key competitors, and determine the manner of which actions of key competitors might affect current organizational interest.

Competitive Business Intelligence (CBI) is a process that implies assembling, analyzing and generating decisions based on information about competitors and the competitive environment. CBI is a vital tool for guaranteeing victory in a particular market competition. They offer a critical quantitative approach of the business making use of exploiting technologies like OLAP and data mining. The result of CBI is great value of business information which is enough to express the business case. Typically, organizations around the world are investing efforts to deal with the most important two factors, which they have a major impact on the company's growth and raise profits, these are the customers and competitors. CBI forms a system within your company to let you sustain up information on your competitors, customers and your marketplace. Furthermore, it provides a system for expanding customer fulfillment.

The aim of this research is to explore and measure the impact of six significant factors of competitive Business Intelligence, illustrated in conceptual research model: BI strategic plan, cooperation among business units, expertise, information and analysis usage, effective decision making process, and technical readiness of BI (which are considered as independent variables) on the improved business competitive advantage (considered as dependant variable). Specifically, this research intended to explore the correlation and regression between the factors of (CBI) and the Business performance. The proposed conceptual model, which was based on reviewing different models developed by different authors, assumes that there is no statistically significant relationship exists between the dependant and Independent variables.

To assess the factors influencing the business competitive advantage, a survey was conducted during the last quarter of year 2010. A Questionnaire were designed and distributed to retail users of banking services of different age group and of different educational level attained across the island. This research was conducted by analyzing results (using SPSS data analysis software) of distributed questionnaires, which was designed and distributed through the web to 69 decision makers from deferent departments at different organizations around the world. All chosen respondents should have worked and practiced on BI software to build their decisions. The remainder of this paper is organized as follows. Section 2 present literature review and 3 discusses the conceptual research model and hypothesis. In Section 4 we discuss the research methodology which will be used for this research. In section 5 result analysis and discussion will be presented. Finally, the conclusion will be presented in sections 6.

## **2. Literature Review**

The majority of the Business Intelligence literature has occurred from within the business, Information Systems industry, and vendor's fields (Jagielska et.al. 2003). Scholarly research within the information system area is however at an initial stage, thus, there is no universally approved definition of BI (Jagielska et.al. 2003; Negash 2004). Business Intelligence systems have been presented and defined by numerous literatures in different ways, depending on a time of definition and the viewpoint of the author. Vitt et al. agreed that the phrase of BI is comprehensive and is "used by different pundits and software vendors to characterize a broad range of technologies, software platforms, specific applications and processes" (Vitt, et. al. 2002). Howard Dresner (1989) of Gartner Research, the father of BI, first introduced the term of BI as "a broad category of software and solutions for gathering, consolidating, analyzing and providing access to data in a way that lets enterprise users make better business decisions" (Gibson et al. 2004). Nevertheless, the term business intelligence was also presented earlier in 1958 by Luhn in an IBM journal article "A Business Intelligence System". Arnott & Pervan (2005) argue that "BI is a poorly defined term and its industry origin means that different software vendors and consulting organizations have defined it to suit their products; some even use 'BI' for the entire range of decision support approaches, whereas Williams & Williams (2007) stated that BI is a set of business information and business analyses within the context of key business processes that lead to decisions and actions.

In particular, BI means leveraging information assets within key business processes to achieve improved business performance. Fisher et al. emphasize that a Business Intelligence system consists of three main corresponding data management technologies: data warehousing, online analytical processing (OLAP), and knowledge discovery. However, Olszak and Ziemia declared that a Business Intelligence system is about a combination of the following essential elements: ETL (Extraction-Transformation-Load) tools, data warehouses, OLAP tools, data mining tools, reporting and ad hoc inquiry tools, and presentation layers. From the technological perspective, Business Intelligence is believed as an extensive type of tools, software, solutions, and technologies that facilitates decision makers to find, accumulate, organize, and access a wider range of information from disparate data sources (Markarian et. al. 2007).

Currently, business intelligence market is in the state of high growth as retailers keep reporting significant profits and the Business Intelligence applications have become known as the highest spending precedence for various top managers and continue as the essential technologies to be utilized (Gartner Research 2006, 2007, 2008 and 2009). Competitive intelligence is considered as a critical part of the contemporary organization, however, it cannot be judged as an innovative concept, as it has been applied by many glittering organizations for decades. The escalation in consciousness of competitive intelligence is confirmed by the increasing number of publications concerning how to establish a competitive intelligence department within the firm. McGonagle and Vella (2007), one of the advanced authors introduced a definition to the term competitive intelligence as “a formalized, yet continuously evolving process by which the management team assesses the evolution of its industry and the capabilities and behavior of its current and potential competitors to assist in maintaining or developing a competitive advantage”.

Teo and Choo (2001) stated that competitive intelligence is a set of practices or formalized processes in organizations aiming to gather relevant information about competitors to stay one step ahead in middle and long range planning. Hermel (2001) indicated that information about competitors is just one part of all the relevant information, thus scanning must also identify technology, success of competitors' products in the market and the whole environment, including economic, legal, cultural and demographic background. By reviewing the above literatures, we can conclude that the Competitive Business Intelligence systems can be assumed to contain different kinds of activities proposed at observing competitors, and collecting different types of information such as human resource, marketing policies, and operation management. Additionally, competitive Business Intelligence may contain activities that aim to collect information, process it, analyze it, and transfer it and display it in the required format to decision makers to enhance decision making process.

Consequently and further to the overview of the business intelligence, literatures reveals that most significant factors of Competitive Business Intelligence that affects organizational business performance are: BI strategic plan, cooperation among business units, Performance management, expertise, information and analysis usage, effective decision making process, and technical readiness of BI. The following table (table 1), shows the identified significant variable, brief description and the authors who are directly or indirectly pointed to them.

**Insert table (1) about here**

### **3. Conceptual research model and Hypothesis**

Figure 1 illustrates the conceptual research model, which assumes that by having a solid strategic plan; good and easy communication between different groups internally and/or externally; by having experts people who have the capability and the experience to make the right decision on right time; having the most relevant information; creating effective decision making process; and having advanced software will have a positive impact on the improved business competitive advantage.

**Insert figure (1) about here**

#### **3.1 Research question and Hypothesis**

To achieve the purpose of the current study, the following research questions have been formulated:

1. To what extent the organizations are implementing the Competitive Business Intelligence System so that it positively affects business performance?
2. To what extent the organizations are developing Business Intelligence System so that it positively affects income invention, decision-making efficiency, and decreasing costs?

To respond to the above questions, this research carries out six hypotheses that were developed from our previous research model which is actually based on previous literatures and studies:

The following hypothesis assumes that there is no statistically significant impact on the use of Business Intelligence to improve the business performance:

H<sub>01</sub>: There is no statistically significant impact of BI strategic plan on improved business performance and gained competitive advantage.

H<sub>02</sub>: There is no statistically significant impact of cooperation among business units on improved business performance and gained competitive advantage.

H<sub>03</sub>: There is no statistically significant impact of expertise on improved business performance and gained competitive advantage.

H<sub>04</sub>: There is no statistically significant impact of information and analysis usage on improved business performance and gained competitive advantage.

H<sub>05</sub>: There is no statistically significant impact of effective decision making process on improved business performance and gained competitive advantage.

H<sub>06</sub>: There is no statistically significant impact of technical readiness of BI on improved business performance and gained competitive advantage.

#### **4. Research Methodology**

##### **4.1 Survey Instrument and data collection**

The research uses a quantitative approach in which a digital online form was created using Google Documents in a questionnaire style. The link was then shared and a total of 122 questionnaires were distributed to different expertise people of different educational level working at different organizations in different countries. However, we had only 69 usable answers. The greater part of the respondents were female (62.5%), the age was (51.1%) for those who are between 20 and 45 years old. The survey designed in English language. The research tested the time to fill the survey and its take approximately 5-8 minutes to complete. Once a subject would answer the questionnaire, the raw data will automatically be logged in a spreadsheet which can be only accessed and downloaded by the researcher. The questionnaire of this research was divided into two sections. The first section focused on the general profile of the respondent including his/her age group, education level and profession and income group.

In the second section we were interested in finding the factors affecting the business performance and the ability of gaining competitive advantage. The respondents were provided with a list of fourteen questions; two questions on BI strategic plan; two questions on cooperation among business units; two questions on expertise; two questions on information and analysis usage; two questions on effective decision making process; two questions on technical readiness of BI and two questions on improved business performance and gained competitive advantage. The participants were asked to indicate their perception on a likert scales (1- 5) with response ranging from “strongly disagree” to “strongly agree”. The collected data were analyzed based on correlation and regression analyses using the statistical package for social sciences (SPSS) version 17 computer program.

##### **4.2 Pilot Study**

With the purpose of confirming that the survey is valid and reliable, a pilot study will be conducted before the final distribution process. To find out whether the questionnaire is reliable or not we will measure the internal consistency, which is the most popular methods of estimating reliability. Cronbach's alpha test will be used (Nunnally and Bernstein, 1994). She suggested that a minimum alpha of 0.6 sufficed for early stage of research.

**Insert table (2) about here**

As showed in table 2, the Cronbach's alpha in this study were all much higher than 0.6, the constructs were therefore deemed to have adequate reliability.

#### **5. Analytical results and discussion**

##### **5.1 Correlation Test**

The correlation analysis was used to illustrate the strength and direction of the linear relationship between six independent variables and the dependent variable. Studies stressed that prior to the regression testing; the correlations between variables (Coakes and Steed, 2007) should be achieved. The result of this research, as illustrated in table 3, showed that the six independent variables found to be strongly correlated to dependent variable.

**Insert table (3) about here**

The correlation results showed that BI strategic plan ( $r=0.313$ ,  $p < 0.009$ ), cooperation ( $r=0.507$ ,  $p < 0.01$ ), expertise ( $r=0.560$ ,  $p < 0.01$ ), information ( $r=0.926$ ,  $p < 0.01$ ), technical readiness ( $r=0.666$ ,  $p < 0.01$ ) and effective decision making ( $r=0.950$ ,  $p < 0.01$ ) are clearly correlated to business performance and gained competitive advantage.

## 5.2 Regression Test

For further analysis, Linear Regression was carried out to study the extent to which the independent variables influence the dependent variable. The independent variables were regressed across organizational outcomes. Tables 4 and 5 summarized the results of the Linear Regression analysis. The results of regression in the ANOVA (table 4) revealed that the model is highly significant ( $p < 0.01$ ).

### Insert table (4) about here

The results of the regression in the coefficients table (table 5) exposed that BI strategic plan ( $t=2.102$ ,  $\text{sig} < 0.05$ ), cooperation ( $t=2.977$ ,  $\text{sig} < 0.01$ ), information ( $t=4.088$ ,  $\text{sig} < 0.001$ ) and effective decision making ( $t=7.588$ ,  $\text{sig} < 0.001$ ) are found to be significantly affects business performance and gained competitive advantage. This result corresponds with the view of Hostmann et al. (2006), Rayner et al. (2008), Hagerty (2006), Rayner et al. (2008), Williams et al. (2007), Montgomery (2008), Eckerson (2007), Deng (2007), Wells (2008), and Burton (2007).

### Insert table (5) about here

The analytical results of the regression, astonishingly, shows that task expertise ( $t=-1.109$ ,  $\text{sig} > 0.05$ ) and technical readiness ( $t=-.185$ ,  $\text{sig} > 0.05$ ) is seriously unaffected the dependant variable (business performance). Consequently, based on the above correlation and regression analytical results, we reject the null hypothesis ( $H_0$ ) and accept the alternative hypothesis ( $H_1$ ) of the following measured independent variables ( $H_1$ ,  $H_2$ ,  $H_4$  and  $H_5$ ). However, regarding hypothesis  $H_3$  and  $H_6$ , and relating the unexpected results we are rejecting alternative hypothesis ( $H_1$ ) and accepting the null one ( $H_0$ ). It seems that there is a highly significant relationship and affects between BI strategic plan, cooperation, information, and effective decision making (independent variables) and improved business performance and gained competitive advantages (dependent variable).

## 6. Conclusion

Timely competitive information is the magic stick for any managers to make fast, accurate and in time decision process. Such information can be produced by a thoroughly design system which can offer information for different management level, tactical and/or strategic information level. Reviewing the significant business intelligence literature revealed that this system is needed to answer the following essential questions: what is the crucial strategy of the competitor(s) in the market? How do these strategies intimidate our existing market position? The reviewed literature has revealed that applications of Business Intelligence systems are very extensive and can be customized to different organizational requirements. In the daily business market, the key provider to advantageous leverage efforts is typically as follow; anyone who is more knowledgeable about beforehand and reacts based on this knowledge on time will come first.

This fact was the reason to take off this research; this is where competitive business intelligence systems arrive. A small number of business organizations have sufficient information about their competitors. Several organizations possibly ignore this type of information, and many others are expected to pay consequence for ignoring the valuable information. Organizations that have not handled competitive business intelligence system accurately will soon or later loss its position in the competitive market. Nowadays, although implementing Business Intelligence system is an advance step for any organizations wanted to be survived in the market competition, there is still a high need to strategic plan for gaining accurate information about competitors, analyze it, share it using advanced tool, and accessed by managers who are professional enough to make right decision at the right time.

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Figure 1: Conceptual research design

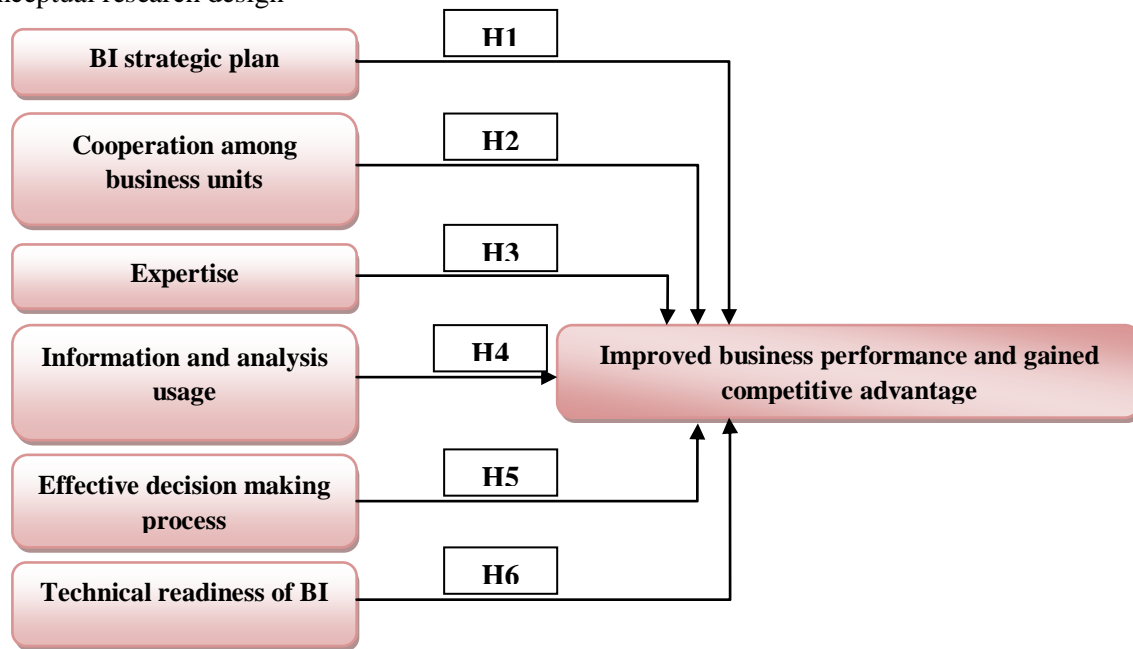


Table 1: Research Variables

Variables	Brief description	authors	Dependent (D) /Independent (I)
<b>BI strategic plan</b>	components that have been defined for business intelligence and performance management, have to be incorporated to facilitate a better defined strategic vision and plan which are needed for implementing business intelligence initiatives		I
<b>Cooperation among business units</b>	Typically, most business-intelligence applications concentrated on providing targeted reports, data analysis and other key information to decision makers who are usually fall back on intermediary collaboration tools, to enhance the process of sharing this information between different units		I
<b>Business Performance</b>	Business Performance is a natural evolution of Business Intelligence		D
<b>Expertise</b>	BI should be managed by specialists from various departments and level of managements and headed by the Business Intelligence program manager.		I
<b>Information and analysis usage</b>	BI users at various management stages should be able to access information, then and analysis is required for generating business value and encouragements in business performance.		I
<b>Effective decision making process</b>	Business Intelligence is the capability of the organization or company to explain, plan, predict, solve problems, think in an abstract way, understand, invent, and learn in order to increase organizational knowledge, provide information to the decision process, enable effective actions, and support establishing and achieving business goals”	<i>Wells 2008; Burton, 2007; Williams et al. 2007</i>	I
<b>Technical readiness</b>	Based on technological viewpoint, BI is described as a broad category of tools, software, solutions, and technologies that enhance decision-making process.	<i>Markarian et al. 2007; Eckerson 2007; Williams et al. 2007; Burton, 2007</i>	I

Table 2, Result of Cronbach’s alpha test

Cronbach's Alpha	N of Items
.878	7

Table 3: Correlation test results

		Correlations						
		strategicplan	Cooperation	expertise	information	decision	technical	performance
strategicplan	Pearson Correlation	1	.235	.296*	.246*	.244*	.210	.313**
	Sig. (2-tailed)		.052	.014	.042	.043	.084	.009
	N	69	69	69	69	69	69	69
Cooperation	Pearson Correlation	.235	1	.361**	.437**	.419**	.393**	.507**
	Sig. (2-tailed)	.052		.002	.000	.000	.001	.000
	N	69	69	69	69	69	69	69
expertise	Pearson Correlation	.296*	.361**	1	.607**	.567**	.513**	.560**
	Sig. (2-tailed)	.014	.002		.000	.000	.000	.000
	N	69	69	69	69	69	69	69
information	Pearson Correlation	.246*	.437**	.607**	1	.914**	.665**	.926**
	Sig. (2-tailed)	.042	.000	.000		.000	.000	.000
	N	69	69	69	69	69	69	69
decision	Pearson Correlation	.244*	.419**	.567**	.914**	1	.682**	.950**
	Sig. (2-tailed)	.043	.000	.000	.000		.000	.000
	N	69	69	69	69	69	69	69
technical	Pearson Correlation	.210	.393**	.513**	.665**	.682**	1	.666**
	Sig. (2-tailed)	.084	.001	.000	.000	.000		.000
	N	69	69	69	69	69	69	69
performance	Pearson Correlation	.313**	.507**	.560**	.926**	.950**	.666**	1
	Sig. (2-tailed)	.009	.000	.000	.000	.000	.000	
	N	69	69	69	69	69	69	69

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

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

Table 4: Regression results Analysis - ANOVA

ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.210	6	15.535	155.262	.000 <sup>a</sup>
	Residual	6.204	62	.100		
	Total	99.413	68			

a. Predictors: (Constant), technical, strategicplan, Cooperation, expertise, decision, information

b. Dependent Variable: performance

Table 5: Regression results Analysis - Coefficients

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.649	.213		-7.727	.000
	strategicplan	.088	.042	.071	2.102	.040
	Cooperation	.114	.038	.108	2.977	.004
	expertise	-.049	.044	-.046	-1.109	.272
	information	.400	.098	.335	4.088	.000
	decision	.785	.103	.613	7.588	.000
	technical	-.011	.059	-.008	-.185	.854

a. Dependent Variable: performance.