MANAGEMENT ISSUES IN BUSINESS INTELLIGENCE: A STUDY

Mr. D. Amarendranath Reddy

Pursuing Master of Science in Business Intelligence andAnalytics, Saint Joseph's University, Philadelphia, USA.

Abstract
The business environment is changing rapidly and so dynamic. Adapting business strategies and adjusting capabilities for effective decisions is always under focus. Moreover, ever increasing competition and insightful understanding on stakeholders is another important concern to today's organizations. So, in this very contest, Business Intelligence (BI) appears to be of the concept of pivotal importance to business organizations. However, implementation of the BI appears to be challenging issue to management of the concern. This study seeks to find and realize importance and impact of BI systems on organizational performance. The study is basically a systematic study and the literature was retrieved from certain reliable sources with random-search mechanism. The study identified certain important management issues that are paramount in nature. The study shows evidence towards certain issues like data analytics, decision making, and organizational performance etc.

Key words: Business Intelligence, Data Analytics, Decision Making, Business Process, Technology.

INTRODUCTION

Business intelligence is so popular around these days for it was taken in lieu of old phases such as decision support systems, executive information systems, and management information systems. [1] The free dictionary.com defines business intelligence as "the ability to learn or understand or to deal with new situations or the ability to apply knowledge to manipulate one's environment".[1] This definition clearly shows that business intelligence verily deals with application of knowledge to augment environment. In business domain the environment is composed of many elements viz., competitors, customers, intermediaries, public and government. So, to purport this phase one need to understand that business intelligence has mechanisms to cope up with changes that might emanate from business environment. One of the important concerns for business is its competition. Vanquishing competitors is not mere happening but might depend on strategic stamina of the firm.

Technology in business is under focus with business intelligence (BI) concepts since the late 1990s. Business intelligence and knowledge systems are gaining importance in view of complexity, environmental change, globalization, information flow, new economy, and networking. The economies are under rapid change from capitalistic to knowledge driven due to these changes. In addition to the changes in society, advancing technologies and applications have wreaked remarkable change on traditional business models and operations. Running a business is now harder than ever because of the new rules of competition and the greater complexity and accelerated rate of change in the new economy. [2] Because a good portion of economic theory dates from the time of industrialization, both the business and academic world are seeking new ways of increasing their business awareness and know-how in the information society.

A bog at CIO.Com explains BI as below:
"Business intelligence, or BI, is an umbrella term that refers to a variety of software applications used to analyze an organization's raw data. BI as a discipline is made up of several related activities, including data mining, online analytical processing, querying and reporting." [2]

Companies use BI to improve decision making, cut costs and identify new business opportunities. BI is more than just corporate reporting and more than a set of tools to coax data out of enterprise systems. CIOs use BI to identify inefficient business processes that are ripe for re-engineering. With today's BI tools, business folks can jump in and start analyzing data themselves, rather than wait for IT to run complex reports. This democratization of information access helps users back up—with hard numbers—business decisions that would otherwise be based only on gut feelings and anecdotes. Although BI holds great promise, implementations can be dogged by technical and cultural challenges. Executives have to ensure that the data feeding BI applications is clean and consistent so that users trust it.

---

[1] *The Free Dictionary. Available at www.thefreedictionary.com*

2 *Available at Cio.com*

What kind of companies uses BI systems?

Business Intelligence Companies provide business reporting solutions which are all-inclusive, reasonably priced and simple to understand, implement, organize and maintain. Most of BI products offered by the firms are next generation reporting solutions constructed from advanced technology and processes. Terradata, MAIA intelligence, IDC India Ltd., Binary Scemantics Ltd, TechAxes are world renowned Indian's based companies.[3] These companies outsource BI services to companies ranging from SSIs to LSIs. Usually companies need BI to make strategic decisions, such as new product developments, process revamping, supply chain and logistics and etc. BI is also used for tactical matters such as renegotiating contracts and identifying opportunities to improve inefficient processes. BI is so central to helping companies run their businesses.

One crucial component of BI—business analytics—is quietly essential to the success of companies in a wide range of industries a.l.a., agriculture, food and braveries, manufacturing and other organizations engaging in both manufacturing and services. Business analytics as a part of BI will try to analyze the data and give meaningful insights such that management can not only take certain meaningful decisions but also predict as how likely the future is certain abreast of challenges. There are many software suits that are viewed as highly important viz., hadoop, SAS, Python and etc. They not only help business organizations set their future but also remain critical for strategic success. Businesses throughout the world are relying more and more on analytics to fine tune their operations. The application of data analysis techniques has been prevalent in large corporate companies for several decades to monitor sales, target audience for maximizing marketing potential, work processes to reduce on internal cost as well as a variety of other aspects of the business where large quantity and regular flow of data is available. However, in the last decade a there has been a growing trend for smaller businesses to apply some of these techniques to bolster their competitiveness. The most prevalent usage has been in off-the-shelf services to monitor Internet usage and interaction with a business website in order to leverage Search Engine Optimization (SEO) techniques and therefore drive more traffic to on-line operations. However, the use of a wider spectrum of Business Intelligence techniques has remained primarily within the reach of large companies due to the cost involved.

REVIEW OF LITERATURE

Ho evar, B and Jakli , J. (2010) source many definitions available for business intelligence in their paper. They explain that the abundance of definitions is created by "various software vendors to suit their products". Some definitions of business intelligence include: "the process of gathering and analyzing internal and external business information, an architecture and a collection of integrated operational as well as decision support applications and databases that provide the business community easy access to business data, and an organized and systematic process by which organizations acquire, analyze, and disseminate information from both internal and external information sources significant for their business activities and for decision making". [4] From these definitions, we can infer that the term business intelligence does not relate to a particular piece of information but rather a systematic process that businesses employ to gather data to learn about their competitive environment and support decision making process. So from Jaklic and *et al* point of view, *ipso facto*, BI is not just data crunching mechanism but that helps organizations to revamp their internal operations while engaging in effective decision making. Today's economic environment is changing at an ever increasing pace, having the ability to adapt is vital to a business's success. As new products are delivered onto the market, customer preference can quickly shift. It is up to the businesses to identify consumer trends and react accordingly. This is why business intelligence is at the core of every firm's operations. Businesses no longer have the luxury to produce what they want, but rather their products are dictated by consumer demand. As a result, businesses must constantly check its surroundings and identify risks and opportunities as they arise. To start, organizations must be able to collect information based on its own operations and compare to its industry peers. However, possessing the ability to collect information does not automatically infer intelligence; intelligence is rather the ability to interpret information and make the right decision. Jaklic, Popovic and Tuck (2010) emphasizes that "the essential element of BI is the understanding of what is happening within an organization and its business environment, as well as appropriate action-taking for achieving organizational goals." [5] So, it is clear that BI operations helps organizations to understand their publics effectively through insights that they comprehend from the very data collected from the publics. As such BI helps companies to sell well by understanding their prospects properly.

After interpreting the meaning of business intelligence, the next question that comes to mind is how companies attain such intelligence? The answer to the question is simple, but the answer to the problem is complex. Business intelligence systems are integrated information gathering systems that can quickly help users interpret data and allow for better decision making process. Solomon explains that "business intelligence systems combine data with analytical tools to present information in a

---

3 Cio.com lists out almost 25 different companies that are potentially engaging in business intelligence operations. Available at http://www.cioreview.in/magazine/25-Most-Promising-BI-Companies-in-India-VWRT371563630.html

Research Paper
Impact Factor - **2.262**
Peer Reviewed Journal

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

more useful manner to decision makers". [6] These systems enable users to predict market trends, analyze competitor actions and impact of business decisions. The top four strategic use of business intelligence are: *corporate performance management, monitoring business activity, packaged applications for specific operations, and management reporting*. In fact, business intelligence and business intelligence systems are so intertwined that two terms are often used interchangeably. The impact and use of business intelligence systems are widespread and pervasive. In a survey of the state of business analytics by Bloomberg Businessweek, 97 percent of companies with revenues exceeding $100 million were found to use some form of business analytics. [7] These systems are so powerful that they have one of the greatest potential in differentiation from competitors. Business intelligence systems pull information from many different sources such as data warehouses, online-data processing, customer relationship management, and enterprise resource planning and convert the data into useful information. [8] Such systems allow full integration across all functionalities of an organization and increase overall productivity and efficiency. With the abundance of information available that are now made available to the entity, management can use business intelligence systems to create forecasts, perform 'what if' analysis, and produce ad-hoc reports." So, from these excerpts it is clear that BI basically involves data collection and later the same data will be analyzed in order to gain insights, these insights are useful for business process. It is also found that those companies that exceed in revenues are likely to use BI for effective decision making.

While coming to technology; businesses leverage these BI capabilities to navigate the market and provide real time feedback to important decision makers. [9] Ad hoc query and search-based OLAP allow users to quickly obtain operational information and provide various ways of organizing data output. Scorecards and dashboards provide executives with real-time feedback of their companies performance. Using operational data, business intelligence systems can perform predicative modeling and generate interactive visualization to assist decision making process. Negash illustrated in his journal article that a business intelligence system is composed of many different components. [10] Some of these components can be an analytic system by themselves. This fact further illustrates just how powerful and complex business intelligence systems are. All individual systems combine together to provide users with operational data on company level. Management use these information to stay current on company production schedule, obtain real-time financial performance, perform environmental scanning and forecast future trends. These analytic systems are tailored to a company's specific needs whether it be supply chain management, marketing, or customer relationship. But the act of combining these standalone solutions to work in sync creates much bigger value for the company and create a true business intelligence system. Based on Negash's illustration, the architecture of a business intelligence system consists of all IT systems that an organization has employed. [11] So, BI is not a simple to use as a technology, it is in fact a system of certain subsystems where the data is set to navigate across all sub-process and finally ends in analysis, visualization.

Venet, A., (2012), an astrophysicist turned data analyst, outlines 5 indicators such as ***deseasonalized sales, cost issues, inflation, buying patterns and productivity*** as they influence usage of BI tools in business. He also explains systematically as how these indicators try to necessitate the usage with the help of certain valid illustrations. At last he concludes that BI is very much useful not only for LSI but also for SSI for they are not so costly now-a-days while warning that industries must not treat BI as magic wand expecting to cure all ills of business. [12] In same note, Chen H., *et al* (2012) mentions that about four overarching trends transforming the industry: Big Data, predictive analytics, self-service/embedded analytics, and cloud-based analytics. Common technologies/tools used for sharing analytics insights within an organization comprise of spreadsheets (MS Excel), dashboards (drillable/interactive data visualization interfaces), scoreboards (performance analysis against KPIs and set goals) and reports in PDF or html format. She also mentions the pangs of managing ever growing data as she puts "An information-driven strategy is one that finds hidden or undervalued information to provide a strategic advantage. The increased volume of data, along with the greater variety generated by countless new devices emerges as Big Data." [13] So, BI appears to be categorical in case if firms interest is more broad in the sense that if company would like to control its cost, plan new products, aspire for better productivity, then they might think about BI. BI as technology transforming its shape from simple data analysis to big data architecture. Big data architecture is imperative for companies with massive data sets which in turn shows the evidence that BI is important not only for SSI but also LSI. In other words, growing data (volume) might demand sophistication in technology so why BI appears in the picture.

Ranjan, J. (2009) studied various techniques and other managerial issues of BI in business organization. The study is basically conceptual in nature. The study states that powerful transaction-oriented information systems are now commonplace in every major industry, effectively leveling the playing field for corporations around the world. To remain competitive, however, now requires analytically oriented systems that can revolutionize a company's ability to rediscover and utilize information they already own. The business intelligence (BI) has evolved over the past decade to rely increasingly on real time data. The BI systems auto-initiate actions to systems based on rules and context to support several business processes. These analytical systems derive insight from the wealth of data available, delivering information that's conclusive,

fact based, and actionable. Enterprises today demand quick results. It is becoming essential nowadays that not only is the business analysis done, but also actions in response to analysis of results can be performed and instantaneously changes parameters of business processes. The paper explored the concepts of BI, its components, benefits of BI, technology requirements, designing and implementing business intelligence, and various BI techniques. So, it is clear that today's enterprises need real time data to understand the ever changing environment. The data so collected need to be analyzed effectively and to do so enterprises need hi-fi systems like BI. Deploying BI systems and using them properly to arrive at quick results enable them to respond quickly to changing trends.

Djatna, T., *et al* (2011) studied BI progress through secondary data sources. The study reviews based on literature on business intelligence approaches the 60 journals of business intelligence system. Relates articles appearing in the international journal like Proquest, Ebscohost, Emerald, Science Direct and IEEE Conference from 2000 to 2011 are gathered It was found 46,67 % research is in single approach Business Intelligence System. Integrated between Business Intelligence and Customer Relationship Management is the most popular evaluating criteria with 6,67 %. Integrated between BI, Data Mining 5 % and Integrated between BI, AI and, Data Mining 5 % The topic that integrated with BI research that is found in this research is Supply Chain Management, Customer Relationship Management, Data Mining, Data Warehouse, Decision Support System, Performance Scorecard, Knowledge Management, Business Process Management, Artificial Intelligence, Enterprise Resource Planning, Extract Transformation Loading, OLAP, Quality Management System. From this study it is clear that BI is strictly connected to other technologies like data warehouse, knowledge management, process management, artificial intelligence, ERP and etc. In order to make BI successful all these technologies must work in tandem.

Pirttimäki, V. H., (2007) did a literature study and the study summarizes that "despite the importance of systematic BI, the concept is still trying to find a footing in both academia and the business world. From
the literature review, one sees that there are numerous intelligence concepts and that their categorization is ambiguous. The BI concept is also multidimensional as there is no precise or universal conception of what BI is." The article aims to provide an analysis of BI definitions and related intelligence concepts, such as the content of each key concept, what it describes and how intelligence concepts relate to each other. Another objective of the article is to increase the academic understanding and status of this recent field of research on intelligence activities. This study emphasizes the importance of BI research in both academic and industrial setups.

Jones, N. E., *et al* (2005), studied relationship between knowledge management (KM) and BI. The purpose of the study was to explore about integration of KM and BI. The study gone through literature spanning from 1986 to 2004. The study finds that "BI focuses on explicit knowledge, but KM encompasses both tacit and explicit knowledge. Both concepts promote learning, decision making, and understanding. Yet, KM can influence the very nature of BI itself. Hence, this paper explains the nature of the integration between BI and KM and makes it clear that BI should be viewed as a subset of KM."

Horakova, M., (2013), did a study on importance of BI for SSIs. The study mentions that "business Intelligence (BI) systems provide users for information and analysis to better support with tactical and strategic business decision processes." The article summarizes the current trends in BI systems, discusses aspects of BI tools and BI solutions in small and medium businesses. Principles of integration of multidimensional views of business data with analytical and visualization tools are studied and describe. The study also provides an example of a BI solution implementation in a small company and shows how the multidimensional analytical data model and related applications can be designed, created and implemented for the small company. Finally paper concludes that small companies need BI applications in order to collate, analyze and summarize data.

Elena, C., (n.d.), did a study on BI and the study mentions that "Business intelligence (BI) refers to computer-based techniques used in spotting, digging-out, and analyzing business data, such as sales revenueby products and/or departments, or by associated costs and incomes. BI technologies provide historical, current, and predictive views of business operations. Common functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, business performance management, benchmarking, text mining, and predictive analytics. Business intelligence aims to support better business decision making. Thus a BI system can be called a decision support system (DSS). Though the term business intelligence is sometimes used as a synonym for competitive
intelligence, because they both support decision making, BI uses technologies, processes, and applications to analyze mostly internal, structured data and business processes while competitive intelligence gathers, analyzes and disseminates information with a topical focus on company competitors. Business intelligence understood broadly can include the subset of competitive

Research Paper
Impact Factor - **2.262**
Peer Reviewed Journal

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

intelligence." This paper clearly shows that it is, in fact, a set of technologies that helps data mining and visualization. As such it helps to taking business decisions through analytics.

Table 1 –Managerial Issues in the Business Intelligence (BI) Focused from select Studies in the Review of Literature

	Title	*Author/s*	*Year*	*Focus*	*Managerial Implications*
1	Conceptual Model of Business Value of Business intelligence Systems. Management: Journal Of Contemporary Management Issues	Ho evar, B and Jakli , J.	2010	Decision making	Decision making
2	Conceptual Model of Business Value of Business intelligence Systems.	Aklic, J., Popovic, A., & Turk, T.	2010	Understanding data, stakeholders. Helps gain insights.	Data Analysis
3	Business Intelligence. Communication of the Association for Information Systems	Negash, S.	2004	Understanding data, stakeholders. Helps gain insights. Also helps taking better decisions. Helps understand business processes.	Data Analysis, Decision making & business process management
4	BI for small businesses	Venet, A.,	2012	BI helps organizations of all sizes viz., SSIs and LSIs	Organizational performance
5	Business Intelligence and Analytics: From Big Data to Big Impact.	Chen H., Chiang, R. L., & Storey, V. C.	2012	BI as technology transforming its shape from simple data analysis to big data architecture.	Information systems & data analysis
6	Business Intelligence: Concepts, Components, Techniques And Benefits.	Ranjan, J.	2009	Deploying BI systems and using them properly to arrive at quick results enable them to respond quickly to changing trends	Data analysis & business environment
7	Progress in Business Intelligence System research :A literature Review	Djatna, T., *et al*	2011	BI is strictly connected to other technologies like data warehouse, knowledge management, process management, artificial intelligence, ERP and etc.	Technology management
8	Conceptual analysis of business intelligence	Pirttimäki, V. H.,	2007	BI research is important in both academic and industrial setups.	Organizational performance
9	Knowledge management and business intelligence: the importance of integration	Jones, N. E., *et al*	2005	BI should be viewed as a subset of KM	Technology management
10	Business Intelligence and Implementation in a Small Enterprise	Horakova, M.,	2013	Small companies need BI applications in order to collate, analyze and summarize data.	Data analysis
11	Business intelligence	Elena, C.,	n.d.	BI is a set of technologies that helps data mining and visualization.	Data Analysis

Table 2 – Summary statistics

Managerial Issue	Number of articles	Proportion (relative probability)
Decision making	2	0.1428571429
Data analysis	5	0.3571428571
Business process management	1	0.0714285714
Organizational performance	3	0.2142857143
Information systems	1	0.0714285714
Technology management	2	0.1428571429
Total	**14**	**1**

The above table deals with summary statistics from literature review done in previous section. From the table, it is clear that the study seeks to find six major managerial issues regarding BI. The issues pointed by the study are decision making, data analysis, business process management, organizational performance & business environment, information systems and technology management. The relative probabilities are computed from the number of studies to that of total number of studies i.e.,

$$R.F = \frac{no.\, of\, studies}{total\, number\, of\, studies}$$

The above expression seeks to explain relative importance of the issue identified from the respective study. For instance, the most important managerial issues is identified as data analysis ($p = 0.35$), which means most of the organizations use BI as a potential platform for data collection, storage, analysis and understanding. So, BI helps organizations to understand and gain insights from the data. Second important issues appears to be organizational performance and business environment, which means BI helps management to improve organizational performance and also enable firm to cope up with environmental changes. Business process management and information systems appears to be least important issue to management for relative proportions turned out to be 0.071 respectively. This is a bit contrary to what is thought about BI by the research community. BI also is used for revamping process and as a matter of information systems but relatively less. In order to understand the same more research needs to be done in future. So the study recommends future research as on these less important issues.

CONCLUSION

The study shows that BI is important for business. Mostly organizations need BI practices to take care of data analysis and presentation, which is followed by decision making, business environment, technology management etc. There is evidence from the literature that BI practices also impact organizational performance. In other words, research in this direction is necessary to show that BI practices are important in supporting information systems and process management. So this study also suggests some vital managerial implications for transparent business reporting.

[Disclaimer: The data in this study is retrieved from various sources. The author, journal, Institute is neither responsible nor liable for the data and its authenticity]

REFERENCES
1. Negash, S. (2004). Business Intelligence, Communication of the Association for Information Systems, 13, 178.
2. Pietersen, W. 2002. Reinventing strategy: using strategic learning to create and sustain breakthrough performance. New York: John Wiley & Sons.
3. CIO. (2007). Business intelligence definitions and solutions. Available at http://www.cio.com/article/2439504/ business-intelligence /business-intelligence-definition-and-solutions.html.
   Aklic, J., Popovic, A., & Turk, T. (2010). Conceptual Model of Business Value of Business intelligence Systems. Management: Journal Of Contemporary Management Issues, 15(1), 8.
4. Chen H., Chiang, R. L., & Storey, V. C. (2012). Business Intelligence and Analytics: From Big Data to Big Impact. MIS Quarterly, 36(4), 1165.
5. POPESCU, S. (2012). Business Intelligence Solutions - a Way of General Improvement   of Efficiency and Effectiv -eness. Review Of International Comparative Management / Revista DeManagement Compart International, 13 (1), 88.

6. Venet, A., (2012), BI for small businesses. Available at http://analyticsindiamag.com/smebi/.
7. Ranjan, J. (2009)**.** Business Intelligence: Concepts, Components, Techniques and Benefits.Journal of Theoretical and Applied Information Technology. 2005 - 2009 JATIT.
8. Djatna, T., *et al* (2011). Progress in Business Intelligence System research: A literature Review. International Journal of Basic & Applied Sciences IJBAS-IJENS Vol: 11 No: 03.
9. Pirttimäki, V. H., (2007). Conceptual analysis of business intelligence. South African Journal of Information Management. Vol.9 (2) June 2007.
10. Jones, N. E., (2005). Knowledge management and business intelligence: the importance   of integration. JOURNAL OF KNOWLEDGE MANAGEMENT. VOL. 9 NO. 4 2005,   pp. 45- 55,Q Emerald Group Publishing Limited, ISSN 1367-3270.
11. Horakova, M., (2013). Business Intelligence and Implementation in a Small Enterprise.JOURNAL OF SYSTEMS INTEGRATION 2013/2. P. 50.
12. Elena, C., (n.d.). Business intelligence. Journal of knowledge management, economics and IT. ScientificPapers.org. ISSN 2069-5934.