# Analysis on cloud computing and business intelligence systems and its effects on project management practices in the construction sector

Maher F.Alhasen

Dec 2020

#### Abstract:

Rapid innovation means rapid evolution, and with the concurrent development of information and data technologies, many applications have arisen and many technological implementations have to considered in this context, business intelligence is relatively a new interdisciplinary term that helps businesses gain value through exploiting different sources of data, therefore maximizing performance, getting more development in its operational activities, more customer satisfaction and managing to have a more wise decisions based on data in an efficient manner. number of organizations adapting these technologies are increasingly on the rise, due to the raising of awareness of the different capabilities business intelligence can offer. In this paper an analysis will be conducted on information systems and trying to evaluate their effect on organizations in the construction industry, study cases will be considered to derive data from their historic experience with information systems, and thus identifying their path toward effectively using these systems and applications for better performance, the latter will be represented by companies' system configuration and construction business functions. eventually defining the most common applications and practices companies are using, and evaluating their role in the strategic, organizational, and managerial aspects within the construction industry.

## Introduction

Our world is evolving quickly with the rapid development and the usage of information and communication technologies, which have widely grown and kept continuously spreading in all paths of life and in almost every single corner. Along with this evolution, more and more methodologies have emerged consequently to accommodate the necessity of speeding up processes, and obtain high quality outcomes in term of products, services and even when it comes to decision making systems for enterprises and administrators, by embracing large streams of data and extracting the usefulness and the gist of these interlaced data' sources.

data management had been implemented and used in the past half century and was defining a value for businesses, Nicholas Enticknap wrote "The 1990s have seen an increasing emphasis on making IT provide competitive business advantage, and this has led to the rise of data mining and data warehousing applications". For smartening such systems, several stages have been taken place with the aid of different variables on which these systems rely on, firstly we can define Business Intelligence with reference to (Reinschmidt and Francoise, 2000), a BI system is "an integrated set of tools, technologies and programmed products that are used to collect, integrate, analyze and make data available".

Thus, if we look carefully at the definition, we can observe what steps are supposed to be taken, and what is the predicted results out of this integrated methodology. And that leads us to the conclusion that obtaining good decisions is one of the ultimate goals of Business Intelligence, According to Farjami (2015), Decision maker indeed needs good data, to make the right decision at the right time and place. And undoubtedly BI will be very beneficial in the convoluted environments where decisions need extra temporization, but with BI systems it will become a more sourcing guide. As according to Arnott, D., Gibson, M., & Jagielska I. (2004), "A Business Intelligence (BI) system is a technology that provides significant business value by improving the effectiveness of managerial decision making".

# **Research Issue**

Due to the vast growth in data and data availability which has taken place over the past 20 years, huge concerns have arisen regarding the exploitation and utilization of data for enhancing the performance in organizations, more specifically the construction sector with its huge work load and various parties involved, need to have more organized fabric for the sake of success in related projects, as failing in defining prevention measures may incure construction companies and contractors a big amount of money, because of the lack of quality assurance, rework activities and some other consequent events that may rise because of the unproper use of information systems for efficient decisions making and quality monitoring.

# Hypothesis

making platforms, as eventually meaningful and accurate information has a big support for business decisions (Matei, 2010). The problem lies in taking advantages of all informational resources and harnessing these precepts of information to manage organizational operations and activities, reporting and planning, and to boost decision-making effectiveness to the ultimate level during times of great uncertainty. Having exploited such resources is one of the most critical success for organizations (Cody, Spangler, Krishna and Kreulen, 2002).

# **Research Methodology**

Throughout the study, there will be intensive research on previous literature reviews, extracting data from different articles and some other sources, the primary aim of this study is to analyze, and make investigation of different approaches that can be implemented to empower business intelligence for further enhancement in organizations, mainly the business intelligence is to collect, organize and interpret data in a valuable meaning to assist decision makers in organizations. Being in this Theory-Driven hypothesis, deductive reasoning will be used as a result, an empirical approach will be conducted in this study to evaluate the current situation, explore different scenarios, and use cases to further analyze and create specific hypothesis.

# Data Transformation Pyramid

For the aim of supporting business decisions, certain transformations are applied to raw data to gain valuable information, for the purpose of increasing potential for boosting decision making, with a more meaningful aspects and greater significance, to avoid misconception about data, information, knowledge, and sometimes "wisdom" or in other words "intelligence". However, the following illustrates and distinguishes these terms according to Ackoff (1989)

1) Data: It all begins with data as it is the seed for information, wisdom and knowledge, transactional processing systems are defined in this level, data or raw data are introduced as a random set of things, observations, activities, transactions, facts and so on which has no meaning or value because it is without context and interpretation (Jessup and Valacich, 2003, Groff and Jones, 2003). As according to (Awad and Ghaziri, 2004, Chaffey and Wood, 2005) data are discrete, objective facts or observations, which are unorganized and unprocessed, and do not convey any specific meaning, whereas Data items are an elementary and recorded description of things, events, activities and transactions (Laudon and Laudon, 2006, Boddy et al., 2005). 2) Information: this higher level of transformation is defined by management information systems which basically identify Information as data which adds value to the understanding of a subject (Chaffey and Wood, 2005, p. 233). Data that have been shaped into a form that is meaningful and useful to human beings (Laudon and Laudon, 2006, p. 13). Or according to (Awad and Ghaziri, 2004, p. 36) Information is an aggregation of data that makes decision making easier. 3) Knowledge: this upper level has a direct effect on decision making and represented by decision support systems, where knowledge is the combination of data and information, in addition to experts' opinions, skills, and expertise, which eventually result in a valuable asset which can be

used to aid decision making (Chaffey and Wood, 2005, p. 223). Some other definitions include Knowledge as data and/or information that have been organized and processed to convey understanding, experience, accumulated learning, and expertise as they implement to a current problem or activity (Turban et al., 2005, p. 38). Lastly, with reference to (Boddy et al., 2005, p. 9) Knowledge is built on information that is extracted from data ... While data is a property of things, knowledge is a property of people that predisposes them to act in a particular way. However, Strong et al. (1997) pointed out that the process of converting unprocessed data, organizing them and transforming them into information, which can be utilized and analyzed by a data consumer that eventually will shape the term knowledge, this whole process is called "data manufacturing system". 4) Wisdom: the making of intelligent decisions by expert systems is the goal of business intelligence, in this context wisdom or intelligence is defined as accumulated knowledge, which allows you to understand how to apply concepts from one domain to new situations or problems (Jessup and Valacich, 2003). Or is considered the highest level of abstraction, with vision foresight and the ability to see beyond the horizon (Awad and Ghaziri, 2004, p. 40). As according to (Jashapara, 2005, pp. 17-18) wisdom is the ability to act critically or practically in any given situation. It is based on ethical judgement related to an individual's belief system. Wisdom is achieved after too much processing of data, information and knowledge and the whole process starts with data.

#### Conclusion

Even though Business Intelligence has not been a trend that was implemented since quite long time, there is an obvious concern and interest in information systems and BI technologies in so many fields nowadays, and BI became one of the most critical requirements for organizations and got to be placed on the top priorities due to the enormous evolution of data, and the need to align companies' operations with the concurrent conditions. Many techniques which have been used widely in enterprises are getting to evaporate, because of the existence of this newly handy smart technologies, which in turn, are taking place of those relatively obsolete trends. Adoption of BI systems is not as easy as it might seems, as there are many failure implementations of BI systems, due to the lack of awareness of the tangible value of sophisticated data and analytical tools, through which various benefits can be derived for the development of businesses, knowledge and expertise is another factor that blocks the initiatives to start implementing such systems, and that is in addition to some other factors both technical and organizational to which we have been exposed throughout this study, which indeed affects the integration process of these systems and are considered to be the critical success factors of implementing BI systems, a more thorough search will be conducted on these factors in order to define the lanes through which more development can be obtained, and to reveal more information and possible approaches of enhancement and development in this field. BI is an interdisciplinary concept that has many technical and organizational aspects to be further examined and explored, besides researching of future trends that will come to the surface as well as key developments, which in turn will influence business intelligence and analytics.

# References

1 - Chaudhuri S., Dayal U. and Narasayya V. (2011). An overview of business intelligence technology. <u>https://cacm.acm.org/magazines/2011/8/114953-an-overview-of-business-intelligence-technology/fulltext</u> Vahid FARROKHI1 and Laszlo POKORADI (2013). Organizational and technical factors for implementing business intelligence

http://imtuoradea.ro/auo.fmte/files-2013-v1/Farrokhi%20Vahid%201.pdf

2 - Bernhard Wieder and Maria-Luise Ossimitz (2015). The Impact of Business Intelligence on the Quality of Decision Making – A Mediation Model:
<u>http://www.sciencedirect.com/science/article/pii/S1877050915027349</u> Alaskar T. and Poulis E. (2015). Business Intelligence Capabilities and Implementation: <u>http://www.gsmi</u>-ijgb.com/Documents/IJGB%20V8%20N1%20P04%20Alaskar%20Thamir%20-Business%20Intelligence%20Capabilities.pdf Hawking P. and Sellitto C. (2010). Critical Success Factors of Business Intelligence (BI) in an ERP Systems Environment <a href="https://pdfs.semanticscholar.org/3e50/971c28fd582c32f619e463037909c7117d5e.pdf">https://pdfs.semanticscholar.org/3e50/971c28fd582c32f619e463037909c7117d5e.pdf</a> Renne

Hirsimäki (2017). Critical Success Factors for Business Intelligence systems implementation https://jyx.jyu.fi/dspace/bitstream/handle/123456789/53682/URN%3ANBN%3Afi%3Ajyu-201704262089.pdf?sequence=1 John Lloyd (2011). Identifying Key Components of Business Intelligence Systems and Their Role in Managerial Decision making https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/11389/Lloyd-2011.pdf Gartner:

Four factors will influence business intelligence and analytics (2014) http://www.mycustomer.com/marketing/technology/gartner-four-factors-will-influence-businessintelligence-and- analytics Gene Bellinger, Durval Castro, Anthony Mills. Data, Information, Knowledge, and wisdom <u>http://courseweb.ischool.illinois.edu/~katewill/spring2011-</u> 502/502% 20and% 20other% 20readings/bellinger% 20on% 20ackoff% 20data% 20info% 20know% 20wisdom.pdf Jay H. Bernstein. The Data-Information-Knowledge-Wisdom Hierarchy and its Antithesis <u>https://journals.lib.washington.edu/index.php/nasko/article/viewFile/12806/11288</u>

JAYANTHI RANJAN Ranjan J. (2009). Business Intelligence: Concepts, Components, Techniques and Benefits <u>http://www.jatit.org/volumes/research-papers/Vol9No1/9Vol9No1.pdf</u>

Gao J., Koronios A. and Yeoh W. (2008). Managing the implementation of business intelligence systems: a critical success factors framework. <u>http://im1.im.tku.edu.tw/~cjou/bi2009/1.pdf</u> VIOLET ASIKOMURWA, MANAR MOHAISEN (2015). GAME THEORY AND BUSINESS INTELLIGENCE IN STRATEGIC BUSINESS DECISIONS <u>http://www.worldresearchlibrary.org/up\_proc/pdf/40-14349578049-13.pdf</u>

Marcus Gibson & David Arnott & Ilona Jagielska (2016). Getting value from Business Intelligence systems: A review and research agenda. Decision Support Systems <u>https://pdfs.semanticscholar.org/e68c/c7461282396135609201081197350e119d38.pdf</u> Arisa Shollo (2013). The Role of Business Intelligence in Organizational decision-making http://openarchive.cbs.dk/bitstream/handle/10398/8664/Arisa\_Shollo.pdf Bhumika Hansoti (2010). Business Intelligence Dashboard in Decision Making

http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1015 HYPERLINK "http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1015&context=techdirproj"& HYPERLINK

"http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1015&context=techdirproj"context=tech dirproj