

Review on Business Intelligence (BI) Success Determinants in Project Implementation

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ABSTRACT

Business intelligence (BI) is a business management term which refers to applications and technologies which are used to gather, provide access to and analyze data and information about an organization's operations. Business intelligence provides insights that will enable the key players of the organization to make tactical decisions, as well as to establish, modify, or tune the business strategies and processes in order to gain competitive advantage, improve business operations and profitability, and generally achieve whatever goals management has set. This paper compiles critical success factors or successful determinants required to make a business intelligence project deemed as successful. The determinants are compiled based on previous studies that have been used for business intelligence, data warehouse, executive information systems and decision support systems in other parts of the world.

General Terms

Business Intelligent, Decision Support System, Data Warehouse

Keywords

Project Management, Success Factor, Organization, Information System.

1. INTRODUCTION

Business Intelligence (BI) is one of today's most important enterprise technology areas. It has many capabilities, including reporting and querying, complicated analysis, data mining, prediction, forecasting, and much more. These capabilities surfaced from the tools and techniques on which BI is based which is from Decision Support Systems (DSS), Executive Information Systems (EIS) and Data Warehousing (DW). It involves many components such as querying, visualizations, workflow, operations research/management science, and applied artificial intelligence.

BI is a critical aspect for enterprises in today's highly information in making timely decisions and responding to changing business circumstances. Competitive threats and commoditization of technologies and services constantly render current products and services obsolete or unprofitable. In order to remain competitive, organizations must find the means to improve product offerings and to introduce value-added services

ahead of the competition. For such activities to take effect the information must be reliable, accurate and easy to access. Business Intelligence solutions are being accepted among organizations because it enable enterprises to improve new product development by providing insights in areas such as providing visibility into customer dynamics and providing a consistent picture of internal status and operations. Despite the growth of BI, however, achieving return on investment remains a challenge when implementing this software. The problem lies where companies treat BI projects as just another IT project. BI is neither a product nor a system. It is, rather, a constantly evolving strategy, vision and architecture that continuously seek to align an organization's operations and direction with its strategic business goals.

BI implementations have unique characteristics that may impact the importance of determinants that apply to it. Management support and resources play important roles to help address organizational issues that arise during BI implementations; resources, user participation, and highly-skilled project team members increase the likelihood that BI projects will finish on-time, on-budget, with the right functionality; and diverse, un-standardized source systems and poor development technology will increase the technical issues that project teams must overcome. The implementation's success with organizational and project issues, in turn, influence the system quality of the BI solution. To succeed at BI, an enterprise must nurture a cross-organizational collaborative culture in which everyone grasps and works toward the strategic vision. This paper identifies what are the successful determinants of BI project implementation.

2. OVERVIEW OF BUSINESS INTELLIGENCE

A BI system is an integrated set of tools, technologies and programmed products that are used to collect, integrate, analyses and make data available [1][12]. Whilst [2] defines BI as architecture and a collection of integrated operational as well as decision support applications and databases that provide the business community each access to business data. Stated simply, the main task of a BI system include intelligent exploration, integration, aggregation and a multi-dimensional

analysis of data originating from various information sources [3]. [4] define Business Intelligence as the process of taking large amounts of data, analyzing that data, and presenting a high-level set of reports that condense the essence of that data into the basis of business actions, enabling management to make fundamental daily business decisions.

When windows desktops made their entrance in the early 1990s, many experts believed end-user reporting and analysis tools would free users from their dependency on the IT department to create and deliver custom reports. The combination of these tools and data warehouses caused these experts to announce that the era of self-empowerment of business intelligence had arrived. However, reality quickly fell short of promise. It turned out that a majority of users found early versions of BI tools too difficult to use, and continued to rely on the IT department to create custom reports, and many of the remaining “power users” used BI tools simply to download huge data sets to their desktops — congesting networks and withholding query performance for everyone else. These business analysts then downloaded data was then dumped into spreadsheets or local databases such as MS-Access, where they conducted their “real” analysis, creating dozens, if not hundreds, of “spread marts” and which caused mushrooms of departmental analysis which undermines data consistency. C-level managers have a hard time defining which reports portray the true performance of the company.

To escape from this nature of departmental BI and attain an enterprise resource that empowers all users across the enterprise, a BI infrastructure or platform with reliable BI tools is required to supports a variety of reporting and analysis processes to allow for a consistent view of the business. There are various types of BI implementation in today’s business including enterprise BI suites (EBIS) which typically provide BI scalability and extend not only to internal users but also to key customers, suppliers sometimes the general public, query and reporting tools, advanced BI tools--primarily On-Line Analytical Processing (OLAP)/advanced analytic tools, and BI platforms for developing BI applications [5].

Figure 1 below shows an example of a BI architecture which includes the somewhat typical components that make up a Business Intelligence platform which offer complete sets of tools for the creation, deployment, support, and maintenance of BI applications.

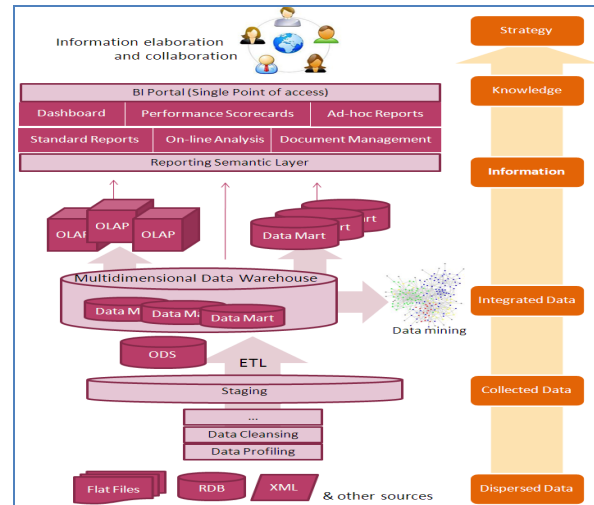


Figure 1: A typical Business Intelligence Architecture [1][5]

3. SUCCESSFUL DETERMINANTS OF BI PROJECTS

Although the acceptance of BI as an important area of practice, not a lot of studies have been conducted to assess BI implementation successful determinants. This portion of the paper provides related-studies in the field of BI and data warehousing that have presented critical success factors influencing data warehouse implementation, though the majority of the available research focused largely on technological and educational aspects, which represent the operational level in the organization. The aim of this study is appropriate because it highlight on organizational and project-related dimensions, together as a package, which influences the adoption of Business Intelligence.

An approach to understanding BI implementation is to consider the determinants that should be effectively addressed if a project is to succeed. There are very few studies of BI critical success factors [6].

However, other research has shown that all management support systems (MSS) share basic concepts and research findings from one type of MSS can be transferred to another [7]. Many of the success factors identified from the review literatures in relation to the implementation and success of BI are not unique to the BI environment. Many of these success factors can be applied to other IT systems such as EIS projects [8] and data warehouse implementations [9] [10].

The approaches and measures associated with the identification of critical success factors differ widely. Some studies measured implementation factors while others measured BI success.

[9] conducted an empirical study that investigated the model of data warehousing success through cross-sectional mail survey to data warehousing managers and data suppliers from 111 organizations in the United States. This outcome of the paper identified many success factors which were categorized into three factors:

- Organizational determinants: Management support and dedicated functional and system support resources help

address organizational issues that arise during warehouse implementations;

- Project determinants: User participation, resources and highly-skilled project team members increase the likelihood that business intelligence projects complete on-time, on-budget, with the right functionality; and
- Technical determinants: un-documented and un-standardized source systems and development tools increase the technical issues that project teams need to overcome.

According to [9] data warehousing has a unique characteristic in that “the amount of complexity involved is what makes a data warehousing project different from traditional software engineering or systems development initiatives. They also debated that due to the level of complexity in data warehousing, success factors can be unfavorably affected to a greater degree than with other applications.

[10] developed a research model for data warehousing success to facilitate research integration and variable selection in future research and adopted eleven implementation factors and eight success variables as a model for their data warehouse success model.

The eleven factors that contribute to the success or failure of data warehouses were identified and categorized into four aspects which are:-

- Operational aspects: - Top management support, clearly defined business needs/benefits and user involvement/participation;
- Technical resources and expertise: Source data quality and project management/teamwork;
- Project management: Practical implementation schedule and proper project planning/scoping and
- Economic aspects: Adequate funding and measurable business benefits.

These implementation factors in turn reflect on the system success. The following measures were used to assess system success:-

- Quality of system developed: measured by the ease-of-use and speed of information recovery;
- Benefits of system output: measured by the amount of information produced and information with more quality;
- Benefits resulted from the use of information: measured by the improvement of work productivity and better decision making from the individual decision makers;
- Benefits accrued at the organizational level: measured by the improvement of business.

[8] investigate critical success factors for the development of information systems study of six organizations. It has been known for a long time that EIS and their derivatives are usually developed with high expectations, yet often end in failure [8]. The suggested that there is a hierarchy of five evaluation criteria to consider when evaluating an EIS which are accessibility, usability, satisfaction, impact and diffusion. From these criteria they then identified the conditions that need to be met to assure

success of the system. They extracted ten areas that appeared to be the most important to EIS success.

[11] investigated the organizational fundamentals for the implementation of a data warehouse project. The critical areas of the research model are structured into a five-factor table, Systems factors, Data factors, Skills factors, Organizational factors, Project management factors. The factors are not mutually exclusive in relation to their influence on a data warehouse project implementation [9] and are consequently applicable for business intelligence. For their study four organizations were purposefully chosen to provide a breadth of implementation experience. They differed in nature of business, organizational structure, scope of the data warehousing project, methodology employed, and the strategic uses of the warehousing system. Based on four case studies they found these fundamentals were essential to the success of DW implementation:-

- Technology and Systems: A business driven initiative and long term plan for data warehousing and automated ETL solution;
- Data: flexible enterprise data model, data stewardship and source data quality;
- Project management and skillsets: Project team skills and knowledge of DW compatibility with existing systems;
- Organizational concerns: Executive sponsorship, commitment and funding commitment.

[6] presented a framework to help data warehouse professionals visualize how critical success factors can be included in each phase of data warehouse implementation process. They found that the data warehouse implementation process follows the phased pattern of evolution; Pre-implementation, Implementation and Post-Implementation phases. After reviewing previous related-studies, a list of 13 critical implementation factors was developed and categorized into two major categories:

- Technical factors: Data and data management, development methodology, the technology being adapted, appropriate resources with the technical skill, training and expertise to develop and manage data warehouse systems.
- Organizational factors: Executive sponsorship, operating sponsorship, factors related to business needs, clear link to business objectives, user related factors such as user involvement, support and expectations, organizational resistance and organizational politics and planning for system evolution and sustaining growth.

These factors have been discussed and weight to see each factor contribution of each factor towards every phase of data warehouse implementation process.

The approaches and measures associated with the identification of critical success factors differ widely. Some studies measured implementation factors while others measured BI success. Table 1 provides a summary the successful determinants that have been identified by the mentioned writers.

Table 1: Identified BI Successful Determinants from other studies

Authors	Identified Successful Determinants/Factors
Wixom and Watson (2001) [9]	Data quality, system quality, management support, adequate resources, user participation, skilled project team.
Hwang and Xu (2007) [10]	Top management support, clearly defined business needs/benefits and user involvement/participation.
Sammon and Finnegan (2000) [11]	Business driven approach, management support, adequate resources, data quality, flexible enterprise model, data stewardship, strategy for automated data extraction methods/tools, integration of data warehouse with existing systems, solution proof of concept.
Poon and Wagner (2000) [8]	Executive sponsor, operating sponsor, IT staff, technology, data management, business objectives, organizational resistance, system evolution, development methodology, defined requirements.
Mukherjee and D'Souza (2003) [6]	Data quality, technology fit, management support, defined business objectives, user involvement, change management.

4. CONCLUSIONS

Business Intelligence has reached a new level of importance for decision makers. Capturing data—from customers, partners, employees and operations—has always been a part of running a business, but using this information proactively has become essential. Access to BI has never been more important and the use of BI can help organizations reduce costs, plan inventory, identify sales and marketing opportunities, optimize pricing and, ultimately, increase revenues.

To help achieve the promise of BI success, this paper has investigated several successful determinants that can be used by organizations to ensure a better BI implementation. This paper compiled several operational and technical factors critical to the success of BI. Specifically, better communication of the value of BI, especially targeted at senior management is critical. Champions play a vital task in persuading the employees to see the visions for the company and adopt new technologies, embracing the need to secure required capital and information. Having top management support/commitment will help remove many obstacles to greater BI implementation such as human capital issues, lack of skilled resources and time, money and labor. It is also important is that organizations leverage on their existing enterprise technologies and experience with external

data sources. Organizations should also browse and benchmark on proven technologies and work with experienced consultants and vendors but also promote and retain in-house expertise. End-user involvement, availability of resources and a skillful project team are also key contributions for implementing a successful business intelligence project.

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