SUCCESS FACTORS FOR BUSINESS INTELLIGENCE: PERCEPTIONS OF BUSINESS PROFESSIONALS

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Abstract: While business intelligence (BI) has gained considerable attention in recent years, many organizations are still searching for a better understanding of the phenomenon and how it can be leveraged for greater benefit. Moreover, BI has evolved beyond just an IT issue and requires organizations to consider the people and business issues involved. Sponsored by several Fortune 500 organizations, a web-based survey of hundreds of business professionals is conducted. The results provide important data for companies to benchmark their BI efforts. The analysis also reveals a number of operational and technical factors critical to the success of BI.

INTRODUCTION

The term "business intelligence" or BI is widely used. For example, a Google search in late 2008 returned about 48,800,000 hits, compared with 20,500,000 hits for data warehouse and 22,800,000 hits for data mining. The phrase is generally attributed to Howard Dresner of the Gartner Group, who in 1989 discussed a set of concepts and methods for improving business decision making through the use of fact-based support systems (Hayes, 2002; Martens, 2006). It has been closely associated or used interchangeably with data warehousing, decision support systems and online analytical processing (OLAP). The goal of BI is to explore data collected in an organization's data warehouse to produce insight for business gains. Techniques used for BI purposes include traditional query and reporting tools, OLAP, and data mining. Today, it is considered a real and powerful technology ripe for strategic exploitation (Andriole, 2007).

Despite the tremendous interest in business intelligence, there is no generally accepted definition. BI has been used in at least two different contexts: as a system and a process. As a system, BI has been equated with decision support systems and executive information systems (Gray, 2005). As a process, BI has been defined by the Data Warehousing Institute as a process of turning "data into information and information into knowledge and plans that drive effective business activity" (Eckerson, 2003, p.5). While there are merits to both perspectives, a more complete view of BI is that it is a discipline that can be described by both a process and a system, although the system is broader than a traditional decision support or executive information system. This discipline is distinguished by the use of data analysis tools and analytical approaches designed to understand, predict, optimize, and take action based on current and future business activity. This work employs technologies such as data and text mining, geographic information systems, language translation, statistical analysis, predictive modeling, simulation and advanced visualization. This broad view of BI allows companies to transform data into actionable insight to achieve strategic goals in customer relationship management (CRM), supply chain management (SCM), and quality assurance such as Six Sigma. Support for the discipline view of BI can be found in the BI competence center being established in leading global corporations (Beal, 2005).

For organizations contemplating BI initiatives, unfortunately, there is little published research that describes the practices and prescribes solutions that are supported by empirical data. Currently, only a few white papers authored by practitioners have examined BI from the perspective of IT professionals (Eckerson, 2003; KCR Research, 2004). However, BI has evolved beyond just an IT issue and requires organizations to consider the people and business issues involved (Betts, 2005). In a comprehensive review of the literature, Jourdan, Rainer, and Marshall (2008) noted that theory formulation/literature review had been the dominant research strategy in the last decade. They call for more survey research, especially research on the benefits of business intelligence.

At the request of a group of global corporations, this study surveyed business professionals from various functional areas to obtain their perspectives on BI issues and practices. Their responses allowed the identification of several factors that contribute to the success of BI. As shown in Figure 1, the potential factors are categorized into three groups: technical feasibility, operational feasibility, and project characteristics. Both technical and operational feasibility are organization-wide factors that affect all BI projects. The former deals with the technical infrastructure whereas the latter cultural and organizational issues. Project characteristics include factors that are project specific such as how projects are initiated, prioritized, and evaluated post implementation. As will be detailed later, most technical and operational factors have a significant relationship with BI success, defined as the number of successful projects. Interestingly, the only significant project factor is the number of BI projects completed per year.

THE STUDY

A panel of BI practitioners from Fortune 500 companies contributed to the identification of BI issues and practice questions. The survey was pre-tested with a pilot group of industry practitioners prior to its full-scale release. Commercial email lists and databases were used to identify middle to upper-level managers from the business functions of Marketing, Information Technology, Finance, Purchasing, Manufacturing and Operations, and Research and Development at organizations with more than $100 million in annual sales. Over a six-week period a total of 282 respondents completed the survey. Figures 2 and 3 display selected characteristics of the respondents.

Participating Organizations

Most companies (59%) had annual sales of less than $1 billion and less than 5,000 employees (64%). Many of these companies had operations in multiple continents; with North America, Europe, and Asia being the most popular areas. Organizations from more than twenty different industry classifications were represented.

RESULTS AND DISCUSSION

BI Success

The survey asked respondents to estimate what percent of their company's BI projects are successful. Figure 4 gives the breakdown of the responses, which show companies' experiences varied widely. Kruskal-Wallis tests were conducted to determine if these responses were related to answers to other survey questions. As indicated in Figure 1, a number of factors were found to be significantly related to BI success at either the one or five percent level.

Management's Understanding of BI

Since management support/commitment is often an important factor to the success of organizational initiatives, the survey assessed the extent to which participants think their senior management understands the value of BI. Slightly over half of respondents (51%) rated their senior management's understanding as "very high" or "high," while 34% indicated it as "moderate," and 13% said management had "low" or "no" understanding of BI. As expected, greater management understanding is related to higher BI success.

Importance of BI

The perceived importance of BI to a company's success is also critical. BI is not likely to thrive until it is viewed as vital to a company's overall success. A majority of respondents (89%) reported that BI is "very important" or "important" to the success of their company, while only 7% said it is "neither important nor unimportant" and 3% "unimportant". As expected, greater perceived importance is associated with higher BI success. Results of the first two questions indicate that while most managers recognize the importance of BI; not all of them, especially senior managers, understand the value of BI. It remains a challenge for both IT and business managers to make a strong case for the value of BI to senior management (Havenstein,2007).

Current and Future Involvement of BI

It was interesting to determine the proper level of BI involvement both currently and in the future. Almost three-fourths of the participants (73%) thought their company should have more involvement in BI activities, compared with 21% who said "about the same level of involvement," and 2% less involvement. Approximately two-thirds of respondents (65%) thought their company will increase its BI involvement in the next two to three years, while 25% said it will "stay about the same" and 3% said it will decrease. Interestingly, only future involvement is significantly related to BI success. The BI project success ratio is higher in companies where respondents forecast a significant increase in future use of BI. Perhaps companies with more BI success in the past are more likely to increase its use.

BI Structure

An important question is how a company should structure its BI resources. Three alternative models were identified: centralized, decentralized, and a chartered network of experts. The study found that 38% of respondents indicated their company's BI activities are centralized, 39% decentralized, and 21% a chartered network of experts around the company. Companies that follow the model of a chartered network of experts are more successful. This model seems a good compromise of the two extremes and allows BI to flourish through coordination and collaboration.

Barriers to BI

A series of questions asked respondents to rate whether various factors were barriers to greater BI adoption in their company. The highest rated barriers to BI were insufficient stuff, insufficient budget and lack of skilled stuff. Not surprisingly, the fewer the number of barriers the more successful BI is. The other side of the coin is that these barriers also point out factors that need to be present in order to ensure BI success. Companies are advised to; for instance, allocate adequate resources including human capital for BI projects.

Enterprise Technologies

Since BI is closely related to enterprise technologies and applications such as CRM, SCM, data warehousing, and data mining, respondents were asked to rate their organizations in these areas. On a five-point scale, the means ranged from 3.04 for data warehousing to 2.64 for GIS. Overall, as expected, companies that excel in those areas are more successful in BI.

External Data

The extent to which external data sources are utilized may also be related to BI success. Respondents were asked to rate on a five-point scale how their organizations utilize external data sources including Lexus-Nexus, Dun & Bradstreet and US census. The means ranged from 2.86 for Dun & Bradstreet to 2.38 for Chem Abstracts. Generally, the results support the assumption that companies good at utilizing external data sources are more successful.

Dedicated Hardware

It was important to determine if organizations are allocating separate hardware for BI applications. Forty-eight percent of the respondents said "yes,"
41 percent said "no," whereas 11 percent said "don't know". Interestingly, companies without dedicated hardware tend to have higher BI project success rates. It could be that companies spending extra budget on BI hardware felt the need to recoup the costs in order to consider a project successful. The implication is that organizations should refrain from spending large sums of money on hardware upfront.

External Hosing

It was also important to establish if external hosting is being used to support BI activities, given the increasing popularity of on-demand computing. A majority (67%) of the respondents said "yes,"18 percent said "no," whereas 15 percent said "don't know". Interestingly, companies without external hosting tend to have higher BI project success rates. This suggests that BI is by no means a mature application that can easily be optimized through external hosting.

BI Projects

Several survey questions addressed the nature of BI project practices in organizations. Participants indicated that BI projects are initiated from a variety of sources: strategic/corporate initiative (40%), business unit/functional objective (33%), and individual recommendation (27%). The most frequent drivers of BI projects are: revenue generation (32%), cost reduction (27%), and competitive threat (23%). BI projects are most often prioritized based on: cost-benefit analysis (26%), the alignment of the project with strategic goals (23%), the availability of staff resources/skills (22%), and the availability of data (19%). On average, more than half (54%) of BI projects are paid out of a centralized company fund compared to 40% that are paid by end users. The estimated

average size of a BI project has 765 full-time equivalent employees, a budget of about $140,000 and a duration of a little over four months. Completed BI projects are most often evaluated based on: whether or not the project met its objectives (19%) and the degree of end user satisfaction (17%). However, 17% of respondents indicated there is no formal evaluation, only 12% reported a cost benefit analysis is performed, and just
6% indicated that a formal ROI value is assigned to projects.

Questions were also asked about the makeup of BI project teams in order to find out the need for advanced degrees and external expertise. Only about 40 percent of project team members possess masters or doctoral degrees and the majority of companies (56%) use few (less than 10%) external consultants for their BI projects. Finally, respondents were asked to indicate how many BI projects their organizations undertake per year. The most frequent response was from one to three (45%), followed by from four to six (20%). Interestingly, this is the only project factor significantly related to BI success and the result indicates that the more projects that are carried out the higher the success rate. This makes sense because in general the odds for success improve with experience.

CONCLUSIONS

Business intelligence is important and the term has been used in various contexts. A complete view of BI is that it is a distinct discipline that can be studied from both a system and a process perspective. However, not much research has investigated best BI practices based on empirical data. Drawing from a cross-section survey of business professionals, this study has produced data on BI practices from a broad spectrum of organizations. The results provide companies with valuable baseline data for benchmarking their BI efforts. More importantly, this study reveals 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 (Havenstein, 2007). Having top management support/commitment will help remove many barriers to greater BI adoption. Currently, the most common barrier is a lack of resources including human capital. Equally important is that organizations leverage their existing enterprise technologies and experience with external data sources. Organizations are also advised to take advantage of proven technologies; work with vendors and consultants but foster and retain expertise in-house. Build BI activities around core competencies (Havenstein, 2007); proceed gradually and follow an iterative development approach. More experience will likely increase the odds for success, as found in this and related studies (Eckerson, 2003).

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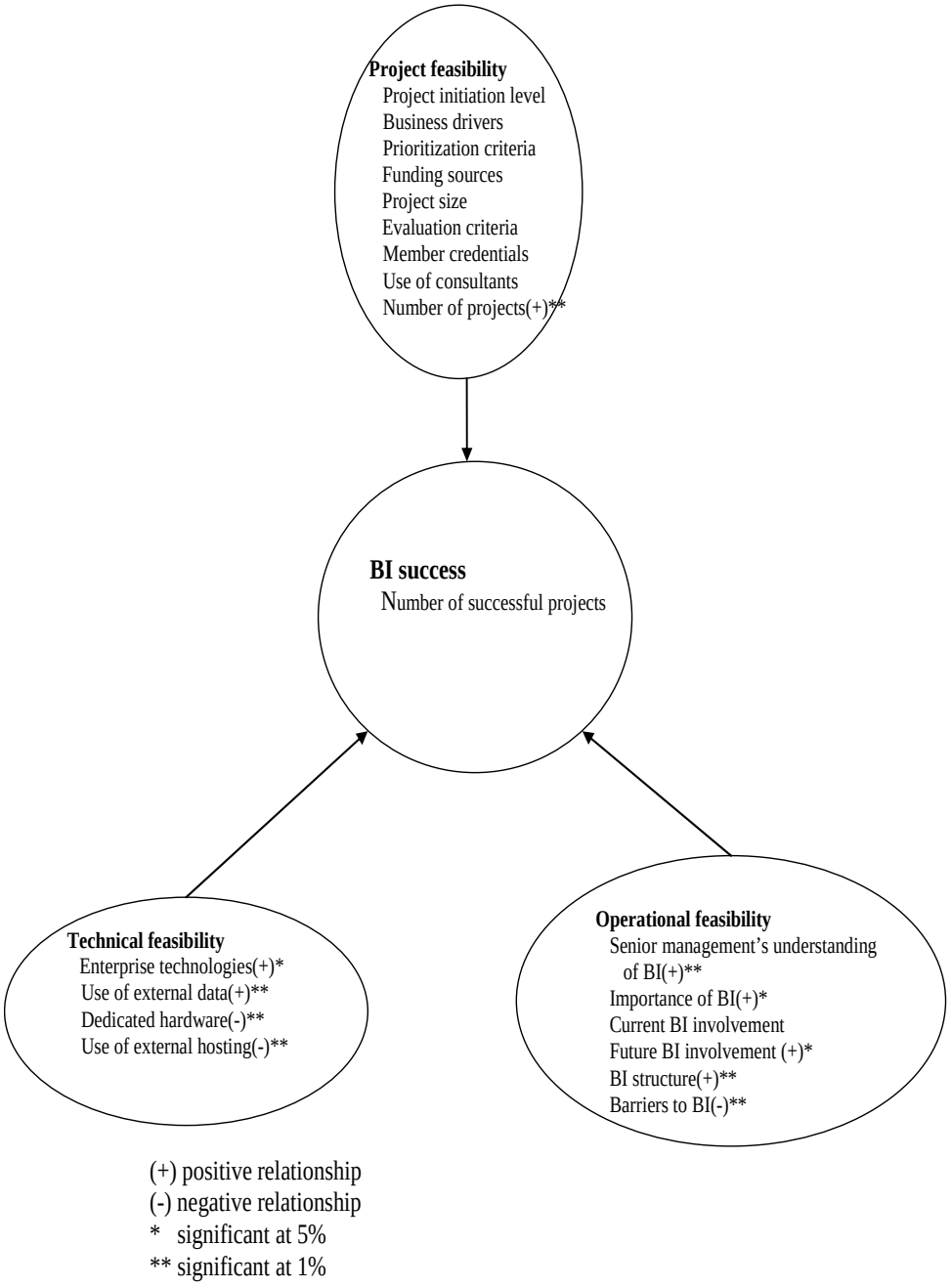
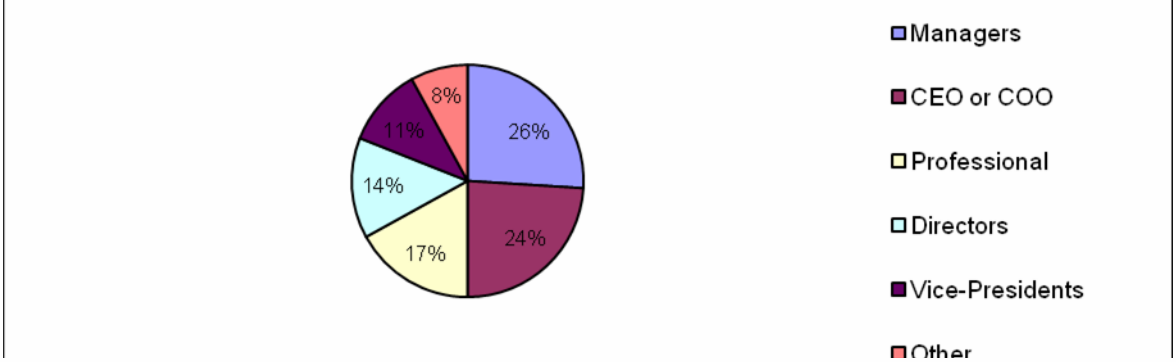


Figure 1: Research Model for Business Intelligence Success



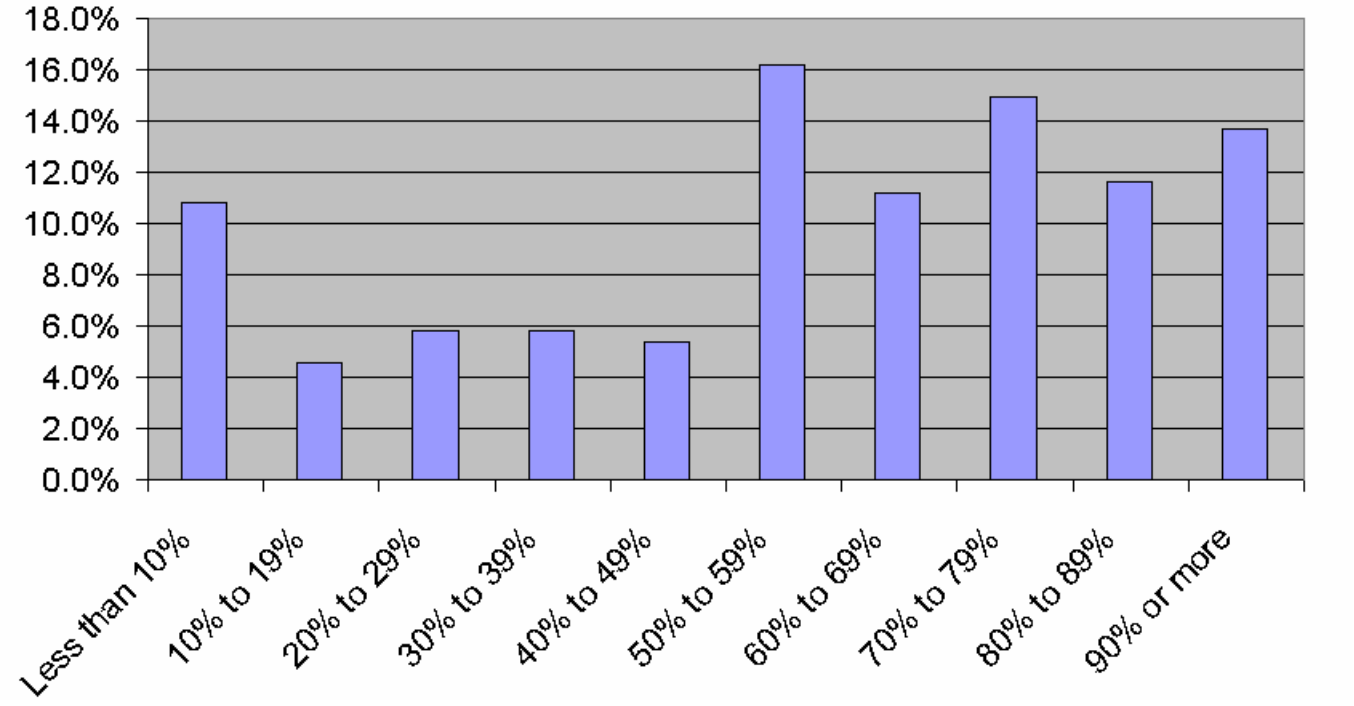


Figure 4: Percents of Successful BI Projects