

# **Business Intelligence**

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## **Introduction**

Business Intelligence (BI) is an umbrella term which encompasses software and development of information systems and makes it possible to detect the necessary data of any company (Lönnqvist & Pirttimaaki, 2006). Most agree that BI deals with capturing, saving, understanding and analysing unprocessed data and developing accessible information from it in order to improve business performance (Davenport, Harris and Morison, 2010; Elbashir, Collier and Davern, 2008; Laursen and Thorlund, 2010; Lönnqvist and Pirttimaaki, 2006; Yeoh, Koronios and Gao, 2010).

The authors' purpose is to make it clear what business intelligence is, how it benefits organizations and to find the best suitable means for its installation. The main conclusions of a research called 'Effective Installation of Business Intelligence' are examined, with the main question being: How is it possible to ensure effective installation of business intelligence solutions? The article attempts to explain the necessary factors for companies to achieve better results by utilizing business intelligence.

The research is based on a qualitative research method which provides illustrative data; the actual words and behaviour of the interviewees (Bogdan and Taylor, 1998). Interviews, lasting around an hour each, were taken with people possessing considerable knowledge of business intelligence, either as experts (three people) or users (five people) within companies that utilize business intelligence.

Business intelligence combines knowledge and information – thus the subject is regarded here from the viewpoint of knowledge management and ideas on the learning organization. Ideas on the learning organization were well supported during the 1980s and throughout the following years. Learning organizations place emphasis on continuous learning, good delivery of information, and the type of enterprise that is characterized by open communication and cooperation between employees (Mintzberg, Ahlstrand and Lampel, 1998).

All companies possess a considerable amount of information in their information systems. It can be said that information systems have mainly been used as depositories for data. With the advent of business intelligence, it is possible to detect a change in emphasis in the way competing organizational structures increasingly utilize all possible data to produce concise and efficient, and meaningful information (Ranjan, 2008).

### **Business intelligence is an organizational value**

In the learning organization, knowledge assets are referred to as intangible resources which are well suited for creating competitive advantage for companies. Knowledge assets comprise business wealth, human resources, and organizational value (Jashaphara, 2004). Business intelligence pertains to the last mentioned, as it is part of the information system of the organizational whole.

Business intelligence is a mixture of information technology, the qualifications and abilities of the human resources, and organizational processes. Analytical skills required for succeeding in analysing data and information have an increasingly important role and centre at present on achieving maximum efficiency in management (Laursen and Thorlund, 2010).

Why do some companies succeed in achieving outstanding results in information technology and in creating value from information, while others do not? In the book *Information Orientation* by Marchand, Kettlinger and Rollins (2001), the authors present their theory on how to achieve outstanding results in managing information technology, business information and human resources, which have direct positive connections with general performance. They refer to it as an information-based company and state three different areas that need to be considered:

#### *1. Information technology in progress*

The ability of companies to control matters regarding information technology; for example by developing systems, and organizing and supporting information technology and management.

#### *2. Controlling information affairs*

The capability of companies to control information where the informational flow is everywhere and the access to information is great and good. The ability of companies to control information in a successful way, by reviewing what is important by collecting data, and organization and preservation of information.

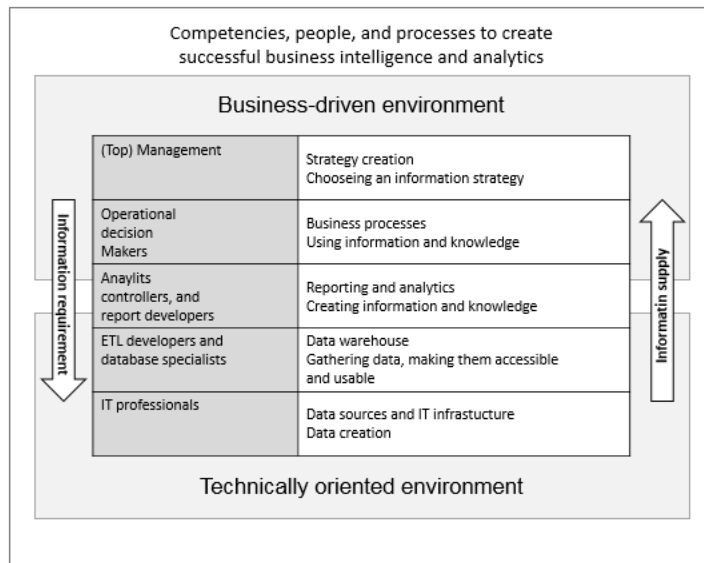
#### *3. Etiquette and traditions in conducting information*

The capability of companies to modulate specific employee behaviour and values in order to utilize information successfully.

The benefits of organizing information systems and the data which companies possess for facilitating their use to create business intelligence solutions are unequivocal. All companies need to measure the results of their operations by some means; this creates demand for a business intelligence system which supports decision-making (Davenport et al., 2010). The quality and reliability of data creates a basis for companies to utilize the opportunities found in analysing information and take advantage of the databases they possess (Arnott and Pervan, 2008; Davenport et al., 2010; Griffin, 2010; Laursen and Thorlund, 2010).

The design and installation of business intelligence is a cooperative venture in which administrators and those in charge of decision-making in business need to be a leading power. Experience has shown that giving this power only to employees in the information technology fields is seldom productive. Larsen and Thorlund (2010) put forward a business analytics model with the purpose of providing an overview of the qualifications required to maximize the payoff of business intelligence and/or analysis of the business.

In the Business Analytics Model (image 1) the different roles required within companies are divided into five layers. The top two layers are defined in a business environment, the bottom two belong to a technological environment and the middle layer, the role of the analyst, is the bridge between the two. Each layer requires a different set of skills and knowledge and forms the basis of being successful in analysing information. A metaphor is made to answer questions on how each link in this chain needs to perform its role to support the policy objectives and core activities of the company (Laursen and Thorlund, 2010).



**Image 1: Business Analytics Model**

Business analysis is mainly used to measure key performance indicators (KPI), in order to produce information which highlights areas for improvement while operating a company (Laursen and Thorlund, 2010). The KPI is, however, based on the critical success factors (CSF), which are the factors in the external or internal environment carrying the decisive impact on whether or not a business goal is achieved. The KPI is a measurable factor which companies use in order to measure their performance in relation to the CSF. There can be more than one performance measure on every CSF (Rockart, 1982); for example, as regards sales currency, exchange rate developments on markets.

Business intelligence is used to analyse trends and to see in which direction operations are developing. In this context, the terms *lead* and *lag* information are discussed. As such, the information is, on the one hand, defined as *lag*, as it refers to looking into the rear-view mirror and measuring results in a historical context. Examples include sales accounts during a specific period of time. *Lead* information is, on the other hand, meant to correct the business processes already in place. Examples include the comparison of sales figures between years or relating to sales programmes. A characteristic of *lead* information is that it indicates whether the KPI is ahead of or behind the set goals. The *lead* information also detects the causation since, as the measure is based on the CSF, it is possible to determine what went wrong and to make corrective decisions based on that. It is, indeed a big advantage of business intelligence to be able to access a great deal of *lead* information, which can have forecasted value and make decision-making that much easier (Laursen and Thorlund, 2010).

From the above, it is clear that business intelligence does not become useful without the combined control of information systems, human resources and information delivery. Regarding the installation of business intelligence, there are often many kinds of information systems in place which include a large amount of data that has to be taken into consideration, so it must be based upon a pre-existing system, as opposed to starting from scratch, making the introduction technically more complicated than otherwise (Davenport et al., 2010; Laursen and Thorlund, 2010).

The key factors in the installation of business intelligence are initially requirements analysis and strategic planning. A status analysis needs to be performed regarding the project to establish what the purpose and goal of business intelligence is – and what it is supposed to achieve. Then it is important to define the issues that are of chief importance for the company's business, then categorize them and prioritize. Having categorized the key issues that are of chief importance to the core operations, a key performance indicator,

or KPI, is formed. These key issues form the linchpin of the company strategy which will be kept in mind once business intelligence has been installed.

Usually, the same principles apply to the design of business intelligence and information policy: overview, supervision and overall management with the installation are the key issues in order to achieve success and improve analytical skills. Adjusting to the KPI for a business-related purpose is thus a necessary basis for enabling the application of successful business intelligence (Davenport et al., 2010; Laursen and Thorlund, 2010; Yeoh et al., 2010).

The installation of business intelligence is often a complicated procedure involving a lot of time and manpower. It requires an entirely new approach compared to the traditional installation of infrastructures, referring to Enterprise Resource Planning (ERP) or other related resources which support singular business procedures. The installation of business intelligence is a task involving the infrastructure of organizational wholes and requires solutions that are both technically complicated and specialized (Davenport et al., 2010; Yeoh, et al., 2010).

Yeoh et al. (2010) have defined a seven-part framework for the successful installation of business intelligence:

1. Commitment of administrators, support and finance
2. User-friendly change management
3. Clear business purpose, well-defined projects based on business requirements
4. Business-related approach regarding methodology and project management
5. Management from the business world and well-distributed project teams
6. Organized technical framework with growth potential
7. Permanent quality of data; a framework on data policy

## **Conclusions**

For this research, questions were posed in semi-structured interviews. These are listed below followed by the main conclusions:

1. Benefits – what do the interviewees believe they get from business intelligence?
2. What fundamental difference is there between ERP and business intelligence –why are different approaches required for the installation of the solutions?
3. Quality of data. The importance of data as the basis for business intelligence.
4. Project management and success factors.
5. Training and teaching. What difference does it make and how is it best to conduct the training?
6. Performance management and impact assessment.

## **Benefits – what do the interviewees believe they get from business intelligence?**

When asked what sort of benefits can be obtained by business intelligence, interviewees all agreed that business intelligence delivers faster and better information, better access and better analysis options. Banks have a great responsibility in regards to the profiling and transmission of information to supervisory bodies. This was, according to one interviewee, one of the main reasons for the banks' installation of business intelligence, along with the fact that there was a great need for an integrated data bank. The banks usually have many databases and therefore it was harder and more time-consuming to access information.

One interviewee, specialist 2, believes the benefits of business intelligence to be improved delivery of information and better analysis options for all those in need of analysing and assessing their own achievements: 'Companies have a great deal of data, but incredibly little information available.'

A chief financial officer, who uses business intelligence in his profession, says: 'Yes, in my case, it is incredibly important to be able to express this information in an understandable manner. Administrators can tell the importance of being able to examine each month carefully.' He saves a vast amount of time by accessing the information and creating reports from it. In other words, it makes the process easier and speeds up the data analysis noticeably.

An interviewee working at a company which has utilized business intelligence for approximately six years claimed that the solutions offered by business intelligence were an incredibly important aid for the company: 'They have become completely interwoven with the information system and people cannot be without them.'

The conclusion, according to most interviewees, seemed to be that the solutions offered by business intelligence had improved analytical skills and made it possible for companies to save their employees' time spent on accessing information and understanding it. These solutions are more dependable, standardized and clear. Business intelligence thus reduces the risk factor and unpredictability and increases the competitive advantage of companies.

### **What fundamental difference is there between the accounting system (ERP) and business intelligence – why is there a need for different approaches in the installation of the solutions?**

The accounting system is basically different from business intelligence. The role of accounting software is to monitor certain processes; for example, revenue procedures which involve accessing a product in a database and booking an account on a client that is accessed in a database. Thus, there is a lot of data kept in accounting software; for example, information on clients and products, but also on procedures that are managed, such as booking accounts. Business intelligence is different in the sense that it is meant for analysing information from all the company's underlying systems, including accounting software. There are no data kept in business intelligence except for the request itself which reflects the conclusion of an enquiry made when an execution is in place. The solutions of business intelligence only produce information in the form of reports, screenshots in the form of instrument panels, and other such presentations which are most often graphical and descriptive for the user.

The conclusions of the interviews concur with the opinions of scholars in this area. When asked what the difference was, one interviewee said that 'in the installation of ERP, it was highly important to test a solution and ensure that it worked.' If that is not done, the ERP system can stop, meaning that it is impossible to manage important operational processes, such as booking accounts, transferring wages, etc. The chief financial officer agreed and believed the installation of ERP to be very different, referring to a similar installation, and said: 'It was a huge matter, it is completely different. It was quite an issue, a lot more so than installing this. This is just something you put onto the accounting software.'

Another specialist mentioned the importance of having users participate from the beginning and keeping them involved during the whole business intelligence installation process. He also placed emphasis on the connection between business intelligence and the key measures of performance, which are different in every company and are naturally always subject to change. He, thus, believes that business intelligence should constantly be developing and adapting – it is 'perhaps never completely ready', and it is in that regard possibly not correct to speak of installation, such as other interviewees mentioned.

What changes upon the installation of business intelligence? One specialist mentions it involves fewer roadblocks compared to ERP solutions, e.g. by providing employees with access to a business intelligence environment, if it benefits them in their daily routine. He believes the delivery of information and communication improves and becomes more efficient within companies; all orientation and instructions often come from chief executive officers or via a top-bottom passage, while the feedback or reactions do not

return from the bottom up. The flow of information within the company changes: it increases and improves and should, thus, be quite suitable to support the decision-making process better and improve overall performance. More interviewees agreed with this, with regard to the flow of information.

### **Quality of data. The importance of data as the basis for business intelligence**

Interviewees agreed on the necessity of data quality for the basis of installing business intelligence. The number of infrastructures that need to be connected in business intelligence is also of importance. One specialist said that as soon as the solution includes two infrastructures, things become twice as complicated: ‘... from there on it escalates and becomes exponentially more difficult.’ This became clear while comparing the companies under observation. In one case, there is only one database and the accounting software used is that with the most reliable data, which is because rules need to be fulfilled on settlements and financial reporting acts.

An authenticity evaluation on data and the work behind making the data usable in business intelligence is what is thought to take the longest time during installation. The specialists mentioned that around 80–90% of the time is spent doing this work. The coordination required makes these projects often difficult to execute as it is of vital importance to secure the homogeneity of data.

### **Project management and success factors**

One of the greatest challenges during the management and design of business intelligence is related to communication and understanding between the business world and the information technology world. Projects often lack a clearly defined goal that reaches all the way to the top company administrators. Specialist 1 says: ‘It is so common that whenever any project comes up, which has to do with information and data, it is tossed over to the IT department and they’re supposed to solve it there.’ One interviewee believes that the best projects turn out to be the ones which incorporate regimented project management. From there on the projects are chosen from a collection of different projects, followed by a few questions such as: How much does it cost? How many people will use the solution? Should we train a new user? Is this a new technological solution? Therefore, a number of topics pertaining to project management as a methodology are being built upon. In these cases, interested parties are defined and an underwriter or project owner appointed.

A lack of understanding and support from administrators was also mentioned: ‘It is hard to encourage people to show interest in this,’ according to specialist 1. Politics also has a role to play here, with administrators having different styles, and a conflict can arise, as many different points of view are voiced, which is hard for IT departments to handle.

### **Training and teaching**

Training and teaching are among the most important parts of ensuring maximum payoff in business intelligence investment (Lopykinski, 2010; Yeoh et al., 2008). If this is poorly managed it is likely that the business intelligence money is spent in vain.

The business intelligence solutions under observation all have considerable requirements regarding user skills, both concerning understanding of the possibilities the solution has to offer and, no less so, Microsoft Excel knowledge, especially skills in working with pivot tables. Moreover, it is fundamental that the data being worked with is recognised and the ‘business world’ being analysed is understood, whether it involves production, sales activities, financial affairs or anything else. The key employees who will use the solution need to participate in the requirement analysis right from the beginning, so that information is defined and

the demands on business intelligence made clear, in order to meet the goals of their owners to the best extent possible. Their interest needs to be aroused immediately and they must participate in the change process.

The training of staff and administrators is one of the most important factors in making the installation generate the intended results, and for business intelligence to be the tool which the company is seeking in order to give its information meaning and to increase its competitive advantage in the market.

### **Performance management and impact assessment**

The solutions of business intelligence can be used as a tool to facilitate performance management and impact assessment. The specialists who were interviewed believe it is often complicated to define measurements, although it is at the same time fundamental when installing business intelligence. Business intelligence involves key criteria which can be based upon multiple, complicated data that have been graphically presented in a very simple way. Specialist 2 considers it is important that business intelligence solutions can be applied by everyone, not least those working in particular areas such as sales, production or an invoicing, as they are best able to determine what it is useful to analyse and to know what sort of questions to ask.

Specialist 1 places great emphasis on companies providing a comprehensive information policy which defines throughout the process from beginning to end what information the company needs: 'There need to be some goals towards connecting the company's policies directly to the information technology. Design this right into the IT world, so that it goes through some sort of a chain all the way to the top.'

### **Discussions and epilogue**

The results of this research shed light upon the primary obstacles and challenges in installing business intelligence. They can be categorized in the following manner. First, the organizing of information systems, i.e. how many systems include data in need of analysis. With more infrastructures it is harder to design and create solutions for business intelligence. It is important that, right from the beginning, key parties have adequate knowledge and understanding of the tools intended to be used.

Second, training and teaching are key issues in order to ensure fruitful results. The support and participation of administrators in creating a course in information affairs and making goals needs to be clear before the operation itself begins. Here it is important to look at the communication between the business world and the information technology world (see image 1). That is, a mutual understanding between both parties is vital in all stages of the installation. Companies tend to rely too heavily on key employees (super users) during the designing of solutions in business intelligence, but neglect to distribute the knowledge with the increased training of other employees. This involves some risk, as super users can temporarily or permanently disappear, along with all their knowledge. Neither is it viable to expect them to distribute their knowledge automatically, because more often than not these employees are already quite busy and it is not high on their priority list to teach other staff, who possibly have limited interest and patience to learn these solutions.

Third, there can be vast variances in how complicated and expensive it is for companies to install business intelligence, and it primarily depends on how complicated and divergent the information systems are. It has also been shown that business intelligence solutions improve the delivery of information within companies to a great extent as it improves both end results and reliability. Administrators have not always been keen on exposing themselves to technical issues, yet in business intelligence this is determinant because it should at least be expected that administrators have a deeper understanding of key measures on performance and a better comprehensive overview than the company's designers and technical staff. The results show that the support and commitment of administrators is the key to success.

Those seeking permanent success in the future and to improve their company's competitiveness should seek to install business intelligence. They must allow time for a full requirement analysis covering both the company and its employees, and to intertwine the training for the installation process. Thereby, a clearer oversight can be gained of all the operational factors through an analysis for those who make decisions today and those creating the future policy of the company.

According to the authors, business intelligence is important for all organizations, companies and institutions willing to be progressive and successful, and who want to base their decisions on meaningful and reliable information.

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