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The impact of supply chain management on business intelligence

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The impact of supply chain management on business intelligence

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ABSTRACT This conceptual paper investigates the impact of the supply chain on business intelligence (BI) in private companies. The article focuses on these two subjects in order to broadly understand the concept of business intelligence, supply chain and characteristics implement such as OLAP, data warehouse or data mining. It looks at the joint advantages of the business intelligence and supply chain concepts and revisits the traditional BI concept. We found that the supply chain includes many data samples collected from the first supplier to the last customer, which have to be analysed by the company in order to be more efficient. Based on these observations the authors argue for why it makes sense to see the BI function as an extension of supply chain management, but moreover they show how difficult it has become to separate BI from other IT intensive processes in the organization.

KEYWORDS Business intelligence, information systems, real-time business intelligence, supply chain management

1. INTRODUCTION

Customers' demand for high quality products and services is rising. They want the right product at the right place and on time. Modern companies have to be more efficient to match customers' needs while reducing the time and cost of the production process. Thus, a company can't be viewed as a single entity, but as a part of the supply chain if they want to gain a competitive advantage. As Christopher (1998) says, a supply chain "is a network of organizations that are involved, through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hand of the ultimate consumer". Additionally, supply chain management is viewed as the best way to reduce costs and to increase the optimization of the production process. Yet, since the early 2000s, technologies have increased and the collection of data has deeply changed. For example, "Wal-

Mart handles more than a million customer transactions each hour and imports those into databases estimated to contain more than 2.5 petabytes of data." (Ittmann, 2015). Today, as companies are drowned in information which doubles every two to three years, they have to find the best way to understand it and gain a competitive advantage. It is more important to know what information the company needs, how and when to match the customer needs. Therefore, software has been created in order to answer these questions.

One of the most used practice is business intelligence (BI) which integrates and analyses various software. BI provides a set of technologies and products for supplying users with the information they need to answer business questions, and make tactical and strategic business decisions (Stefanovic et al., 2006). The BI field is growing over the years because as said by Gartner (2012), "the global spending on BI systems, including analytics and performance management applications,

has risen from \$10.5 to \$12.2 billion in 2011". Given the increase in data, competition and customers requirement, it is vital for a company to have rapid access to its information in order to take the best decision and reduce its cost. BI, consequently, is also appropriate for supply chain management (SCM) which needs to be functional. Thus, it can provide real-time data of this supply chain. Before using BI in the supply chain it is important to understand and to know how to use it. In this respect, some questions must be asked:

- What is business intelligence?
- Why do supply chains need business intelligence?
- What is the impact of the business intelligence on the supply chain?

A supply chain provides information from the supplier to the client and has to be processed. More information means more competition. In the age of the information explosion, executives, managers, professionals, and workers all need to be able to deliver their product on time and make better decisions faster. Because now, more than ever, "time is money" (Reinschmidt and Francoise, 2000). The creation of BI revolutionized business and is bringing a new way for business to thrive and manage its supply chain at reduced cost. However, it was often difficult to understand and very expensive, so much so that companies don't really used it. It is only for a few years that its uses have been facilitated and its cost is now lower. Today, BI is an important factor for a company's success. However, no articles that we found discuss the relationship with supply chain (research gap).

2. EMPIRICAL FINDINGS: A LITERATURE REVIEW

2.1 Business intelligence, data gathering, competitive intelligence

The importance of a good intelligence systems has become increasingly apparent during the past few decades for two reasons, the abundance of information now available due to new technologies, and, as a consequence, the need to be able to distinguish between "need to know" and "nice to know" (Soilen, 2012). Businesses collect enormous amounts of data every day: information about orders, inventory, accounts payable, point-of-sale transactions, and of course, customers. Businesses also

acquire data, such as demographics and mailing lists, from outside sources. Unfortunately, based on a recent survey, over 93% of corporate data is not usable in the business decision-making process today (Reinschmidt & Francoise, 2000). To put order in all these data, some companies use business intelligence. It is difficult to give a clear definition of BI when many of them can be used. Business intelligence is seen as a concept of conscious, organized, continuous, legal and legitimate gathering, analysing and using data and information for strategic and tactical marketing decisions according to Šerić et al. (2014). Adelman et al. (2002) describe BI as a term that "encompasses a broad range of analytical software and solutions for gathering, consolidating, analysing and providing access to information in a way that is supposed to let an enterprise's users make better business decisions". Malhotra (2000) points out that BI benefits facilitate the connections in the new-form organization, bringing real-time information to centralized repositories and support analytics that can be exploited at every horizontal and vertical level within and outside the firm. According to Partrige (2013), BI is the use of computing technologies for the identification, discovery, and analysis of business data such as sales revenue, products, costs, and incomes. However, BI can also be viewed as more technical and integrate several software for extraction, transformation and loading (ETL), such as data warehouse (database where data is collected for the purpose of being analysed; it collects, organizes, and makes data available for the purpose of analysis), database query and reporting (Berson et al., 2002). We also find multidimensional/online analytical processing (OLAP) and data mining (used to solve different kinds of analytical problems, OLAP summarizes data and only makes forecasts, data mining discovers hidden patterns in data and operates at a detailed level instead of a summary level). BI is a system designed to support decision making, it finds information from many other systems (Figure 1).

Some of these terms have briefly been explained in order to understand the BI dimension. BI helps to create knowledge from a world of information, get the right data, discover its power, and share the value. BI transforms information into knowledge. (Reinschmidt & Francoise, 2000).
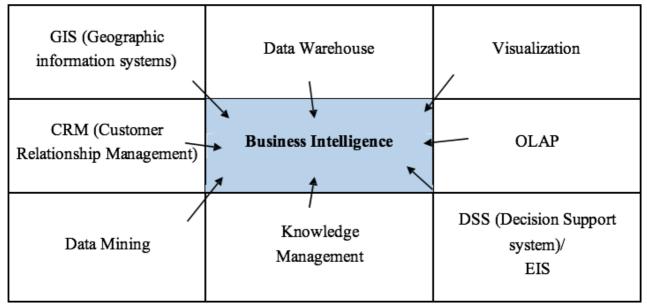
GIS (Geographic information systems)	Data Warehouse	Visualization
CRM (Customer Relationship Management)	**Business Intelligence**	OLAP
Data Mining	Knowledge Management	DSS (Decision Support system)/ EIS

Figure 1 Information systems used by BI.

Consequently, BI is the application of putting the right information into the hands of the right user at the right time to support the decision-making process (Reinschmidt & Francoise, 2000). The business success factor for any enterprise is finding ways to bring the vast amounts of data that are flowing within and across the business processes together and making sense out of them (Sahay & Ranjan, 2008). For those reasons, BI is not business as usual. It's about making better decisions easier and making them more quickly (Reinschmidt & Francoise, 2000), thus improving the timeliness of input to the decision process, and facilitating managerial work (Negash, 2004).

In addition, BI gives an overview of the competitors thanks to competitive intelligence (CI), which could be defined as a special branch of the BI literature. CI is the process of ensuring your competitiveness in the marketplace through a greater understanding of your competitors and the overall competitive environment (Solomon Negash, 2004). In consequence, it's the practice of "defining, gathering, analysing and distributing need-to-know information to the organization's decision makers" (Soilen, 2013). Much of information obtained by CI comes from easy sources (Imhoff, 2003) such as Government websites and reports. For example, it could come from:

- Online databases, interviews or surveys,
- Special interest groups (such as academics, trade associations, and consumer groups),

- Private sector sources (such as competitors, suppliers, distributors, customer) or
- Media (journals, wire services, newspapers, and financial reports).

Soilen (2010) points out that trade shows represent another opportunity to gather information about competitors, whether for their products or services in order to obtain a competitive advantage. However, it is important to collect useful information, staff training has to be done in order to gather the right information by the team. Companies can also access books and articles in journals dedicated to these issues like this one or previous journals like the Journal of Competitive Intelligence and Management (JCIM) or the Competitive Intelligence Review (CIR) according to Soilen (2013).

2.2 Supply chain management, software and data creation through big data

First of all, it is important to have a clear definition of what logistics and supply chains are, as these two terms can often lead to confusion. Logistics is a term which has been used for many years, it has a military origin and was born during the preparations in anticipation of a battle, to make available the means of transport, the equipment or all that concerning the foodstuffs. According to dictionary.com, there are two definitions for the term logistic: "the branch of military science and operations dealing with the procurement, supply, and maintenance of
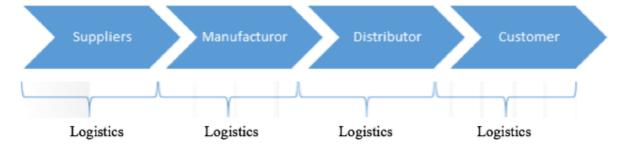
Figure 2 Logistics as part of every step in a supply chain.

equipment, with the movement, evacuation, and hospitalization of personnel, with the provision of facilities and services, and with related matters" and one definition based on the actual logistic: "Planning, execution, and control of the procurement, movement, and stationing of personnel, material, and other resources to achieve the objectives of a campaign, plan, project, or strategy. It may be defined as the 'management of inventory in motion and at rest". The concept of logistics is a rather recent and appeared in the 1960s. The concept of supply chain was born some time later, towards the 1990s. Supply chain could be explained by the logistics management corresponding to a part of the supply chain management that provides, sets up and controls upstream and downstream flows efficiently, storage, services and information exchanged between the actors of the chain from their point of departure to the final customers in order to satisfy them, in other words, logistics is only one (important) element of supply chain management (Figure 2).

As stated previously, Lambert et al. (1998) defines a supply chain as the alignment of firms that bring products or services to market. It is important to know that the final or end consumer is included as an element of the supply chain. Differentiated from the supply chain, supply chain management (SCM) is "the task of integrating organizational units along a supply chain and coordinating materials, information and financial flows in order to fulfil customer demands with the aim of improving competitiveness of the supply chain as whole" (Stadtler, 2005). The main objective of SCM is to meet the customer needs by sending the right product at the right place, time, and price. Besides, SCM is a multi-dimensional approach which integrates product development, manufacturing, logistic, customer service, performance measurement, and information sharing (Surbhi, 2015). Consequently, the supply chain is a part of the

SCM, it transforms resources into a product and delivers it to a customer whereas the SCM is a broader area which aims to cut costs and to add a value for the customer and the shareholder. The supply chain is only a way to help the SCM to execute the operations. Nowadays, SCM is a factor of differentiation, especially for the competitors and for the customer service.

To make a SCM work efficiently, different types of software and actors are included in the process. Some software will be used for strategic planning, others for the execution. The software is classified according to the three different functions of the SCM: The first one is the SCP (supply chain planning), it is about planning the production, the distribution, the transport and realizing forecasts. The software related to SCP is an APS (advanced planning system), it analyses the capabilities of the resources in order to propose a detailed schedule for a better production (http://www.catlogistique.com/supply_chain.htm). The second function is the SCE (supply chain execution) and this function integrates the data related to the operational activities management of the supply chain. Software like TMS (transport management systems) and WMS (warehouse management systems) are associated with SCE. The last function is the SCEM: the supply chain event management. Another type of software to take into consideration is ERP (enterprise resource planning). It is a software that integrates all the functions of a company. It is constituted of several units named business objects (BO) (for example: supply, sell, production, finance, HR, or stock). These units share the same database, so it facilitates the control of the company (http://www.logistiqueconseil.org/Articles/New-tech/SCM.htm) even if "traditional ERP players are now facing competition from cloud providers" (Trebilcock, 2016), the leader in the ERP software market remains SAP with €2.67 billion in revenue in 2014. There are many
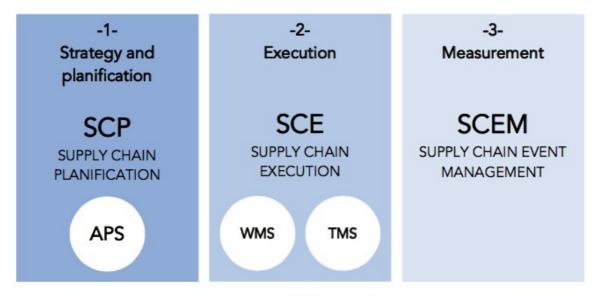
Figure 3 The different kinds of software.

actors participating with supply chain software, therefore it is important for companies "to find the system that best suits their business" (Nyblom, 2012) and they have to know what are the software and techniques used by the companies.

This software is generating tons of data which is called big data. In fact, "millions of shipments are tracked daily from origin to destination, indicating information such as the content, weight, size, location, route" (Watson et al., 2012). This huge amount of data is then exploited. With the enormous amount of data created every day, companies are under pressure to make smart use of the data, and take advantage of it. The nature of the SCM environment is changing, and two major trends will impact the SCM in the future: big data and analytics (Ittmann 2015). Ittmann is not the only one to argue this. Cooke (2013) points out that "the increased use of big data analytics is one of the three trends in SCM to watch" (Cooke, 2013).

Big data and analytics are becoming increasingly important for many reasons. First

of all, storing data is becoming cheaper and data is available everywhere thanks to the anytime connectivity. Plus, the tools are easier to use because it is simpler to make the analysis, there are techniques to show and present huge volume of data, and the processing power is faster (Deloitte & MHI, 2014). In fact, extracting and analysing the values from big data can have a huge impact on businesses and help them to succeed.

Analytics, which is considered a subset of BI is defined as "the scientific process of transforming data into insights for making better decisions" (Ittmann, 2015). There are many ways to extract data in order to create business intelligence, for example "statistical and quantitative analysis, explanatory and predictive models" (Ittmann, 2015). Therefore, big data and analytics can directly be related to BI because it can help firms to make decisions and improve their businesses. As mentioned by Partridge (2013), "being able to find, understand, and use that data to make strategic decisions that improve supply chain effectiveness is crucial."

2.3 The importance of business intelligence strategy

When a company decides to take advantage of BI and use it for its own supply chain, it is important to set up a supply chain business intelligence strategy. Having a reliable strategy is essential for every business to succeed, the same holds true for the implementation of BI in a supply chain. As reported by Sangari and Razmi (2014), the supply chain BI competence is seen as a multidimensional construct competence. The company has to build a full strategy, including three competences: the managerial, technical and cultural competence. The managerial competence aims to relay the right information to the right people at the right time (Bose, 2009). The technical competence represents the tools and the technologies (like data warehousing) used to gather information in a supply chain in order to make business decisions. The cultural competence is defined as the ability to develop a strong BI culture, including the quality of the information and the quality of the communication flows. All of these three competences prove that having a strategy can have a positive impact on the performance of the supply chain, especially on the customer satisfaction and the cost reduction.

3. METHOD

This article is conceptual and built on a literature review. When reviewing a number of articles within BI that link with software, competitive intelligence, and strategic planning a gap was identified with supply chain management. The authors found definitions for the keywords, such as business intelligence, logistic, supply chain, supply chain management, and competitive intelligence. Afterward, they extracted key elements from the articles in order to analyze and compare content. The last part of the research was conceptualization and synthesis, building models to sum up the analysis.

4. ANALYSIS

4.1 Business intelligence in SCM

The concept of supply chain and BI is nothing new, but, until recently, only few companies had these solutions at their disposal. As seen above, the supply chain allows a company to gain a competitive advantage on their competitors. However, it is not easy to lead a supply chain. It requires having a good relationship with suppliers and customers as the supply chain represents the chain of a product from the supplier to the final customer. This is done in order to be efficient and reduce costs. These can be procurement costs, production costs, financial capital and possession costs, transfer costs, breaking costs, product design costs and insurance costs. To reduce these costs, companies are used to employing supply chain management defined as the execution, the conception, the control of the supply chain activity in order to create value for the company, to achieve greater efficiency and gain a competitive advantage. Consequently, supply chain management is a priority and essential challenge for the company, in order to optimize its productivity. However, there are many steps before selling a product on the market; they concern purchases, inventory management, handling, storage, and transportation. Supply chain management aims to improve administrative management and thus reduce a significant number of errors. It contains many tools developed by companies in different fields:

- Planning (MRP, JIT, DRP, etc.).
- Manufacturing (OPT, CRP, etc.).
- Stock optimization: endogenous method (historical analysis) or exogenous (market research approach) etc.
- Transport and warehousing (RFID, Tracking, etc.).
- Information management (ERP, CRM, SRM, PLM, EDI, etc.).
- Quality (TQM, etc.).

All of these software collect data, so that companies can read them to have an overall view of the company and to make decision despite obstacles such as arrivals in disorder, and delays in organizing and interpreting data. Formerly, companies had to hire specific technical employees in order to read and understand this data. Today, companies use BI in order to collect data quickly, efficiently and to make it available immediately. It provides decision-making support to professionals through reports and dashboards to monitor both analytical and forward-looking business activities. BI collects data from ERP (enterprise resource planning), TMS, and CRM that it then stores in the data warehouse as a central data repository or in data marts via ETL (extraction, transformation and loading)
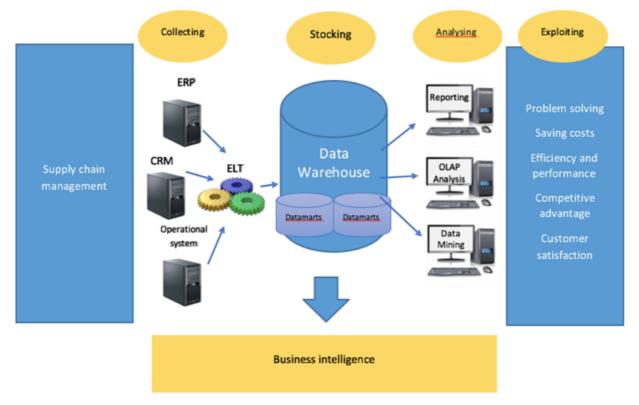
Figure 4 Creating business intelligence in the supply chain management.

processes which are responsible for retrieving data from all existing operational sources and loading them to the decision-making system.

Then BI distributes this data and finally analyses them through data mining, OLAP charts and reporting. As seen above, BI is made up of several components. The following are the major components: a *data warehouse* is a database dedicated to the storage of all the data used in decision making and decision analysis. The data warehouse is exclusively reserved for this purpose. *Data marts* are a smaller version of the data warehouse. They focus on a topic, a theme or a job. In *OLAP*, within an OLAP database, the data is stored according to a principle of dimensions closely corresponding to the user's search axes, its structure can be seen as a "cube". "OLAP provides multidimensional, summarized views of business data and is used for reporting, analysis, modelling and planning for optimizing the business" (Sahay and Ranjan, 2008). *Data mining* is able to find original structures and informal correlations between data. It allows us to better understand the links between apparently distinct phenomena and to anticipate trends that are not yet discernible.

As a consequence, BI is a part of business, it allows the company to make decisions clearly and quickly. The faster the stores send information about what customers buy, the faster the information can be passed on to manufacturers and designers, the faster the supply chain can react and contributes to the optimization of supply chains which are the issue in the search for competitive advantages. Stock reduction and optimization of the supply chain cannot be conceived without good information management. Beyond the traditional operational systems that automate processes, it is without doubt necessary to rely on an appropriate decision-making system like BI. The latter must be based on a data warehouse that integrates all internal and external logistics data and provides all stakeholders with the historical, operational, forecasting or simulation visions they need. Consequently, BI in management of SCM contributes to the differentiation of a business entity.

4.2 Real-time business intelligence

BI is important in order to make appropriate decisions. As part of this, the concept of real-time BI is starting to attract companies' attention. Real-time BI consists of reducing time and collect instantaneous data. It not only supports the traditional

strategic functions of data warehousing, but also provides tactical real-time support for generating corporate actions to respond immediately to events as they occur. Manh et al. (2005) propose an "event-driven IT

infrastructure to leverage BI applications that enable real-time analysis in all business-to-business processes, notify actionable recommendations, or trigger business operations automatically, and allow to effectively bridge the gap between BI systems and business processes." For example, if a company sells clothes online then the company's web site and the company's call centre representatives must have the same updated information on inventory levels, so that, if a customer makes an order and the size or colour is sold out, the customer can be notified and redirected to another similar item. Sahay and Ranjan (2008) point out the real-time BI system is to provide information on business operations with minimal latency. This means providing information a few seconds after the business event. While traditional BI presents historical information to users for analysis, real- time BI compares current business events with historical models to detect problems or opportunities automatically. Not all departments of a company need real time BI, because of the high cost compared to traditional BI, companies should use the real time BI only when it is necessary and needs to focus first on specific business needs.

4.3   Real time business intelligence in the supply chain

Traditional BI systems are used by several varied sectors like manufacturers, airlines telecommunication providers, retailers, financial services, health systems and hotels and consist of a back-end database, a front-end-user interface, software that processes the information to produce the BI itself, and a reporting system. It produces for these companies customer support, market research, segmenting, product profitability, statistical analysis, inventory and distribution analysis. However, BI requires a complex technology usable only to technical specialists. Moreover, BI takes a long time to yield correct analyses and companies want this analysis in real time for short-term projects. Traditional BI cannot do this and in consequence real time BI is seen as a rescue. Real time BI detects early situations for planning and coordination of logistics such as delay of freight, stocks alert, and failure of delivery. Real time BI reacts in near real time to changes in the business environment. It analyses data minute-to-minute in various time zones and helps firms

move to what is called as "zero latency" or real time enterprise. According to Hackerthorn (2003), a business is operating with three latency periods: data latency, analysis latency and decision latency. The aim is to reduce the latency to the minimum to be more efficient and this is one of the purposes of real-time BI. Sahay and Ranjan (2008) noticed that it means "delivering information in a range from milliseconds to a few seconds after the business event". Take the example of Flixbus, a bus is stuck in the traffic jam, the real time BI automatically discovers the problem, analyses it before a decision is needed. From

there on the bus route will be adjusted or the customers will be notified of the shipment delay. According to Sahay and Ranjan (2008) A global real time data warehouse, real time data mart for storing historical and summary data at different levels is required, as well as an efficient OLAP interface with secure real time architecture for such efforts to succeed.

4.4   The impact of using BI in the supply chain management

After having explained how BI and SCM are related and how software help to create BI especially with the real-time BI, the focus here is on the benefits for companies to use BI in their supply chain. There are many positive consequences in each function of a supply chain (warehouse management, transportation management, marketing and sales, financial management) that can lead to the success of a company.

First of all, BI tools are helpful in the supply chain because they can help to detect and solve problems. Chen et al. (2012), "consider business intelligence and analytics as an important area of study and research to solve data-related problems in companies". If there is a problem with transportation, the idea is that BI will detect the problem first and it will help by changing the transportation route or the mode of transport, in order to reduce negative consequences. If there is a failure of delivery or a delay in the shipping, real time BI can directly send a message to customer and let them know about delay in shipping (Ramish Babu, 2010). Some software has a strong ability to monitor and predict low in-stock items in advance (Krupnik, 2013), this reduces the amount of incomplete shipments, reducing complaints from customers and avoiding new a problem. As an example, Amazon developed an algorithm to analyse clicks on the website to

solve the problem of stocks. This analytic tool helped Amazon track sales on many kinds of products allowing them to manage inventories (Ittmann, 2015).

When a firm succeeds in avoiding problems which could arise on any part of the SCM, it obviously saves costs. Tools help to reduce waste, they show which part of the supply chain is not efficient, and if managers are taking this into account, they will make changes to reduce and save costs. IBM optimized their supply chain by using analytics tools (Dietrich et al., 2014) and they implement a system which can detect problems earlier. As a consequence, the company increased productivity, revealing opportunities to cut costs and saved money.

Another positive consequence of BI is the efficiency and the performance of the supply chain, which is also a logical consequence of cost savings and problems solving. As mentioned previously, firms include mobile devices and barcode scanners to store the information for every item, such as location, stats, and method of transportation (Ramesh Babu, 2010). This way of tracking the information enhances monitoring and optimizes process flows. For example, GAP implemented ways to keep the supply chain as efficient as possible through BI solutions. They carried out the seamless inventory to improve its performance and they build the "reserve in store" on the e-commerce website. Moreover, all of the functions of the company are affected by BI, even the support functions such as human resources or financial management. For example, as for the human resources, reports can analyse the movement and the performance of staff, tools can measure the need of the workforce (Rao P. and Swarup, 2001). HR managers are able to know which employees are efficient, they also see how many people they need to hire for each new project or implementation. Concerning financial management, budgets can be analysed and financial viability can be assessed (profitability per kilometer of distance covered or labour cost, for example) through financial report or data warehousing. This helps take strategic decisions and directly participates to the efficiency and the performance of the firm.

Through the analysis of data, BI helps to find what is providing value. As mentioned by Soilen et al. (2010), "a value chain analysis focuses first on the firm's core competences from an inside perspective", and this analysis aims to identify the competitive advantage of the firm. In this sense, tracking the information and analysing it increases the efficiency and the performance of the supply chain but also provides a competitive advantage. Firms can be more competitive on the market. Firms can find a differentiation approach faster than usual. As stated by Sangari (2004), "Businesses are still struggling to achieve competitive advantage." Nowadays, organizations noticed that they need to use effective tools for decision making, in order to create BI. To prove that a company can be more competitive with data analysis, the example of a baseball player will be used. Lewis (2003) performed research on a baseball team and used data-based analysis on one of the players' performance. It turned the club into a very competitive team. Lidl is one of the many firms that used BI in their processes. They used the software SAP (an ERP software) to analyse a large amount of data, to understand and react to the customer behavior. This allowed them to have a better understanding of the customer and to target the right market. Targeting the right market also means they will have better chance to improve the success of the company.

All of the elements stated previously are participating together towards the common and final goal, customer satisfaction. Through profitability analysis of the services offered to the clients, firms are able to know what to offer to each customer. It allows them to provide more value-added services to exactly meet their needs. To sum up the ideas mentioned previously, a citation stated by Ngai et al. (2011) can be used:

> "supply chain agile capabilities help to sustain competitive advantage and improve performance through reducing manufacturing costs, enhancing customer satisfaction, and removing non-value-added activities."

5. CONCLUSION

Data has been used for critical decisions since the beginning of globalization. New opportunities and choices have been given for both consumers and companies. A competitive pressure has forced companies to lead their sourcing and manufacturing on a global scale resulting in a significant increase in product offerings. When a company grows, it needs a bigger and more sophisticated supply chain with tools that generate the insight that leads to smarter IT solutions. BI systems are part of this effort to provide technology in order to

collect information to improve business potency and give easy access to the information that partners, suppliers, and employees need to do their job. It facilitates scrutinizing every aspect of business operations to find new revenue or squeeze out additional cost savings by supplying decision support information. As such it has become increasingly difficult to separate BI from other IT intensive efforts, like the supply chain.

Robison (2002) points out that BI uses technology-related complexities and can be useful only with technically savvy specialists. Robinson argues that BI is expensive due to its complexity and that BI can take long time to yield correct analyses when companies need to get a perspective in the short-term. Given that BI is hard to set up, there are other ways to provide BI, such as SQL (Structured Query Language). SQL is a domain specific language designed for managing data held in a relational database management system. As discussed previously, the focus of supply chain management is to optimize tools and methods in manufacturing, sourcing and distribution sectors in order to reduce delivery times, inventories and costs. Applying the concepts of BI to SCM systems provides strategic information to decision makers in organizations. Besides, real-time BI has an impact on business decisions and current business processes. Ittmann (2015) summarized the situation well with the following statement:

> "Organisations need to understand forces in their marketplace better and respond faster to changes in their environment in order to remain competitive. The proper use of any tools and methodology to assist in this is essential." Using BI tools has become essential in the current business environment because there are many advantages for companies to use BI in their strategies because it allows them to be more competitive on the market and manage customer relations in the easiest and best way.

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