BUSINESS INTELLIGENCE AS AN ESSENTIAL COOPERATE MANAGEMENT TOOL FOR THE LOGISTICS INDUSTRY

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Abstract

Present and historic cooperate data provide the platform for deep interrogation of business processes with the aim of producing effective and timeous reports for management decisions. This study explores the abstract link between the successes and failures of strategic decision-making process and business intelligence as integral factors making significant impact on planned corporate destinations particularly in the logistics industry. The study advocates efficient business intelligence and strategic reporting systems for enhanced cooperate decision support.

Keywords: Business Intelligence, Corporate Planning, Corporate Decision

JEL Code: P41

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1 Introduction

Business intelligence refers to the process of extracting, transforming, managing and analysing business information in order to support high level decision making (Niu, Lu and Zhang, 2009). It can also be regarded as the set of mathematical models, methodologies and analysis that are used to exploit available data for information and knowledge generation which are useful and critical for decision making processes (Vercellis, 2009). Business intelligence uses large sets of data with the prerogative of disseminating intelligence and knowledge across the logistics industry which includes lower strategic levels to higher tactical and operational levels of management. Business intelligence is therefore "a system that combines data acquisition, data storage, data delivery and knowledge management using analytical tools to make quality information accessible to decision makers" (Bobek and Perko, 2006) and it is "software tools designed for the collection, manipulation, display and utilization of data to support business decisions" (SAP AG, 2006).

Figure 1. Decision Support System (DSS) architecture
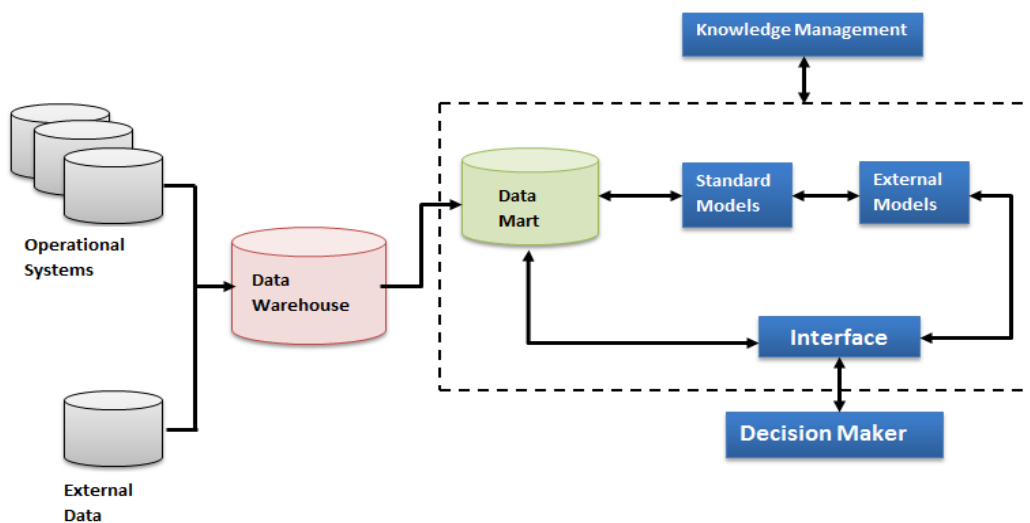
Source: Vercellis (2009:38)

The architecture of business processes driven by the need to support decision making processes in real-time paved the way for real-time business intelligence in the logistics industry. The decentralization of decision-making at different level in the logistics industry, allowed for the development of distributed decision support system which is progressively gaining ground against personal decision-making strategies in the business environment (Wang, 2009). The heterogeneous form of information management systems allows for the integration of data systems that are self-executable but does not execute information integration system by itself at run time. Information integration at this level of business intelligence system initiates and monitors knowledge generation process that is capable of leveraging existing systems (Xi and Hongfeng, 2009).

Business intelligence as an important element in the core competence of the logistics industry, it introduces comprehensive systematic intelligence for corporate decision making through the introduction of business target and operating conditions for decision makers. The business intelligence targets could be grouped into layers depending on the requirements of the organisation at a given period. These layers may include the purpose of introducing business intelligence to solve a particular business problem, the implementation of business intelligence concepts, the identification of basic elements of the business intelligence system for that particular business problem and the conjugates that may exist in the use and implementation of business intelligence technologies in the organization (Li, Qu, Zhu and Han, 2009).

Decision making process and methodology assist and facilitates the delivery of information within the framework of decision making. The use of human behaviour and emotions in the process of decision making introduces a system that is not aligned with the capabilities and functionality of business intelligence. The identification of technologies such as executive information systems which are in harmony with business intelligence tools towards decision making in the organization allows for improved managerial decision productivity and leverage the capability of business intelligence in the organization (Feng, Richards and Raheemi, 2009).

In applying business intelligence in the logistics industry, knowledge-driven systems create an integrated service with business intelligence such that information retrieval, data mining, statistical analysis and presentation are consolidated to provide key business knowledge for the smooth running of the logistics industry. Business intelligence pursues flexible avenues for the implementation of data mining, analysis and knowledge presentation. It brings to the table knowledge discovery process within the organizational structure and constantly seeking new information in the application domain. Business intelligence brings efficiency into business process

that required substantial amount of human intervention for decisions to be made (Hang and Fong, 2009).

2 Business intelligence processes

Business intelligence system is made up of five important processes (Niu et al., 2009; CSIRO, 2008). These include:

• Data Sourcing: This process allows the business intelligence system to extract data from various data sources. These various data sources represent different business departments which include production, marketing, finance and human resource. The extracted data is filtered, transformed and integrated into the system for analysis.

• Data Analysis: This converts data into knowledge and information through the use of different data analysis techniques. The data analysis techniques include modelling, strategic reporting and data visualization. The results derived from the data analysis process assists decision makers to have an improved and revised understanding of the business environment and to make informed decisions on business processes.

• Situation Awareness: Situation awareness allows key players in the organisation and industry to have a deep understanding of current business condition and decision situation which are derivatives of the data analysis process. The situational awareness as a sub-system in the business intelligence system allows and assists decision makers to develop robust situational awareness about their business decision conditions.

• Risk Assessment: The ability to make prediction about business conditions in the future is developed as a function of decision makers having richer situational awareness of the business environment. This allows managers to identify threats, strength and opportunities that may present themselves during the course of daily business operations. This provides the opportunity to be able to respond to the business conditions adequately. Hence, business external and internal environments affects decision making process and this makes risk assessment a critical component of business intelligence system.

• Decision Support: The primary objective of business intelligence is to assist managers to make accurate decisions that are based on facts, current and real-time business data.

Business intelligence has a particular structure and configuration that consists of four primary intelligence levels and metadata management component. The structure and configuration are the capabilities indicators of a business intelligence system in the logistics industry. The different components of the business intelligence system work hand in hand towards an effective management

decision process in the organization. The intelligence levels are (Niu et al., 2009):

• Operational Systems Level: Current operational processes and procedures in the logistics industry provide data sources for the business intelligence system. Business activities which are done through an online transaction processing (OLTP) system provide the initial data source for the operational systems level. The activities which are done online include human resource management system, customer order processing system and the financial system in the organization (Vercellis, 2009).

• Data Acquisition Level: This component pre-processes data at three stages: the first stage is data extraction process followed by data transformation process and finally data loading process (ETL). The data acquisition level, filters, unifies and aggregates the data before it is loaded onto the central data warehouse. The pre-processing of the data is an important process in the business intelligence system as the quality and validity of data depends on this process. The integral design that is built into the process includes flexibility of the system, quality of data and processing speed of the data acquisition system (Vercellis, 2009).

• Data Storage Level: The data that is processed by the data acquisition system is kept at the data warehouse. The data is stored using relational database management system designed to support real-time transaction processing. Data warehouse provides a data system that is time-variant, subject oriented, integrated and non-volatile such that data is prepared for loading onto pre-defined systems and schemas. The data warehouse system includes two basic tables into the system; the dimensions tables and fact tables irrespective of the type schema it is designed to work with (Luo, Naughton, Ellmann and Watzke, 2007).

• Analytics Level: Various forms of analysis are drawn from the vast amount of data that is stored in the data warehouse. Business intelligence allows analysts and decision makers to have two basic analytical functions at their disposal. The analytical functions are the online analytical processing (OLAP) and reporting. The reporting functions provides management with human resource reports, logistics reports, product reports, level of service reports, sales report and time of service delivery reports. The reports are generated by sending queries to the data warehouse. The reports are usually presented in static formats and may contain fixed types of data.

The OLAP provides managers and decision makers with the opportunity to go through their business data efficiently from different analytical dimensions especially in real-time. Analytical dimension refers to the viewpoint through which data is made available and presented to stakeholders in the logistics industry. Analytical dimension may include type of service rendered, category of customer, time and sales location. OLAP supports the use and integration of ad hoc data to an already set up analysis thereby giving managers full access and control on the data analysis by allowing them to select the analysis dimension of interest. OLAP operates and functions on a multidimensional data model (Racz, Sidlo, Lukacs and Benczur, 2007).

Additional analytical operations can be integrated into the data warehouse system and they include business process management, data mining, business performance management, executive dashboards, customer relationship management and knowledge management.

• Metadata Management: Metadata are special information regarding other data. The special information include: data warehouse storage, data sources, data and system access authorizations, business principles and rules as well as the mode in which different data is extracted and transformed into knowledge. The metadata management is important for producing consistent and accurate data and system maintenance (Niu, et al., 2009). There may be limited awareness on the value of the metadata management system and this may pose as challenges for organisations. Hence careful and demanding data capturing towards managing and providing visibility into metadata becomes appropriate for the organisation (Friedman and Strange, 2004).

It is often common to refer to business intelligence an on-line decision making business tool in real-time. At some point in the analysis of business operations, it may refer to the reduction of the time spent on business operations so that intelligence on business activities remains useful to the decision maker when decision making time arrives. The nature and characteristics of business intelligence technology is that it gives decision makers the ability to be proactive in their actions. The essential proactive components of business intelligence include the following; real-time data warehousing, data mining, automated irregularity and exception detection, proactive alerting with automatic recipient determination, seamless workflow, automatic learning and refinement, geographic information systems, data visualisation and presentation (Negash, 2004). Figure 3 shows the subsystems of a business intelligence system.

Business intelligence incorporates data integration processes into its system. Data integration activities are all activities and processes which are geared towards filling the data warehouse with distinct activities that are recorded during the course of business operations. Data integration process into the business intelligence system consist three critical processes. They include data extraction process, data transformation process, and data loading process. The three combined processes are referred to as the data ETL process. The data extraction process allows for the capturing and staging of data. The data transformation process includes data validation procedure, data cleansing, data decoding and

renaming, data aggregation, key management and generation. The data loading process includes the loading of business activity facts, tables and graphs as well as the loading maintaining of dimension tables (Bouman and Dongen, 2009).

Figure 2. Insight for decision making process
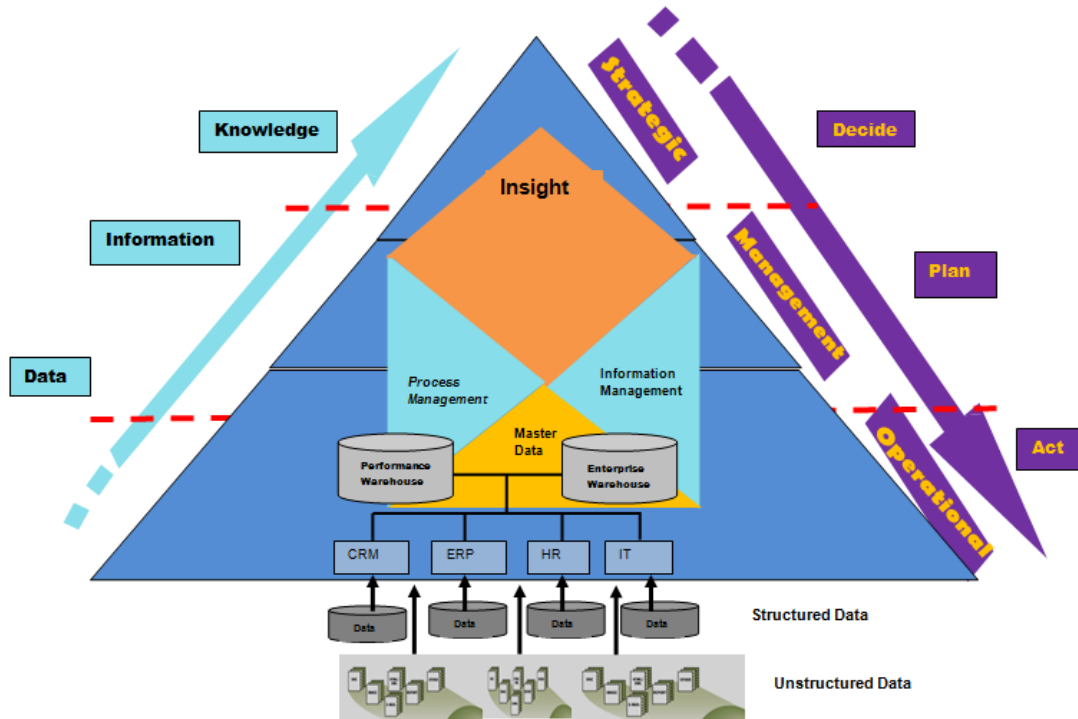
Source: Ballard, et al. (2006: 13)

During the implementation of business intelligence system, organisations pay little attention to the hidden aspects and "behind the scenes" areas of business intelligence. Organizations focus their attention to functionalities that are visible to the users of business intelligence, trainings on how to use business intelligence tools and applications and the impact of business intelligence on their business process. The critical underpinnings of a business intelligence system are what makes or breaks the business intelligence system. These critical substructures ensure that the business intelligence is deployed and implemented in an efficient and robust manner. The robust implementation of business intelligence makes the business intelligence system to deliver insight in a reliable, scalable and flexible manner (Friedman and Strange, 2004).

Figure 3. The subsystems of Business Intelligence System

Source: Negash (2004: 178).

Where GIS refers to geographic information systems, CRM refers to customer relationship management, DSS refers to decision support systems, EIS refers to executive information system and OLAP refers to on-line analytical data processing.

Before decisions are made, the information derived from the processed data is optimised. Business intelligence optimization models give managers the opportunity to determine the best possible solution at any given time from the available alternatives that are present. Decisions are then made based on the choice of conclusions drawn from the analysis of data and which may be the representation of natural conclusion drawn from processing business data. Amidst the use of business intelligence technologies, the choice of decision still remains at the disposal of decision makers at the organization. The decision makers may also take advantage of informal and unstructured data available to them in order to modify recommendations and conclusion reached through the use of business intelligence mathematical models thereby providing an adaptive conclusion (Vercellis, 2009).

3 The inference of Business Intelligence System

The logistic industry has seen and experienced significant growth over past few years as a result of emerging information technologies and business intelligence tools being introduced in the sector. The explosive growth of the logistics industry has placed demand on service delivery turnaround time and quality of service while monitoring the progress of the industry in real-time. The increase in transaction volume and other technological investments have created the need for new processes and application that are capable of enhancing operational processes. These investments on the long run are shaping the logistics industry to develop and have competitive advantage against other sectors in the economy of the country and thereby alleviating operational and decision making problems (Trehan, 2008).

Business intelligence amongst other capabilities integrates information from multiple data sources and therefore provides robust analysis that giver better understanding and insight in customer, behaviour, market dynamics, risks and gains in the industry and providing greater visibility into business operations within the logistics industry as well. Business intelligence technology merges different corporate data into one useful resource, transforms it as the industry truth and leverages it to achieve strategic goals in the organization. Business intelligence technology becomes the industry's way of analysing and presenting information that showcases its tactical and strategic decisions and the impact it has on revenue and profit generation (Trehan, 2008).

4 Bridging the information gap

Business intelligence technology provides the logistics industry with the single information access point which reduces the cost of identifying, collecting and processing of information. Business intelligence technology ensures that both operational managers and chief executives are making informed decisions that are based on facts that have been filtered using well defined business rules. Business intelligence technology can also be used analyse the geographic distribution of customers, advances and services to better understand the concentration of demand on supply risk based economies and how to provide solutions for such economies (Trehan, 2008).

Business intelligence provides the critical tool required by the logistics industry to have high credit ratings as it showcase how business processes are managed and can also predict business performance in the near future to prevent and reduce losses in the industry. Business intelligence technology allows the logistics industry to identify its strengths and weaknesses which are related to collecting and analysing business data. The analysis and reporting finality of business intelligence technology provide adequate level of transparency and control over the daily operation of the logistics industry (Trehan, 2008).

5 The significance of Business Intelligence System

Business intelligence, in today's business world is fast becoming a "must-have" technology which is driven by the quest of securing competitive advantage through the understanding of customer wants. Business intelligence system is designed to speed up the process and quality of decision making in the logistics industry. It enables rapid dissemination of intelligent, relevant information through simplified, integrated technologies and the provision of open user friendly graphic user interfaces to access and share information both internally and externally especially in mixed technology business environments (Microsoft, 2001).

In the current business environment within the logistics industry, the pressure to have good business intelligence technology has increased as the speed of business activities in the logistics industry is increasing. The increase in business operations has varying dynamics as the nature and dynamics of business conditions are changing. In the midst of changing business conditions, customers are expecting good service delivery which often personalised. In the wake of these increases in perfect service delivery, businesses and organisation who are incapacitated by their lack of having business intelligence technology tend to outsource these personal services which they classify as their non-core business functions. The logistics industry demands better business operations

planning with less uninformed risk-taking decisions. The current trend in the logistics market requires that information and knowledge managers do and achiever higher productivity level within short period of time with litter resources (Microsoft, 2001).

Today's logistics operations require that managers access information and use analytical tools that are tailored according to their functions and needs. These tailor-made tools allow the logistics industry to have better information about the business operations, make better decision and increase their profit margins. This translates towards having accurate information about customers and their behaviour in the market. Business intelligence provides access to critical information that relevant and useful giving the industry competitive advantage and allows operations managers to make decisions in time and with confidence and giving the business the necessary agility it requires. The impact of business intelligence within the logistics industry is felt across the board as it lowers operational costs, increases revenue and improves customer relationships for the logistics industry (Microsoft, 2001).

Business intelligence facilitates the industry to have business agility in their business activities. Business agility is the characteristic property of the industry to the way it responds to fresh business opportunities and varying market demands. The combination of intelligence prediction mechanisms with fast execution procedure gives the logistics industry the ability to navigate from business process concepts to implementations as quickly as they can (Microsoft Dynamics, 2006).

Business intelligence allows for increased profitability in the logistics industry as it provides accurate snapshots of the possible profitability for the industry. This allows the industry to focus or redirect their energies towards most lucrative business opportunities. The integration of business systems that slows for the spanning of the logistics industry, customer relationship management, e-commerce and point-of-sale technologies, the industry can create accurate profiles of business operation and offer valuable insights to managers on business sensitive areas, preferred mode of business transactions, buying patterns of customers and mode of communication between customers and service providers (Ballard et al, 2006).

In reducing operating costs, business intelligence reduces the time required to gather relevant business data. By providing the use of power analysis and reporting tools, decision makers are empowered to easily make their own investigations into business operations, prepare their own reports and implement new business processes with minimal assistance from data base administrators and IT specialists (Laursen and Thorlund, 2010).

Business intelligence allows the logistics industry to streamline their customer base, identify valuable customers and device means of retaining their customers. By studying relevant data about customer preferences, the logistics industry can identify and target potential customers. Information acquired through business intelligence system will assist the logistics industry to prepare mind catching, effective and focused campaigns during their marketing exercises and this reduces advertising costs (Laursen and Thorlund, 2010).

Business intelligence allows the industry to device means of imbibing in their customers the sense loyalty as the industry tries to optimise its relationships with the existing customers. Trust is built between the industry and the customer as a result of the pro-activeness of the industry in detecting the preferences of the customer and making them readily available in time. Efficient service rendered to the customer as result of the use of business intelligence technology increases customer loyalty for the industry. Understanding the customers and developing preferential marketing messages and personalisation of service provides the logistics industry with competitive edge against its competitors. Hence business intelligencer merges customer information, knowledge and insight with fast marketing execution activities which geared towards building customer's truth in the industry, inspire loyalty, provide the customer with some sense of belonging that they are valued by the industry for their patronage (Microsoft, 2001).

6 Conclusion

Business intelligence uses large sets of data with the prerogative of disseminating intelligence and knowledge across the logistics industry which includes lower strategic levels to higher tactical and operational levels of management. The process combines data acquisition, data storage, data delivery and knowledge management using analytical tools to make quality information accessible to decision makers

Business intelligence, in today's business world is fast becoming a "must-have" technology which is driven by the quest of securing competitive advantage through the understanding of customer needs.

This study recommends investment in robust business intelligence platforms for corporate entities in the logistics industry.

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