The Study on the Application of Business Intelligence in Manufacturing: A Review

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ABSTRACT
A manufacturing based organization operates in an environment where a fast and effective decision is needed. This is to ensure that the output is met with customer compliance. There exists manufacturing systems that collect the operational data and the data turns out to be in a high volume due to the state of the art of the abundant manufacturing operational data. Having a lot of data without the tool to analyze and extracting valuable information from it, increases the amount of time spent by employees focusing on the data itself. This eventually leads to a delay in a decision making process, resulting in a delay of products delivery to customer. To fill in this gap, a Business Intelligence (BI) implementation will be reviewed, with the aim to execute the right action at the right time or in other words, to improve the decision making process of an organization.

Keywords: Business Intelligence, Manufacturing, Manufacturing Operational Data, Manufacturing Systems, Visual Representation

INTRODUCTION
The manufacturing industry may be the main resources for profit for a certain country. It is one of the major business activities. As the competition rises and customers become more demanding, the world has started to find a way to sustain and increase their profit. Because of the business states and environments which have now become globalized, there is a need to have a fast decision based on the updated information. The growth in the manufacturing sector has supported the world economy positively (Monthly Oil Market Report, 2011). Growth in 2010 was revised from 4.3% to 4.5%, while in 2011 it was revised from 3.8% to 3.9%.

In Malaysia, sales in the manufacturing sector went up to 8.5% from the year 2009 to November 2010 (MITI Weekly Bulletin, 2011). The growth is seen rapidly high in the area of computer peripherals and electronics manufacturing industry. The computer peripherals and electronic product manufacturing company produces computers, computer peripherals, communications equipment and other electronic products. Examples of the products are print-
ers, scanners, fax machines and so on. These products are used in homes and businesses, as well as in government and military sectors. The focus to synchronize business with the manufacturing unit of the manufacturing operations is needed as the segment has increased globally for more value-added chain (Shaw, 2000). Even though the computerized systems in the manufacturing companies for higher productivity, quality and lower production costs produce large volumes of data, the valuable knowledge might be hidden in it (Jenkole et al., 2007). Having a lot of data does not guarantee that the most critical information is being attended. In a manufacturing based organization, a fast and quick decision is very much needed to ensure that the in house operation corresponds to the customer needs. The problem that arises in a shop floor control with this abundance of data is that, decisions is difficult to make in real-time by the status of the shop floor (Shin et al., 2003). Two technologies are seen to improve the knowledge available to decision makers. They are the Business Intelligence (BI) and Knowledge Management (Cody, 2002). The BI systems are chosen since they are becoming increasingly more critical to the daily operation of organizations (Herschel, 2005).

MANUFACTURING PROCESSES AND PROBLEMS

A manufacturing organization consists of many processes initiating from customer orders until the delivery of products to customers (Wiendahl, 2007). The process flow in a manufacturing company is as shown in Figure 1. Being the general flow of the manufacturing organization, it might vary from one organization to another.

The problem seen in the operation section is that, whether the products have been completely built by the production folks or not, they are unknown (Minguez, 2011). The whole process stays invisible to others as there is no real-time information, unless we go down to the production floor itself and check the status ourselves. The problem seen in the Operation Section or also called the shop floor and production here is, the urgent customer orders are often overlooked. In other words, the priority of the orders in accordance to its delivery schedule is not being monitored and carried out. Employees tend to pick a simple order and item (that does not have so many materials to build for example) to fulfil. In addition, if ever exists an order which requires further attention, even though remarks are put in the list, this order is often neglected. Rarely will it be reviewed back by the production employees after

Figure 1. Manufacturing process flow
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