Understanding Business Intelligence Adoption and Its Values: Some Examples from Malaysian Companies

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Abstract—**Business intelligence (BI) has become increasingly important to organizations in supporting business decision making and in achieving competitive advantage. Often, cases of BI adoption mentioned in the press are those from developed countries such as USA, Australia, and Germany. Seldom are adoption stories from developing countries such as Malaysia being reported. This paper intends to highlight a few BI adoption cases among Malaysian companies from various industries. The goal is to underscore (1) the way these companies make use of different BI capabilities, and (2) the values of BI to the companies. By doing so, it is hoped that more Malaysian companies, regardless of size, will become aware of BI and will adopt and adapt the tools as catalysts to support their businesses.**

Keywords-component: business intelligence, BI tools, competitive advantage, Malaysia

I. INTRODUCTION

In recent years, market enthusiasm toward business intelligence (BI) tools is overwhelming. This is evident with increasing parades of BI vendors as well as raising number of organizations, especially large enterprises that either have adopted or are seriously considering implementing the tools. Such enthusiasm can be attributed to their recognition of the value of BI. BI is "an organized and systematic process by which organizations acquire, analyze, and disseminate information from both internal and external information sources significant for their business activities and for decision making" [1, pp. 32]. Specifically, BI serves as a source of competitive advantage in enabling organizations to gain knowledge and insights that result in effective business actions and improved business performance [2]. It does so by delivering actionable information to the right people at the right time, and in the right context [3]. According to Negash [3], BI pairs data gathering, data storage, and knowledge management with analytical tools to provide decision-makers with competitive information.

Even though organizations are becoming aware of the value of BI, many are not actively using it and are still relying heavily on ad hoc data collection and reporting tools such as Excel spreadsheets in their decision-making. In TDWI's Best Practices Report, only 24 percent of BI users (out of 704 respondents) were actively using BI tools [4]. Another survey of 308 individuals (involving executives, management, and users) conducted by Ventana Research found that 70 percent of them are still using spreadsheet to access and analyze data [5]. Extensive use of ad hoc tools may lead to problems such as lack of integrity, inconsistency, time consuming, inability to meet business requirements, and poor decision making [5,6].

Furthermore, even though BI adoption is increasingly common for companies in developed countries (as shown in the press), reports of deployment in developing countries such as Malaysia has been scarce. This lack of press coverage is doing a disservice to Malaysian companies. For example, many are unaware of BI tools and the associated values. Even among those who are aware of the tools, they may still be doubtful of the return on investment and therefore are delaying BI deployment that could have brought competitive edge to their business. This paper intends to underscore (1) the way Malaysian companies make use of different BI capabilities, and (2) the values of BI to these companies. By seeing actual cases in work, it is hoped that more Malaysian companies, regardless of size, will become aware of BI and will adopt and adapt the tools as catalysts to support their businesses. The rest of the paper is structured as follows. Section 2 briefly discusses BI tools while Section 3 highlights some cases of BI adoption among Malaysian companies. Section 4 concludes the paper and identifies the limitations and future research directions.

II. BUSINESS INTELLIGENCE TOOLS

Different BI tools have emerged over time to assist organizations to deal with their specific problems and achieve desired outcomes. Generally, BI tools are used for "enabling organizations to understand their internal and external environment through the systematic acquisition, collation, analysis, interpretation and exploitation of information" [7, pp. 1].

There are a variety of BI vendors in the market such as IBM Cognos, SAP BusinessObjects, Oracle, SAS,

Information Builders, Microsoft, and MicroStrategy. These vendors provide BI products either as stand-alone BI tools or as integrated suites of BI applications. Each vendor offers different products that specialize in different BI capabilities. For instance, Oracle focuses on enterprise reporting, SAP BusinessObjects targets reporting and ad hoc query, and SAS concentrates on statistical analysis. While specialized capabilities are meant to bring out the uniqueness of each product, there are some common BI capabilities that are shared by all BI products. Examples of these capabilities include reporting, OLAP, and dashboard.

The scale of BI tools adoption in each organization can differ greatly depending on the business problems and user requirements [8]. For instance, organizations can adopt various types of BI tools from single or multiple vendors to meet their needs. However, there is no one BI tool that is best-suited or "one size fits all" to meet the divergent needs of everyone.

III. EXAMPLES OF BI ADOPTION AMONG MALAYSIAN COMPANIES

Table 1 shows some examples of Malaysian companies that have adopted BI along with descriptions of their usage type and the benefits gained. These examples were obtained through extensive online search using keywords of "Malaysia companies" and "BI tools". Additional search was also conducted by visiting vendor websites to collect published information on Malaysian companies that have adopted particular BI tools. Press releases and company websites were then checked to obtain information related to companies' BI usage and the benefits gained as a result of using the tools.

As evident from the table, the adoption is not limited to one particular industry. Rather, wide varieties of industries in Malaysia have already started to deploy BI. Examples of these industries are banking and financial, communications, education, government, insurance, healthcare, manufacturing, retail, and service. However, the adoption is still restricted to large organizations with large data volume, probably due to expensive cost of BI implementation. According to TDWI research [9], it is found that the implementation cost of operational BI systems is generally about $1.1 million. Evelson [10] also reported that the average cost of BI software for a department is $150,000. This price may be a burden for small-and-medium sized companies.

The usage of BI is also varied by industrial needs. Due to specific requirements of niche industries, different BI tools are available to meet specific business needs. For instance, the communication industry uses predictive analytics to identify high-potential subscribers that can maximize BI investment by analyzing existing customer behavior and demographic data. Banking organizations apply data mining techniques to perform fraud analysis and improve risk management while retail organizations

utilize forecasting capabilities to estimate customer demand on products.

Generally, BI usage (as shown in the cases) can be categorized into several types as follows:

- *Reporting and query*: Users can easily access the information they need in real time to generate detailed reports and perform query against data warehouses in order to get immediate answers to their specific business questions. Malaysia's Inland Revenue Board is a good example. This tax revenue collecting board uses the reporting and query model to obtain clearer picture of taxpayers who are more likely to under-report their income tax. Furthermore, the time used to produce complex reports is reduced from two weeks to three days following the adoption of BI tools. This has helped the revenue board to identify underpaid taxes and perform tax collections faster.

- *Ad-hoc analysis:* With the use of BI tools, users can immediately perform ad-hoc analysis on data and information from multiple sources to improve their key business areas such as customer profitability analysis, sales and marketing analysis, communications management, and tax collection activity. For instance, Bank Kerjasama Rakyat Malaysia Berhad uses analytical reporting solution to find out the most profitable customers by performing customer analysis and profitability analysis. Through these kinds of analyses, the bank has gained benefits such as improved product performance and better customer relationships. DiGi Telecommunications Sdn Bhd implements enterprise data warehouse to gain deeper insights into products and customers through analysis on data such as call detail records, which can help DiGi to deliver services more effectively.

- *Data mining:* It is commonly used for marketing, financial, and manufacturing. It allows management to view and analyze data from multiple perspectives to quickly identify useful information (patterns, relationships, and trends) hidden within large amount of data which might be beneficial or threaten an organization. For instance, Insurance Services Malaysia Berhad utilizes data mining techniques to manage and detect potential insurance fraud in order to increase operational efficiencies.

- *Planning:* BI tools facilitate better planning of strategies and resources through effective analysis of data such as customer demographic data and sales data. This helps in uncovering new business opportunities, managing revenue, and improving cost efficiencies. For instance, Genting Malaysia Berhad uses advanced analytics to understand frequency of visits and spending patterns of different customer segments for resource allocation (e.g., memberships and accommodations) and operations planning (e.g., marketing activities and

TABLE I.   EXAMPLES OF BI ADOPTION IN VARIOUS INDUSTRIES IN MALAYSIA

Industry	Company	Descriptions of BI Usage	Source
Banking and financial	Bank Kerjasama Rakyat Malaysia Berhad (Bank Rakyat)	- MicroStrategy's BI Platform is implemented to provide strategic information for decision making and planning. - Employees can track product revenue and perform customer profitability analysis through the use of web-based analytical reporting solution.	[11]
Communications	DiGi Telecommunications Sdn Bhd	- Teradata's data warehousing solution is used to support analytical business intelligence for better understanding of its customers. - BI solution allows the company to analyze customer data related to call detail records and communications management.	[12]
Education	Universiti Tun Abdul Razak (UNIRAZAK)	- The university uses BI to enhance performance of administration and operations, such as staff performance and business unit. - BI assists management to monitor KPIs accurately and generate timely performance reports to improve the efficiency of the university.	[13]
Government	Inland Revenue Board (IRB)	- IRB uses SAS Business Intelligence to analyze tax collections faster and understand the revenue impact of proposed tax changes. - Users are able to access data to perform ad hoc queries and analysis, check data inconsistencies easily, and react quickly to changing requirements.	[14]
Healthcare	Realmild (M) Sdn Bhd	- This company has used BI solutions provided by SAS to enhance strategic planning and budgeting processes of its Group's business operations, such as healthcare facilities management, and logistics and capital management businesses. - Non-productive processes such as manual data entry and data consolidation are eliminated through the use of SAS data integration and analysis technology.	[15]
Insurance	Insurance Services Malaysia Berhad (ISM)	- SAS Enterprise BI server is implemented on ISM databases to meet the business requirements and improve its operational efficiencies. - SAS analytical capabilities are included in ISM system to provide users with self-service functionality to produce customized reports containing statistical and analytical information to make informed decisions.	[16]
Manufacturing	Ricoh Malaysia	- This imaging and printing company has used Cognos TM1 BI solution provided by IBM to identify new business opportunities and better manage its budgets. - Data warehousing (IBM Cognos reporting tools and MS SQL 2005) is implemented for business and monitoring control while IBM's business analytics is used for financial performance management.	[17]
Retail	Senheng Electric (KL) Sdn Bhd	- Senheng implemented enterprise data warehouse using Microstrategy software to store transaction data collected from all outlets and transform it into information such as sales, inventory, customer, and finance. - The implementation of BI system helps Senheng to improve stock turnover by optimizing cash flow and to react quickly to business issues pertaining to customers and outlets.	[18]
Service	Genting Malaysia Berhad (GMB)	- In order to gain and improve customer insights, GMB implemented SAS enterprise reporting to obtain timely and consolidated KPIs information. - SAS Analytics is also used to improve customer segmentation, customize marketing campaign and optimize resources.	[19]

products development). This helps the company to better manage its resources by channelling programs and services with appropriate resources as well as to increase operational efficiencies.

- *Forecasting*: Users can use predictive analytics to accurately anticipate future needs (e.g., products and services) and outcomes (e.g., what will happen if the trends continue). For instance, Insurance Services Malaysia Berhad applies predictive analytics to identify the most profitable product in its insurance profiles. By doing so, it is able to achieve competitive edge.
- *Optimizing:* Managers can optimize daily operations and processes by monitoring the usage of resources (such as inventory, financial, technology, and human resource) and determining which business area requires improvement. Senheng Electric (KL) Sdn Bhd is one of the examples that leverage this optimizing capability to monitor stock movement across all outlets and optimize the cash flow. Stock turnover is improved as a result of better resource optimization.
- *Budgeting:* BI tools enable business users to proactively control costs and improve budgeting process over time by comparing budgets with their actual execution and expenditure (e.g., marketing campaign and manufacturing). Realmild (M) Sdn Bhd is a good example of organizations that uses

this feature to reduce the cost of budget preparation, thereby helping the company to save operational costs.

- *Monitoring:* Organizations can actively track performance and progress toward defined goals by analyzing performance measures and metrics. This can be done through the use of data visualization tools consisting of interactive charts and graphs such as dashboards and scorecards. This enables users to gain valuable insights into customers and business performance. It also helps to improve efficiency and effectiveness of business activities. For example, Universiti Tun Abdul Razak monitors its performance through the use of key performance indicators. This helps the university to identify potential problematic areas through detailed view of performance targets and achievements.

IV. CONCLUSION

This paper has highlighted different usage of BI tools across various industries among Malaysian companies. It has also underscored the benefits achieved by these companies as a result of their BI adoption. Clearly, BI tools have provided a wide range of capabilities that allow these organizations to support their specific business needs. For examples, reporting tools are used to gain a consolidated view of business activities, data mining capabilities are used to discover hidden trends, forecasting tools are used to analyze and predict possible outcomes, and dashboards are used to monitor performance. By applying various BI capabilities, organizations can leverage information more effectively and thus gaining data-driven insights to drive their decisions.

While this paper has underscored the values of BI tools to some Malaysian companies, the information presented here has to be interpreted with some limitations in mind. First, the cases are not inclusive of all Malaysian companies that have adopted BI. Even though an extensive search has been conducted, the data obtained is nonetheless limited to companies that have published their adoption information. Companies that have not done so are left out in the study. However, since the goal of this paper is to highlight some cases of BI adoption among Malaysian companies in an effort to underscore the value of BI, the cases presented in the paper are sufficient to serve this purpose.

Second, the cases presented here lean toward large companies. Information on BI adoption among small-and-medium enterprises remains unknown. Future research can focus on this line of inquiry by documenting BI adoption in small-and-medium enterprises.

This paper has established the value of BI to Malaysian companies. Future research can extend existing work by conducting in-depth studies on how the values are achieved in organizations. Such studies are useful and can serve as benchmarks to companies that plan to adopt BI.

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