บทความวิชาการ

การศึกษาแนวโน้มและสถานการณ์ของเทคโนโลยีสารสนเทศ: บทบาทญี่ปุ่นต่อธุรกิจอัจฉริยะในอนาคต

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บทคัดย่อ

บทความทางวิชาการเรื่อง แนวโน้มและสถานการณ์ของเทคโนโลยีสารสนเทศ: บทบาทของญี่ปุ่นต่อธุรกิจอัจฉริยะในอนาคต แบ่งเป็น ๕ ส่วน คือ ๑) บทนำ ๒) ระบบธุรกิจอัจฉริยะและคลังข้อมูล ๓) บทบาทของธุรกิจอัจฉริยะและคลังข้อมูลที่เกี่ยวข้องกับงานทางวิชาการสาขาต่างๆ ของโลก ๔) บทบาทและวิวัฒนาการของระบบธุรกิจอัจฉริยะของญี่ปุ่น และ ๕) บทสรุป ระบบธุรกิจอัจฉริยะเป็นเทคโนโลยีสารสนเทศที่โดดเด่น และมีแนวโน้มว่าจะเจริญก้าวหน้าในหลายแห่งทั่วโลก ปัจจุบันหลายองค์กรนำระบบธุรกิจอัจฉริยะมาใช้อย่างแพร่หลาย และใช้เป็นซอฟต์แวร์เพื่อการวิเคราะห์ข้อมูล บทความนี้นำเสนอแง่มุมของการนำไปใช้และการวิจัย ในหลายๆสาขาวิชา เช่น สาขาภาษาศาสตร์ ภาษาศาสตร์จิตวิทยา ธุรกิจ สื่อสารมวลชน และสาขาการศึกษา เป็นที่ยอมรับว่า ญี่ปุ่นเป็นประเทศผู้นำโลกประเทศหนึ่งที่มีชื่อเสียงในการนำระบบธุรกิจอัจฉริยะมาใช้ในการแข่งขัน การศึกษาวิวัฒนาการระบบธุรกิจอัจฉริยะของญี่ปุ่นแสดงให้เห็นถึงพัฒนาการ และการปรับปรุงอย่างเหมาะสม รวมถึงการนำมาใช้อย่างชาญฉลาด ซึ่งทำให้ญี่ปุ่นประสบความสำเร็จด้านการทำธุรกิจกับต่างประเทศ ดังนั้นบริษัทญี่ปุ่นจำนวนมากจึงมีความสามารถในการพัฒนา ซึ่งเป็นประโยชน์ต่อภาคธุรกิจและโครงการของภาครัฐ ตลอดจนส่งเสริมความสามารถในการแข่งขันระหว่างประเทศ นับได้ว่าการที่ญี่ปุ่นนำระบบธุรกิจอัจฉริยะมาใช้ให้ผลตอบแทนที่คุ้มค่า

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A Study on Trend and State of Information Technology: Japanese Roles on Business Intelligence in the near Future

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Abstract

This paper consists of 5 parts. They are Introduction, Business Intelligence and Data Warehouse, The Roles of Business Intelligence and Data Warehouse in Global Academic Studies, Japan and its Roles on Evolution of Business Intelligence, and Conclusion parts. Information Technology Trend and Predictions are described Business Intelligence (BI) as the outstanding IT work which can thrive in many places in the world. BI is now widely used especially in the world of practice, to describe analytic application. The importance area of practice and research of BI and data warehouse are shown. The roles of Business Intelligence and data warehouse in global academic studies focus on the following areas: linguistics, psycholinguistics, business and mass communications, and education. Japan, the world leader in practicing business intelligence, has well-earned reputation for being world leaders in business in which they compete. The Japanese roles on evolution of business intelligence presented that the Japanese are very good at acquiring, assimilating, and improving upon foreign business practices, as their successful adaptation of American quality control theory proves. Thus, Japanese firms have capabilities which are well developed within companies, benefiting both the companies and government programs, which in turn support their international competition. Admittedly, the approach is valid. Many enterprises have achieved handsome returns on investments in data warehousing and BI, but the "high investment/high return" scenario priced BI out of the reach of most organizations.

Keywords: BI, business intelligence, information technology, Japanese roles

I. Introduction

1.1 Information Technology Trend and Predictions

It would appear that information technology is very good at the technology part, but not seem to get the information part going. If we're to fulfill our information destiny and not just our technology one, we have to start thinking about the questioner, not just the tools to generate an answer[1]. For many years, it was assumed that North American firms were the leaders in the use of information technology (IT). The large number of students and companies who came to North America to study and learn the latest thinking and practices supported this belief. While the basic hardware and software technology was available around the world, how it was used was another matter. In the business intelligence (BI) space, Business Objects, a French company, became a leading BI tool vendor. Clearly, outstanding IT work can thrive in many places in the world. Further evidence of global IT excellence is provided by recent competitions. The Society for Information Management (SIM) paper competition recognizes the best work in information systems. In 2004, the first place winner was TAL Apparel Limited, a Hong Kong-based apparel manufacturer that uses IT strategically to gain competitive advantage in the intensely cut-throat global apparel industry. The second place winner describes the Future Store in Germany and how shopping, retailing, and value chain logistics will be very different in the future. [2]

1.2 The Current State of Business Intelligence

Business intelligence (BI) is now widely used, especially in the world of practice, to describe analytic application. BI is currently the top-most priority of many chief information officers. BI has initiative and is now recognized by CIOs and business leaders as an instrument in driving

[1] Bruce A Stewart. Computer World. Framingham: Aug 22, 2005. Vol. 39, Issue: 34, pp.20-22.

[2] Watson, H.J. and Swift, R.S. (2002). "Data Warehousing Around the World " Journal of Global Information Technology Management, Vol. 5, No.2, pp. 1-6.

business effectiveness and innovation. BI is a process that includes two primary activities: getting data in and getting data out. Getting data in, traditionally referred to as data warehousing, involves moving data source systems into an integrated data warehouse. Getting data in delivers limited value to an enterprise when users and applications access the data and use it to make decisions does the organization value from its data warehouse. On the contrary, getting data out receives most attention from organization activity, which is commonly referred to as BI. It consists of business users and applications accessing the data warehouse to perform enterprise reporting, OLAP, querying, and predictive analytics.[3] This technology has been well-hyped in the last few years, but some businesses have realized lower returns on investment than anticipated. Failed experiments and the high cost of software have soured many IT executives on this former darling of the board room. Besides, Web 2.0 technology can provide much of the same business market information, and open source tools for business intelligence. BI predictions for 2008 points out that less money is expected to be spent on business intelligence initiatives and ongoing initiatives would be stopped, down graded, or converted to open source solution. New open-source-based business intelligence initiatives would flourish.[4]

II. Business Intelligence and Data Warehouse

Data warehousing is an important area of practice and research, yet few studies have assessed data warehousing practices in general and critical success factors in particular.[5] The actual practice of BI and data warehousing is associated with administrative computing, and the usual technology vendors operate in this space. When it comes to academic computing, BI and data warehousing are typically taught

[3] Wastson, H.J. Wixom. Univ. of Georgia Athens Computer. Sept. 2007 Volume: 40, Issue: 9, pp.:96-99.

[4] Laplante, Philip A. Penn State University IT Professional Jan.-Feb.2008 Volume: 10, Issue: 1, p. 62.

[5] Mark I Hwang, Hongjiang Xu. Business Intelligence Journal. Seattle: Fall 2005. Volume:10, Issue: 4, p.7.

in information systems courses in business schools (rather than, say, in the computer science department). These courses teach concepts, methodologies, technologies, and applications of BI and data warehousing. Not all business schools offer these courses (often titled "decision support systems"), but many do. Good customer data is the foundation of strategic business decisions. But corporate growth, new technologies, and ever-growing volumes of data from multiple sources can significantly compromise a company's ability to control the quality of that data. The Data Warehousing Institute (TDWI) is the leading organization for BI and data warehousing professionals. Each year TDWI conducts a Best Practices competition to identify and recognize the best work in specific areas. In the 2004 competition, there were five non North American firms. The Deutsche Borse Group in Germany won for real-time data warehousing. Both L'Oreal Paris Consumer Products Division (France)and Virgin Mobile Australia won for data warehousing on a limited budget. An Optimus Telecommunications SA in Portugal was the winner for delivering a 360-degree view of customers. The winner in the predictive analytics category was Absa Bank, a leading bank in South Africa. Absa's work illustrates some of the outstanding BI and data warehousing practice that is taking place internationally. In this commentary, we describe Absa Bank and its operating model. Then we discuss how the Information Management Group organizes, manages, and leverages the use of information Critical to their efforts is BI and data warehousing and we discuss what is being done, including identifying leading-edge practices. We also discuss some of the differences in BI and data warehousing in South Africa compared to North America and Europe, and conclude by exploring why it is not surprising that world-class work is being done at Absa Bank. BI and data warehousing have produced many benefits. For example, the use of customer segmentation modeling has helped Absa consistently achieve a return on equity in excess of 20 percent over the past three years. Distribution modeling has resulted in huge cost savings resulting from the optimal placement of distribution channels. At the same time, these placements better meet customer needs and preferences.

The profitability modeling has assisted in turning an unprofitable product line into a profitable one, resulting in an annual value of US$ 1.8M. Though located in Africa, Absa Bank is world-class in BI and data warehousing.[6] This should not be surprising. Many of the conditions necessary for excellence identified by Watson and Swift (200) are in place. Absa is in a highly competitive industry. In order to compete with other large South Africa banks, Absa must be highly customer-focused. Doing so requires Absa to have integrated customer data provided by the data warehouse and to analyze the data using Type 1, 2, and 3 analytics. Absa is large enough to have the management vision, financial resources, and skills to undertake data warehousing and BI in a major way. Absa's head office is in Johannesburg, the largest metropolitan area in South Africa. It is difficult for small firms or firms in remote places to be world class. Absa's management has the required vision to recognize the potential of BI and data warehousing. Because English is widely spoken among the professional class, Absa's senior management has relatively easy access to the latest thinking and writing about how information technology can support corporate strategy. The South African culture, though multicultural, having been isolated in the past is, as a result, self-sufficient. This self-sufficiency combined with a "can do" attitude has resulted in multi-skilled employees that make things work, specifically in BI and data warehousing. "Active Data Warehousing has emerged as an alternative to conventional warehousing practices in order to meet the high demand of applications for up- to-date information. In a nutshell, an active warehouse is refreshed online and thus achieves a higher consistency between the stored information and the latest data updates," investigators in the United States report[7]. A data warehouse is the one place where a company can gain insight into business health, deliver key performance indicators

[6] Hugh J Watson, Dave Donkin. Journal of Global Information Technology Management. Marietta: 2005. Vol. 8, Issue: 4, pp 1-6.

[7] Anonymous. Information Technology Business. Atlanta: Jun 30, 2008. p. 54

(KPIs) to drive performance, and derive a competitive advantage -- yet the projects to build and maintain a data warehouse often end up being much more difficult than anticipated. There are many reasons a data warehouse project becomes lengthier, more costly, and ultimately more risky than expected. A successful data warehouse project requires a partnership between IT and the business and a pragmatic approach that provides an iterative design process to jointly arrive at the best design as quickly as possible. Using fit-for-purpose software and a fit-for-purpose approach is critical in enabling a rapid, iterative development approach. The key factors influence a successful data warehouse project, including: implementing the right development approach, choosing a rapid development product, and ensuring data availability.

III. The Roles of Business Intelligence and Data warehouse in Global Academic Studies

- Linguistics studies:

1. The study entitled "Using Fuzzy Linguistic Representation to Provide Explanatory Semantics for Data Warehouses" [8] indicated that A data warehouse integrates large amounts of extracted and summarized data from multiple sources for direct querying and analysis. While it provides decision makers with easy access to such historical and aggregate data, the real meaning of the data has been ignored. For example, "whether a total sales amount 1,000 items indicates a good or bad sales performance" is still unclear. From the decision makers' point of view, the semantics rather than raw numbers which convey the meaning of the data is very important. The study explores the use of fuzzy technology to provide this semantic for summarizations and aggregates developed in the data warehousing systems. A three layered data warehouse semantic model, consisting of quantitative (numerical) summarization, qualitative (categorical) summarization, and quantifier

[8] Ling Feng, Using "Fuzzy Linguistic Representations to Provide Explanatory Semantics for Data Warehouses" IEEE on knowledge and data engineering, vol. 15 , No. 1 Jan.-Feb. 2003 p. 86.

summarization, is proposed for capturing and explicating the semantics of warehoused data. Based on the model, several algebraic operators are defined. The SQL language allows for flexible queries against such enhanced data warehouse.

2. The study entitled "Semantic Data Mining of Short Utterances" [9] pointed that a methodology for speech data mining along with the tools that the methodology requires. It shows how they increase the productivity of the analyst who seeks relationships among the contents of multiple utterances and ultimately must some newly discovered context into testable hypotheses about new information. While, in its simplest form, one can extend text data mining to speech data mining by using text tools on the out of a speech recognizer, it found that it is not optimal. It shows how data mining techniques that are typically applied to text should be modified to enable an analyst to do effective semantic data mining on a large collection of short speech utterances. The purposes of this study is to examine semantic data mining in the context of semantic parsing and analysis in a specific situation involving the solution of a business problem that is known to analyst. It is not attempting a generic semantic analysis of a set of speech. The tools and methods allow the analyst to the speech data to discover the semantics that best cover the desired solution. The coverage, in this case, yields a set of Natural Language Understanding (NLU) classifiers that serve as testable hypothesizes.

- Psycholinguistics study: The topic on "Data Mining for Detecting Errors in Dictation Speech Recognition" [10] explained that the efficiency promised by dictation speech recognition (DSR) system is lessened by the need for correcting recognition errors. Error detection is the precursor of error

[9] Lee Begeja, Harris Druker, David Gibbon, " Semantic Data Mining of Short Utterances" IEEE on speech and audio processing, vol. 13 no.5 Sept. 2005 p672.

[10] Lina Zhou, " Data Mining for Detecting Errors in Dictation Speech Recognition" IEEE on speech and audio processing, vol.13 no.5 Sept. 2005 page 681.

correction. Developing effective techniques for error detection can thus lead to improved error correction. Current research on error detection has focused mainly on transcription and/or domain-specific speech. Error detection in DSR has been studied less. We propose data mining models for detecting errors in DSR. Instead of relying on internal parameters from DSR systems, we propose a loosely coupled approach to error detection based on features extracted from the DSR output. The features mainly came from two sources: confidence scores and linguistics parsing. Link grammar was innovatively applied to error detection. Three data mining techniques, including NaÏve Bayes, neural networks, and Support Vector Machines (SVMs), were evaluated on 5M DSR corpora. The experimental results showed that significant performance was achieved in that F-measures for error detection ranged from 55.3% to 62.5%. This study provided insights into the merit of different data-mining techniques and different types of features in error detection.

- Business and Mass Communications studies:

1. The study entitled “Mining Customer Care Dialogs for Daily News”[11] explained that as large-scale deployments of spoken dialog systems in call centers become more common, a wealth of information is gathered about the call center business as well as the operation of these systems from their daily logs. This study describes the “voice Tone Daily News” data mining tool for analyzing this information and presenting it in a readily comprehensible and customizable form that is suitable for use by anyone from system designers to call center businesses. Relevant business and dialog features are extracted from the speech logs of caller-system interaction and tracked by trend analysis algorithms. It describes novel techniques for generating alerts on multiple data streams while avoiding redundant “knock-on” alerts. Some initial experiments with automated measures of

[11] Shona Douglas, Deepak Agarwal, Tirso Alonso, “Mining Customer Care Dialogs for Daily News” IEEE on Speech and Audio Processing, Vol.13, No. 5, Sept. 2005.

dialog success are described as possible additional features to track. Features that move outside their expected bounds on given day generate headlines as part of a website generated completely automatically from each day's logs. A "drill-down" facility allows headlines to be investigated all the way to viewing logs of individual interactions behind the headline and listening to the audio for individual turns.

2. The study named "Value of Information Gained From Data Mining in the Context of Information Sharing" [12] pointed out that a game-theoretic framework to suggest the fair value for information extracted via data mining and shared between two retail-market competitors. For mutual benefit, the two players each owning a privileged information set (a collection of data or database) may want to share or pool all or part of the information contained within their respective databases. Assume that each player is equipped with a data mining technique which extracts information from the data. The first model of information sharing as a cooperative game. Then, the study use the results from the cost sharing literature to provide information sharing methods when data can be quantified either as discrete or as continuous variables. In the latter case, the study provides a mean for obtaining decision rules for pricing shared information.

- Educational study: The topic of this study entitled "BI and Data Warehousing in University" [13] explained that universities support administrative and academic computing. Administrative computing involves all of the transaction processing and decision support needed to run the university. It includes processing tuition payments, providing financial aid, and analyzing enrollment trends. Academic computing, on the other hand, supports teaching and research, such as maintaining computer

[12] Yucel Saygin, Arnold Reisman, and YunTong Wang, "Value of Information Gained From Data Mining in the Context of Information Sharing" IEEE on Engineering Management, Vol.51 No.4, Nov.2004.

[13] Hugh J Watson. Business Intelligence Journal. Seattle: Third Quarter 2006. Vol. 11, Issue: 3, p. 4-6.

labs and analyzing research data. Universities typically separate administrative and academic computing. In the extreme, neither personnel nor technology are shared. The actual practice of BI and data warehousing is associated with administrative computing, and the usual technology vendors operate in this space. When it comes to academic computing, BI and data warehousing are typically taught in information systems courses in business schools. Information systems programs often teach undergraduate and graduate courses in BI and/or data warehousing but do not offer a major in BI. However, by taking a set of related courses, it is possible to have a BI concentration.

IV. Japan and its Roles on Evolution of Business Intelligence

Japan is the world leader in Practicing BI. The Japanese have a well-earned reputation for being world leaders in the businesses in which they compete. Their business strengths are equally matched by the ability to gather and use BI, including competitor, customer, market, and technological intelligence. To get the better of superior cleverness from their competitors on international bids to devising superior competitive strategies to identifying and sourcing foreign technology for their next-generation products, Japanese companies effectively use BI as a means of gaining competitive advantage over their rivals. It is not necessary to focus on data analysis. The most important abilities in gaining much of the advantage are to collect and use BI in a timely and effective manner companywide. As the amount of accessible international business information has grown almost exponentially over the past 30 years, Japanese companies and their government have continuously sought new ways to manage the information glut to sort out those key pieces of competitive and business intelligence.

Firstly, this took place through government-sponsored foreign information programs and continued with electronic data bases and information processing systems. On the contrary, presently, many Japanese companies feel they are losing the battle to manage and use the ever-increasing amount of public and available

information generated by most of every country in the world. This has led a number of Japanese business leaders to believe they need to find a more organized and systematic way of managing the BI process. The phenomenon, respectively, has led Japanese companies to reach out to the American Society of Competitive Intelligence Professionals (SCIP) for both new ideas and as a stimulant for the development of more modern and powerful BI systems for Japanese firms. Currently, BI practices in Japanese companies have largely been developed since World War II. At the same time, the government recognized that Western technology would be needed to modernize its badly damaged industrial base. During the late 1950s, the government established two principal organizations to support the development of Japanese BI. The Japanese government created a joint venture in 1957 to identify the Scientific Information Center (SIC) for gathering and disseminating information about Western industrial technology to Japan's private sector. Subsequently, the Ministry of International Trade and Industry (MITI) established the Japan External Trade Organization (JETRO) for the purpose of promoting Japanese exports. JETRO was given the added responsibility of collecting and disseminating foreign business information to Japanese firms. That mission included the responsibility for providing worldwide intelligence on how other nations run their businesses and economies. Initially, because the firms had no foreign presence and little hard currency, much of the foreign business information was gathered by the government, with organizations such as the SIC providing the means for broadly disseminating that information throughout various Japanese industries. The dissemination of foreign business and technical information by the government caused many Japanese companies to set up their own intelligence departments to fully exploit this data.

By the early 1960s, essentially all large Japanese multinational companies had created their own dedicated intelligence units. A survey conducted in 1963 by MITI identified the most effective foreign intelligence collection mechanisms, ranging from the stationing of employees abroad as "listening" posts to the use of both domestic and foreign consulting

services, including the use of their related trading firms for proactive intelligence collection. It was during this period that a school, the Institute for Industrial Protection, was established by Tokyo to train intelligence agents and security officers for Japanese corporations. The school was headed by a former Japanese ambassador; it included a nine-person staff and a number of experienced intelligence officers. Among the first 50 students at the school were some promising executives in their late 20s, who, over the four-month course, were taught a wide range of intelligence collection, analysis, and security techniques. Today, almost all Japanese companies involved in international business and trade have their own intelligence unit. Typically, it is located in the planning or research departments. Some 10 to 20 employees are assigned these responsibilities within company headquarters, but the responsibility for intelligence gathering is companywide, with almost every employee participating (from the president to the sales force). Intelligence collection and dissemination is a well developed process at most Japanese firms. However, it is the ability—almost culturally inherent—for sharing intelligence that makes the use of BI in Japanese companies so effective. Some of the larger companies, such as Mitsubishi Corporation and Nomura Securities, have established more comprehensive intelligence activities in the form of think tanks, whose primary purpose is to study the total business environment in which the companies operate. These think tanks also sell their services to other companies, in addition to producing intelligence for themselves and, sometimes, for the Japanese government. Most Japanese firms are part of a larger group called the Keiretsu, a family of mainly non competing companies whose various business functions cover banking, insurance, manufacturing, transportation, and sales and trading. Intelligence gathered by the various members is traditionally shared with the trading company for broader use by all; the member bank often provides some of the more valuable intelligence. Japanese trading companies' reputation for operating worldwide intelligence networks is well deserved. Mitsui Corporation's trading company is reputed to have had such an excellent global intelligence network before

World War II that was used by the government for military purposes. These trading companies have hundreds of offices abroad, often with thousands of employees. Their basic mission is to gather competitive and market intelligence on an ongoing basis and send it back to the Tokyo headquarter' s intelligence clearinghouse.

Jan P. Herring stated in Business Intelligence in Japan and Sweden: Lesson for the US that Japanese trading companies are more sensitive than ever to the importance of global information, and some have stated that their goal for the 21st century is to become "globally integrated information corporations." This future vision does not diverge much from their past: Mitsui Corporation's motto is "Information is the lifeblood of the company." The collection and use of BI by Japanese firms is world-class. However, the analysis of the intelligence has been less developed and effective. Their ability to often collect the answer to an intelligence problem, such as their competitor's strategy or a description of the competitor's future product, has resulted in less emphasis being placed on the development of more creative intelligence assessment skills and techniques. In fact, because so much intelligence can be collected directly, it has led to problems where Japanese companies have been tempted—as in the Hitachi- IBM industrial espionage case—to collect a competitor's proprietary information .This situation, however, is much more prevalent in Japan, as the recent Komatsu industrial spy scandal has revealed. As competitor intelligence becomes more difficult to collect and as the amount of information that is publicly available grows through electronic data bases and public disclosure, the weaknesses in Japanese firms' intelligence analysis techniques are becoming more evident. The types of analysis that Japanese companies have concentrated on in the past have been mainly the examination and organization of large amounts of data to discern competitor trends and business strategies. However, in view of the increasing amounts of information and the complexity of available data, Japanese firms will have to place greater emphasis on more sophisticated intelligence analysis to reduce the large amounts of collected information and

derive useful insights. Japanese firms believe that although they have had an intelligence advantage over their foreign competitors in the past, they are currently falling behind, particularly in the areas of organized BI systems. They perceive that the US effort to organize competitive intelligence professionals (i.e., SCIP) is providing American companies with enhanced intelligence collection and analysis capabilities. This, in turn, has resulted in a major effort on the part of a number of Japanese business leaders and company officials, led by a major Japanese trading firm, to enlist the assistance of SCIP in organizing and developing the competitive intelligence profession in Japan. *Outlook:* The Japanese are very good at acquiring, assimilating, and improving upon foreign business practices, as their successful adaptation of American quality control theory proves. They will effectively adopt US BI methods and techniques to enhance their companies' overall competitiveness—probably sooner than most American companies.[14]

V. Conclusions

Business intelligence has been a "high-investment/high-return" solution for a long time. However, its price kept BI out of reach for most organizations. A new methodology is available with open source that brings BI to the masses. Open source provides tremendous freedom. The software is freely available, and with open source, it can quickly prototype the desired solution. This allows users to approach executive management sooner with a value proposition that applies to the organization. Users also have the freedom to iterate and evolve. Rather than assembling large teams to catalog and warehouse all corporate data, nimble teams can solve discrete business problems one after another, building knowledge and delivering value along the way with little to no "investment" needed. For over a decade, business intelligence (BI) has been sold as an investment - typically a six-to-seven-figure investment that promised to make organizations smarter and more competitive. Admittedly, the approach is

[14] Jan P. Herring. " Business Intelligence in Japan and Sweden: Lesson for the US " The Journal of Business Strategy. March/ April 1992. p.44-49.

valid. Many enterprises have achieved handsome returns on investments in data warehousing and BI, but the "high investment/high return" scenario priced BI out of the reach of most organizations.

As for Japan and its roles on evolution and development of Business Intelligence, Japanese firms have capabilities which are well developed within companies, benefiting both the companies and government programs, which in turn support their international competition. Compare to some countries that don't adopt intelligence as a strategic management discipline or have been reluctant participants in their companies' business intelligence operations, Japanese companies make greater use of intelligence at all levels and in all business functions throughout the company (e.g., sales, product design, strategizing, and decision making) From the article entitled Detection of Sequential Patterns of Events for Supporting Business Intelligence Solutions points that " Nowadays' s fast changing business environment makes high demands on the organizations for timely strategic decisions and business actions."[15] Event Analyzer is an efficient tool for promptly detecting sequences of business events that require action by decision-makers. It integrates Fujitsu's Interstage Navigator family of products, which provide Business Intelligence to enable decision-making for a more efficient and reliable business operation.

[15] Lilian Harada1, Yuuji Hotta1, Tadashi Ohmori. Detection of Sequential Patterns of Events for Supporting Business Intelligence Solutions. Computer Society. IEEE. Proceeding of the International Database Engineering and Application Symposium (IDEAS'04)

References

"Anonymous" Information Technology Business. Atlanta: Jun 30, 2008. p. 54.

Bruce A Stewart. Computer World. Framingham: Aug 22, 2005. Vol. 39, Issue: 34, pp. 20-22.

Hugh J Watson. Business Intelligence Journal. Seattle: Third Quarter 2006. Vol. 11, Issue: 3, p. 4-6.

Hugh J Watson, Dave Donkin. Journal of Global Information Technology Management. Marietta: 2005 Vol. 8, Issue: 4 , pp 1-6.

Jan P. Herring "Business Intelligence in Japan and Sweden: Lesson for the US" The Journal of Business Strategy. March/ April 1992. P.44-49.

Laplante, Philip A. Penn State University IT Professional Jan.-Feb.2008 Volume: 10, Issue: 1, p. 62.

Lee Begeja, Harris Druker, David Gibbon, "Semantic Data Mining of Short Utterances" IEEE on speech and audio processing, vol. 13 no.5 Sept. 2005 p672.

Lilian Harada1, Yuuji Hotta1, Tadashi Ohmori. Detection of Sequential Patterns of Events for Supporting Business Intelligence Solutions. Computer Society. IEEE. Proceeding of the International Database Engineering and Application Symposium (IDEAS'04)

Lina Zhou, " Data Mining for Detecting Errors in Dictation Speech Recognition" IEEE on speech and audio processing, vol.13 no.5 Sept. 2005 page 681.

Ling Feng "Fuzzy Linguistic Representations to Provide Explanatory Semantics for Data Warehouses" IEEE on knowledge and data engineering, vol. 15 , No. 1 Jan.-Feb. 2003 p. 86.

Mark I Hwang, Hongjiang Xu. Business Intelligence Journal. Seattle: Fall 2005. Volume:10, Issue: 4, p.7.

Shona Douglas, Deepak Agarwal, Tirso Alonso, “Mining Customer Care Dialogs for Daily News” IEEE on Speech and Audio Processing, Vol.13, No. 5, Sept. 2005.

Wastson, H.J. Wixom. Univ. of Georgia Athens Computer. Sept. 2007 Volume: 40, Issue: 9, pp.:96-99.

Watson, H.J. and Swift, R.S. (2002). "Data Warehousing Around the World " Journal of Global Information Technology Management, Vol. 5, No.2, pp. 1-6.

Yucel Saygin, Arnold Reisman, and YunTong Wang, “Value of Information Gained From Data Mining in the Context of Information Sharing” IEEE on Engineering Management, Vol.51 No.4, Nov.2004.