Business Intelligence as a Knowledge Management Tool in Providing Financial Consultancy Services

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Abstract The main objective of this paper is to elaborate how Business Intelligence (BI) as a knowledge management tool could help consultants in providing professional services to the financial sector. The Business Intelligence (BI) solution could be a competitive advantage for the consultants if they are able to exploit the Business Intelligence (BI) tools and technology such as Data Warehouse, Data Mining, On-Line Analytical Processing (OLAP) and Extraction Transformation Load (ETL). The consultants can use Business Intelligence (BI) solution to analyze the organizational data such as structures and business processes of the Financial Institution. By analyzing the organizational data, the financial institution can improve and streamline functional efficiencies to not only bolster up sales and marketing strategies and better develop customer services program, but also mitigate risk by developing more appropriate risk management actions. In brief, by having this competitive advantage, the consultant will be able to withstand in the market, which is always changing.

Keywords: Business Intelligence (BI), Knowledge Management (KM), Data Mining, Data Warehouse, Extraction Transformation Load (ETL), On-Line Analytical Processing (OLAP)


1. Introduction

In 2008, Business Intelligence (BI) was the number one technology priority for the third year in a row (Gartner, 2011). It has become the top presidency of Chief Information Officer (CIOs) since it (BI) can have a direct positive impact on business performance of an enterprise. The capability to complete the task by making brighter decision at every level of the business is another significance that what Business Intelligence (BI) can improve dramatically.

Most leading corporations expect personnel in every role to seek fresh and intelligent ways to improve performance, increase employees’ effectiveness, and grow profit and stronger customer relationship. In order to achieve these expectations, Business Intelligence (BI) is the answer. Supporting decision-making at every level, modifying managers, executives and knowledge actors to take the most efficient action in given situations are the reasons why most leading organizations require Business Intelligence (BI) as a essential element.

Business Intelligence (BI) strategy must be aligned with the organization objectives, advance business and improves knowledge management. Business Intelligence strategy (BI) helps organization in creating the best utilize of information with tactical, strategic and operational decision-making.

Generally, the use of Business Intelligence (BI) in financial services has provided values. A survey conducted by Gartner, Inc found that more than 95 percent of banking answerers agreed that Business Intelligence (BI) is a strategically first step driven by senior management. The respondents are from banks, insurers and nonfinancial businesses. Gartner, Inc also found that more than 90 percent agreed they received the value awaited from their Business Intelligence investment.

Nowadays, most financial institution depends on Business Intelligence (BI). Financial services include banking (saving and loans, commercial banks, mortgage banks, credit union), securities and exchange (brokerages, investment banks, investment advisor), and international finance. The financial institution could exploit Business Intelligence (BI) as a competitive advantage.

In this competitive market age, financial sectors must have strategies to survive. Generally, a financial sector has huge amount of data that they process everyday, which is stored in their complex system. The efficient analysis of the data is very important and will determine the success of the financial industry. The way a Financial Institution in analysing the fraud, risk and customer behavior are very critical. Business Intelligence (BI) has been used for a years in order to help a company to solve this kind of problems, because Business Intelligence (BI) can handle huge amount of data for the comprehensive analysis.

2. Literature Review
2.1. Business Intelligence (BI)

(BI) comprises a wide variety of applications for analysing, gathering, storing and making data easily accessible to help users to make better business processes. A good Business Intelligence (BI) definition must encompass both business purpose and technical functionality. Business Intelligence (BI) tools that are widely used are Data Warehouse, Data Mining, Extraction Transformation Load (ETL) and On-Line Analytical Processing (OLAP) (See Figure 1).

![Figure 1. Business Intelligence](image1)

2.2. Data Warehouse

Data warehouse is an integrated collection of the summarized and historic data, which is collected by the spider web environment from internal and external data sources. Data warehouse is user friendly especially for business analyst and manager (Radonic, 2007). It collects relevant data to the repository where it is validated and organized to serve the decision-making objectives (Rao & Kumar, 2011).

2.3. Data Mining

Data mining is a process of discovering patterns, correlation and trends by modifying through the large amount of data, which stored in the warehouse. Recognition technologies, statistical and mathematical techniques are normally used in Data Mining technology.

2.4. Extraction Transformation Load (ETL)

Extract, transform and load - is set of actions by which data is extracted from numerous databases, applications and systems, transformed as capture, and loaded into target database - including, but not limited to, data warehouses, data marts, analytical applications, etc.

2.5. On-Line Analytical Processing (OLAP)

(OLAP) technology allows users to explore and analyse a huge amount data, involving complex computation and their relationship. On-Line Analytical Processing (OLAP) tools are a combination of graphical user interface (GUI) and processing procedures, which is produce a visual result in different perspectives to the users.

3. Knowledge Management

Knowledge Management (KM) is the collection of processes that govern the creation, dissemination, and utilization of knowledge. (KM) this is, as the word entails the power to handle “knowledge” and right knowledge available to the right people. It is about making sure that an organization can learn, and that it will be able to retrieve and use its knowledge assets in current applications as they are needed. In Peter Drucker paper, he defines Knowledge Management (KM) as the coordination and exploitation of organizational knowledge resources, in order to create benefit and competitive advantage.

Knowledge Management (KM) is not always about technology, but also about understanding how the people work, brainstorming, identify groups of people who work together and how they can share and learn from each other and in the end the organization learning about their workers experience and about the leadership the organization (Arora, 2011).

![Figure 2. Business Intelligence Architecture](image2)

![Figure 3. Knowledge Management](image3)

In Rao and Kumar paper, they explain that Knowledge Management (KM) is the practice to add actionable value to the information from the tacit to the explicit knowledge using storing, filtering retrieving and disseminating explicit knowledge and also by testing and creating new knowledge. "Knowledge Management (KM) will deliver outstanding collaboration and partnership working. It will ensure the region maximizes the value of its information and knowledge assets and it will help its citizens to use their creativity and skills better, leading to improved effectiveness and greater innovation", West Midlands Regional Observatory, UK.

4. Financial Services
Financial sector has definition as a class of ancestries carrying business firm, which offer financial services to the customer and commercial (investopedia.com). The financial sector includes insurance companies, real estate, investment funds and banks. Moreover, the financial services perform best in low interest rate environments while in large portion, this sector needs generates the revenue from mortgage and loans. Furthermore, when the business is, this sector benefits from the additional investments.

The challenges in the financial services are:
1. Developing and changeable regulative surroundings,
2. Continued focus on risk management,
3. Expansion of products and services,
4. Disbursement direction and restructuring,
5. Security and privacy risk keep coming,
6. Ensuring data integrity and proper data management,
7. Model risk management,
8. Derivatives reform,
9. Balancing incentive compensation,
10. In closing.

Wall Street, Fleet Street and Main Street: Corporate integrity at a Crossroads, A recent survey of the financial services industry in United Kingdom and United States revealed the wrongdoing in the financial industry. Among the key finding are (Wehinger, 2013):
1. 26% of respondents indicated that they had observed or had first-hand knowledge of wrongdoing in the workplace.
2. 16% of respondents would commit a crime (inside trading) if they could get away with it.
3. 24% of respondents believed that financial service professional need to engage in illegal activity in order to be successful.

5. Implementation of BI as KM Tools

To implement Business Intelligence as Knowledge Management tool to provide financial consultancy, many BI tools are available. Following are some of the example.
1. Enterprise BI tools,
2. Databases or packaged BI tools,
3. Visual Data Discovery tools,
4. Pure reporting tools.

Many organizations, both private and public, are currently evaluating or deploying Open Source BI tools (OS BI) like JasperSoft, Pentaho or SpagoBI. These three leading open source Business Intelligence suites offer a full range of Business Intelligence capabilities, ranging from ETL to ad-hoc analysis and reporting.

6. The Limitation of Business Intelligence (BI) and Knowledge Management (KM)

(Kascelan, 2011) try to elaborate some limitations in Business Intelligence systems especially on small companies, the reason are:
1. The initial price of the system is costly which even can reach one million euros of the big companies.
2. Data mining tools use sophisticated tools and they require the company to give additional training or even hire external consultant which increase the costs of implementation.
3. The time of implementation take a long time (6 months- several years). It gives disadvantages to the company which have limited financial assets.
4. Uncertainty in the success of implementation. The research from Gartner reveals that 2,000 data warehouse projects, only 20% are succeed.
5. A poor quality of source data is responsible for the majority of the time and cost overruns during the implementations. This is because the small companies has obsolesce of standard information system.

Based on (Joo & Lee, 2006), they doing research on the factors which are lead to dissatisfaction to the knowledge management’s users, they divided the factors by two categories:
1. Restriction factors of System Quality:
   i. Time and Space: time and space limitation in the Knowledge Management (KM) system use and limitation of access methods.
   ii. Inconvenience: the degree of discommode of the system which is resulting the slow response and imbalance.
   iii. Knowledge search: the limitation of keyword-based search and also limited knowledge categorization.
   iv. Knowledge consolidation: the restrictions in integrating of heterogeneous systems as knowledge resources and integration of the existing Knowledge Management system with the Web resources.
2. Limitations factors of Knowledge Quality:
   i. Incongruence and rawness of Knowledge: the degree of incongruence or incompleteness of knowledge proffered by the KM system.
   ii. Untrustworthiness of Knowledge: the degree of inaccuracy and untrustiness of knowledge proposed by the KM system.

The result of the research are have significant affirmative answers, the limitations factors for system quality such as search and integration, inconvenience and system quality positively affect user dissatisfaction with the Knowledge Management (KM) system. Moreover, the limitations components of knowledge prime such as incongruence/ inexperience and untrustiness and increase the dissatisfaction.

Figure 4. Business Intelligence (BI) and Knowledge Management (KM)
Business Intelligence (BI) makes for as educating worthwhile information and discover hidden patterns in internal and outside source of data. The main aim is to melliorate knowledge on the information which accords the top manager to create efficient decision to achieve organizational objectives. But, the majority of organizational knowledge is in unstructured form or in the minds of the employees. Furthermore, Knowledge Management (KM) plays to encompasses both tacit and explicit knowledge within the organizations increase the organization carrying into action by providing cooperative tools to create, acquire and contribute the knowledge within organization. (Khan & Quadri, 2012).

Business Intelligence (BI) and Knowledge Management (KM) are the main tools to achieve the organizational tool by providing the environment which users receive, desired and reliable and also timely information or knowledge. The organizations need both BI and Knowledge Management (KM) as an integrated system to get value from explicit and implicit knowledge (Khan & Quadri, 2012).

### 7. The Similarities and Differences between Business Intelligence and Knowledge Management

Fundamentally, Business Intelligence and Knowledge Management have the same aspires. Attaining the level best degree of empathizing of one’s controlling environment and pertinent considerations that can be bring forward or delay advancement toward an aim is one of the purposes of Knowledge Management (KM). No matter how the same principle implements to the idea of Business Intelligence (BI). Supporting strategic decision-making, growing the business and monitoring competitor of organization are the purpose of conducting Business Intelligence (BI). Undoubtedly, there are absolute similarities between Knowledge Management as well as Business Intelligence.

Knowledge Management and Business Intelligence are established on information technology. They depend on the Internet, hardware, software, database storage technology. Besides that, their application in business processes both includes accumulating, collating, dealing and the use of information and knowledge. In addition, both accomplish their function depending on information and knowledge. It undoubtedly true that Knowledge Management (KM) and Business Intelligence (BI) is interacting and complements each other.

Generally, the focus of Knowledge Management (KM) is cognition. It specifically interested about people have good noesis, cultural behavior. It also stressed the significance of the knowledge innovation and whether it is leveraged effectively. In the same way, Business Intelligence (BI) initially concentrated on technology and data, the applied effect of which in fact is closely related to the skills of user as people normally use quantitative analysis of technical expertise to solve business problem with the assistance of business intelligence system.

There are some fundamental differences, while both Business Intelligence (BI) and Knowledge Management (KM) concepts have similarity high-level objectives. The differences are to be found in the manner in which they are applied toward achieving that goal. While the value of Business Intelligence (BI) and its product, opportunity analysis is found in its usefulness as a decision making tool, the value of Knowledge Management (KM) relies in the ability of the organization to identify, capture and reuse knowledge and in particular best practices in such a manner that can save the organization time, effort and resources.

Another difference between Knowledge Management (KM) and Business Intelligence (BI) is the intension. Business Intelligence (BI) developed gradually through transactional serving systems, like administrative information system, management information systems and decision support system. Knowledge Management (KM) is the management idea and methods in the development of the knowledge economy era. It emphasized that knowledge is most important resource and strategic capital, the corporate competitor advantage relies on knowledge creation, dissemination and utilization.

Beside the connotation, both have difference in the focus. Business Intelligence mostly deals with data resources. As its aim to make information resources orderly and structured, the whole process of Business Intelligence (BI) is relatively closed and independent. Business Intelligence (BI) also focuses to the combining and integration of the external morphology of information. Opposite side, the Knowledge Management (KM) system deals with knowledge resources, knowledge sharing and innovation are the primary goals of it. For organization, while Business Intelligence (BI) manages with objective information in the real world, Knowledge Management system tends to action immanent and personal knowledge.

Lastly, the difference between Business Intelligence (BI) and Knowledge Management (KM) is the core technology. The core technology of Knowledge Management also imply in document management, groupware engineering science, text mining, retrieval technology, enterprise knowledge portals and so on, Business Intelligence (BI) on the other side attach more than meaning to data analysis and its core technologies consist of data warehousing, online analytical processing, data mining and enterprise portals.

### 8. Business Intelligence (BI) and Knowledge Management in Financial Sector
Business intelligence has gained acceptance in the most financial sector, even though there are many definitions of Business Intelligence (BI), however Knowledge Management (KM) has mixed response. Knowledge Management concept in organization has struggled because they frequently attempted to enforce huge enterprise-wide knowledge management projects failed. The complexity is another reason why the implementation failed.

**Banking Operation**

Figure 6 shows how the strict and rigorous competition and market in bank’s operation which are further regulated and restricted by several international and national authorities who demand prompt and constant auditing and reporting to assure the stockholders and supervisors of stability (Radonic, 2007). The figure also shows customer relationship management and business intelligence is needed in relationship to the clients and Human resource, Business Intelligence and business process management to their employee.

The globalization, mergers, deregulations and acquisitions, competition from non-financial institutions and technological innovations make the company to always to rethink about their business strategy. In this case, financial services have to create new revenue streams, enter new markets, gain market share and reduce operational cost and also must concern about the customer expectations.

The application of Business Intelligence (BI) in banks can be summarized as follows: (Rao & Kumar, 2011)

**Bank performance:** It is about analysing the historical data of the institution to make decision on the future. The key performance indicators are deposit, credit, profit, income, branches, employees etc.

**Marketing:** Marketing is the most widely used for data mining in the banking industry. Usually it is been used for analyse the customers, in term of their preferred product or services.

**Risk management:** With the uncertain and changing market, it’s also affected financial situation. Lack of the knowledge may have great risk in the future customer. Especially in banks there are present risk of payment default, fraud, theft and operational risk connected with internal procedures and processes.

**Customer segmentation:** Most business activities are focusing on the customer. All business activities must understand who their customer is. The segmentation is a method of grouping customer based on their character or patterns which will help the organization to understand whom and where the product target.

**Fraud detection:** According to Decker, there two approaches to detect the fraud. First, the bank taps the data warehouse of a third party and use the data mining to identify. Second, using bank’s own internal information.

**Budget planning:** Try to understand the performance indicators from a specific area and calculated from the existing information from the system.

The Figure 7 shows the knowledge management technologies. In a traditional Business Intelligence (BI), the system must provide capabilities such as business process management, collaborative portal, and business planning software, portals and content management systems and be able to support more timely data feeds.

**Knowledge Management (KM)**

The Figure 8 illustrates the knowledge cycle on how the Knowledge Management (KM) can help the business to improve their processes. The figure shows how the Business Intelligence which contents information becomes the central role in knowledge management. It has data, business context, decision, action and the collaboration of experts.
In order to support all major financial and accounting activities, most financial institutions have implemented software. Customer Relationship Management and Supplier Management software are the most powerful systems that have become trend in managing relationship with customers and suppliers. However, the main purpose of these systems is to record, organize and retrieve information that resides in their specific database. But, these systems are not built as analysis tools.

Although some systems offer limited analytical features, but the features are cover only their own application’s database and cannot be used with other systems in the company. Consequently, it is very difficult to get access to summarize as well as detailed information through a single user interface. So, the people who responsible for operating different systems will have a great deal in writing, maintaining and printing their report for management. This is the reason for one of today’s great frustration of corporate managers and analysts.

There are some limitations and issues in decision-making based on static reports from different systems:
1. Information overload,
2. Lack of information,
3. No interactivity,
4. Lack of unified cross-database analysis tools.

Implementing a Data Warehouse with modern Business Intelligence (BI) software can be the solution to the problem of a poor analytical environment in a company. The poor analytical environment will have multiple data sources, different report writers and lack of analytical tools.

It is finally becoming feasible for financial institution to implement Data Warehouse that can be updated and maintained with relative case by utilizing modern ETL (Extraction Transformation Load).

A common data repository is resulted, which provides decision makers with endless possibilities for investigating (Data Mining) and analysing variances, trends and exceptions. Because a modern Business Intelligence (BI) solution feeds off a frequently updated Data Warehouse that includes detailed information. This becomes a tool for any person within the organization or related to it who needs easy and fast access to summarized and detailed information from across the database of company and it becomes much more than just a tool for executives.

There are some key features that offered by many Business Intelligence tools. The some key features are:
1. Drill-down,
2. Graphs, charting and trees,
3. Exception highlighting,
4. Pivot rows and columns,
5. Drag and drop dimension into the current view or to the background,
6. Custom calculations,
7. Queries,
8. Comments,
9. Combo views,
10. Dashboards,
11. Business Intelligence (BI) and web portals,
12. Distribution of cubes/reports,
13. Other popular analytical features (ranking, filtering, sorting, etc).

Most financial manager found difficulties in asking new data from one or more of the corporate information systems to the Information System (IS) department. Because, the feedback is rarely what financial manager asked for. Not all people in Information System (IS) department would understand about finance smatters such as the difference between debit and credit, Year To Date (YTD) or periodic balance.

In some leading organizations, they are specializing some of their Information System (IS) staff by hiring Information System (IS) personnel into the accounting department trying to deal with these barriers. This is an expensive solution and does not necessarily solve the problem.

In order to meet the never-ending request for more financial information, the proactive approach for the financial department seems to be to become self-supplied with timely financial information and better quality on the data.

Over last few years, there are many companies have succeeded to create proactive approach by creating Data Warehouse that host data from disparate sources and making them available to end user through Excel, Internet browser and On-Line Analytical Processing (OLAP) or managed query tools.

9. Conclusion

In conclusion, this paper describes how business intelligence plays its role as knowledge management tool to give benefit to the financial sector which always has fast-changing market and vast-amount of data. The business intelligence plays role to extracting the hidden patterns and valuable information from internal and external source of data. Moreover, the knowledge management has roles to cover the tacit and explicit knowledge within the organizations, which has function to enhance its performance. It can be said that business intelligence sustains the knowledge management to maintain and enhance the performance of financial organization.

The leverage of Business Intelligence (BI) as a Knowledge Management (KM) tool could be competitive advantages for the financial consultancy. Because, Business Intelligence (BI) solution helps consultants provide professional services to the financial sector. Business Intelligence (BI) solution might be the collaboration between any Business Intelligence (BI) tools and concepts. So, the consultant must have a competitive advantage to remain in the global market that keeps changing every time.

References


