

Evaluation of Business Intelligence Maturity Level in Albania Banking Systems

Blerta Moçka^{1*}, Gudar Beqiraj² and Daniel Leka³

Faculty of Economy and Agribusiness, Agricultural University of Tirana, Albania; Kodër Kamëz, Tiranë, Albania¹

Academy of Sciences of Albania, Albania; Square Fan Noli, Tirane, Albania²

Albanian Mobile Communications (AMC), Albania; St. Gjergj Legisi, Laprake, Tirane, Albania³

Abstract

The banking service industry is changing rapidly. It is under the pressure of responding quickly to the changing conditions and factors such as globalization, deregulation, mergers and acquisitions, competition from non-financial institutions and technological innovation. Many large banks in the world have been using Business Intelligence (BI) computer software for some years to help them gain competitive advantage. With the introduction of cheaper and more generalized products to the market place, BI is now in the reach of smaller and medium sized companies. Guided by these factors, the banking systems in Albania are adopting Business Intelligence (BI) technologies, Data Warehouse (DW) and systems that help the decision making process. BI is the process of transforming raw data into meaningful information to enable more effective business insight and decision-making. This study examine the key components on improving BI operations and the benefits gained from Albanian banking industry in using Business Intelligence. The detailed evaluation in the maturity level of Albanian's banking systems BI activities is the goal of this research paper.

Keywords

Business Intelligence (BI), Data Warehouse, Banking systems and CMMI model.

1. Introduction

Nowadays, banks and financial institutions have over the years compiled huge amounts of business and customer data into large electronic repositories. They have large volumes of detailed operational data, but key business analysts and decision makers still cannot get the answers they need to react quickly

enough to the changing conditions given that the data are spread across many departments in the organization or are locked in a sluggish technology environment.

Is the maintenance of the data an obligation, an asset or just another regular task for them? This data will always be a liability as long as it is locked inside the repositories. This information is the most important asset of any organization. To turn data into an asset, its inherent value needs to be stored and analyzed. There are two main purposes in the use of this asset:

- Data capturing for operational record
- Data analyzing for decision making

The first one, is optimized to process everyday transaction quickly. It registers clients, take orders, monitors the status of operational activities, and other operations in bank. The employers of an operational system turn the wheels of the organization. Operational systems do not maintain history they are used to put the data in and to reflect the most current state of the organization.

The second one is where we get the data out to evaluate the performance of the organization. For this purpose Business Intelligence (BI) systems are used to count the new client and compare them with last week's results, and ask what the new customers want and what they are complaining about. It can help banks to improve products, enhance customer relationships, make better forecasts based on the past trends, handle competition, manage risk, increase operational efficiency. BI outputs give organizations a better understanding of their present circumstances, so that they may take the right course of action in the future.

BI is a set of tools, technologies and solutions designed for end users to efficiently extract useful business information from a set of data. Institutions that are interested in implementing efficient BI capabilities require much more than just the collection and storage of data. Banks and technology

*Author for correspondence

vendors need to bring many moving pieces together. This includes the right sourcing strategy, software applications, technology tools, business processes, collected data, company metrics, incentives, corporate culture and project management skills (Datamonitor, 2007 [5]).

2. Business Intelligence

In literature, BI is both defined as a process and a product. The process is “composed of methods that organizations use to develop useful information, or intelligence, that can help organizations survive and thrive” (Jourdan, Rainer, and Marshall, 2008 [10]). The product is the information that allows organizations to more accurately understand current and predict future behaviors of “competitors, suppliers, customers, technologies, acquisitions, markets, products and services, and the general business environment” (Vedder, Vanecek, Guynes, and Cappel, 1999 [17]). Successful organizations improve the value of their customer base by reducing the rate of defections, increasing the longevity of the relationship and enhancing the growth potential of each customer (Kotler and Keller, 2009 [11]). BI can be used to mine customer relationships (Phan and Vogel, 2010 [16]), identify profitable customers and facilitate retaining them by understanding individual behaviors (Jaffri & Nadeem, 2004 [9]). Organizations can gain a competitive advantage with successful implementations of BI (Jaffri & Nadeem, 2004 [9]), by recognizing “their raw transactional data as a valuable source of unique information” (Gunnarsson, Walker, Walatka, & Swann, 2007 [7]).

Given that banks receive a vast amount of information from different resources, the main problem in taking the operational decision is to focus on the right information. In today’s rapidly changing business environment, organizational resourcefulness depends on operational monitoring of how the business is performing and mostly on the prediction of the future outcomes which are critical for a sustainable competitive position. Intelligence becomes an asset only if it is used (Flud, 2003 [6]). Implementing a BI system can help to identify the causes and reasons of certain occurrences thus, helping the business to make predictions, calculations and analyses; so that the needed knowledge is successfully extracted from the data and that the proper decisions are made. BI consists of a wide range of analytically software's that provide the

information necessary for every user of the business, such as analyzers, managers and operators to make a better decision. The information is in real-time and supports reporting on every organizational level.

According to Blomme, traditionally, BI systems provide a retrospective view of the business by querying data warehouse which contain historical data. On the contrary, contemporary BI-systems analyze real-time event streams in memory (Blomme, 2010 [1]).

BI is implemented to give users access to information in their systems in an automatic and efficient way. The users need not to have any technical knowledge of the underlying system because all the gathered data are performed automatically by the BI systems (Ritacco, 2003 [13]).

3. BI technology in banking

The financial service industry is influenced by some factors such as globalization, integration, growing competition, product and market innovations, re-engineering of processes, and other trends. Financial institutions must also manage risk and comply with regulatory requirements such as Basel II accord and IAS (Curko, 2007 [4]). To be successful, financial institutions must (Howson, 2008 [8]):

- Monitor all aspects of client relations;
- Identify and retain the most profitable customers;
- Attract new customers from competition;
- Correctly measure products’ and organizational productivity;
- Recognize new markets and needs for new products.

Efficient Business Intelligence connects business with information technology (IT) so that the available resources can be allocated with respect to their own capabilities, as well as provides intelligent problem solutions (Ranjan, 2008 [12]). Figure 1 describes the BI environment, which integrates many of the business processes (ERP, CRM, etc) into multiple applications that serve the primary source of data. Once the data are gathered and stored in a DW they can be easily analyzed with the help of BI tools, such as reports, OLAP, and data mining. These analytic tools have the potential to provide actionable information that can be turned into valuable information on which the companies base their decisions.

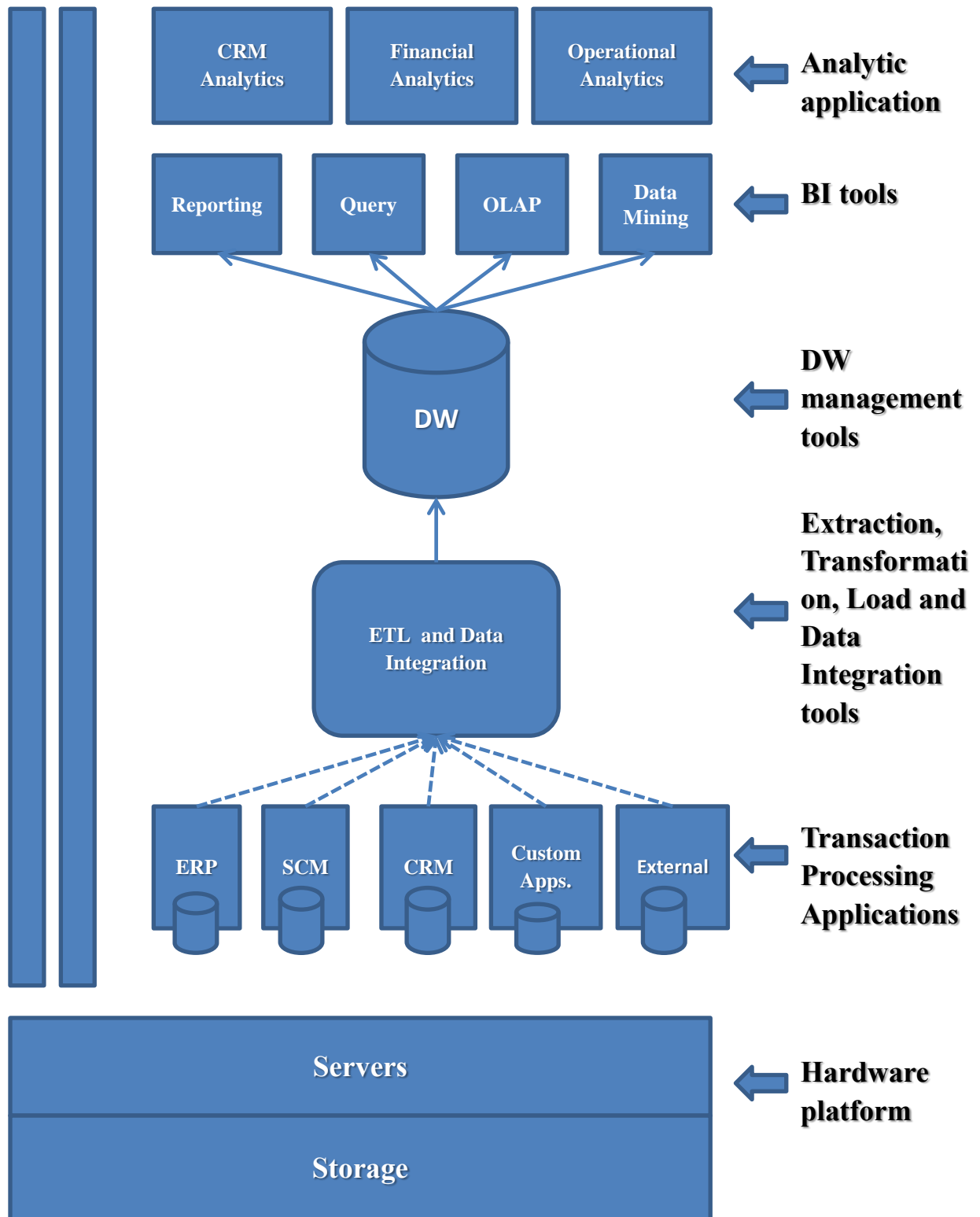


Fig 1: BI environment

With appropriate planning, banks can move their operational database data into a data warehouse and then further exploit that data with OLAP and data mining techniques to create a strong Business Intelligence solution and increased value for their membership. (O'Brien, 2011 [15]).

4. BI Maturity model

To evaluate the application of BI solution for banking systems in Albania one maturity model CMMI is used (Capability Maturity model Integration) (CMMI Product Team SEI, 2010 [3]). This maturity model measure and track progress in the bank organization that is using BI (Figure 2).

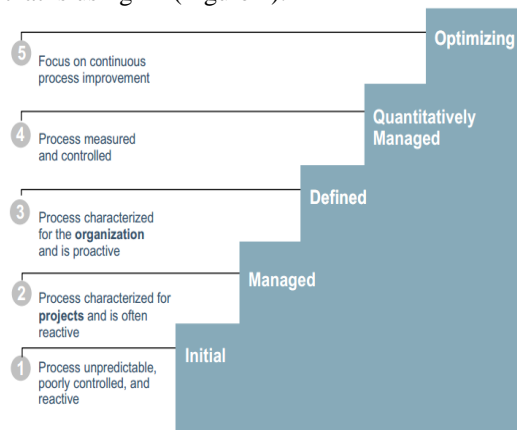


Figure 2: The maturity level (Carienge Mellou, 2005 [2])

At *Initial*, maturity level 1, processes are usually ad hoc and chaotic. The organization usually does not provide a stable environment to support processes. At *Managed*, maturity level 2, work groups establish the foundation for an organization to become an effective service provider by institutionalizing selected Project and Work Management, Support, and Service Establishment and Delivery processes. Work groups define a service strategy, create work plans, and monitor and control the work to ensure the service is delivered as planned.

At *Defined*, maturity level 3, service providers use defined processes for managing the work. They embed tenets of project and work management and services of the best practices, such as service continuity and incident resolution and prevention, into the standard process set.

At *Quantitatively Managed*, maturity level 4, service providers establish quantitative objectives for quality

and process performance and use them as criteria in managing processes. Quantitative objectives are based on the needs of the customer, end users, organization, and process implemented.

At *Optimizing*, maturity level 5, an organization continually improves its processes based on a quantitative understanding of its business objectives and performance needs. The organization uses a quantitative approach to understand the variation inherent in the process and the causes of process outcomes.

Since BI is a process, we used CMMI model for testing the improvement of banks in this process. This process has three levels: acquiring the data, analyzing the data, and taking action based on the data. These levels are used as independent variables and BI maturity level is considered as dependent variable.

5. Analyses questionnaire and result

To collect the needed data we used e questionnaire. It is valid and reliable. The model which is used for the BI processes modeling is as shown in Tab. 1(Najmi, M. Sepehri, M. & Hashemi, S. 2010 [14]).

Table 1: The sub processes of BI

Factors	Construct
Acquire the data	Data gathering
	Extraction
	Transformation
	Data storage
	Data warehouse
Analyze the data	Reporting and dashboard
	Online Analytical Processing
	OLTP
	Data Mining
Take action based on the data	Business strategist

Therefore we just need to know what the maturing level of these processes in Albanian Banking is. Each main process and sub process is assessed according to CMMI maturity levels. For each question at a structured questionnaire, we used a scale from 0 to 5, as defined by CMMI. Here are the results calculated in MS Excel.

5.1 Process of data acquisition

At this phase Data are extracted from this environment and stored in the data warehouse describes in Figure 3.

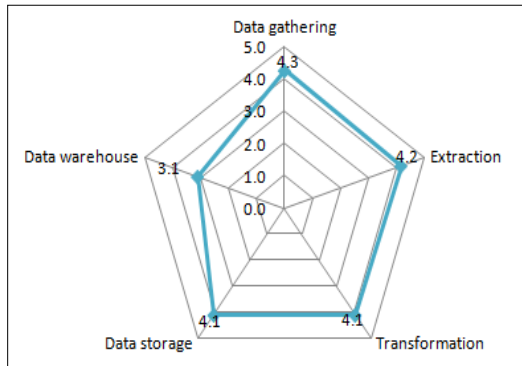


Figure 3: Chart for the process of acquiring the data

- Data gathering is the process of gathering the data from different sources. The data in Albanian banking are gathered through ATM, POS, client, and the process is done automatically and systematically.
- Data extraction is the process of receiving data from the operational environment, like transnational tables or NoSQL database for moving data into the warehouse. In Albania banking there is not any automatic process or specific software, but they are very interested in this process.
- Data transformation is the process of converting data from different systems and formats into one consistent format. In Albania banking this transformation is done through different applications, which are not integrated as they should.
- Data cleaning is the process of removing errors from the input stream. In banking this process is done just for financial purpose twice a year.
- Data storage contains the row data of the data warehouse. This process needs to be done automatic. It includes regular control, backup and recovery, monitoring every 24 hour and is considered completely.
- Data warehouse is not a unique and integrated in all Albanian banking industry. This activity is done by different tools for different applications

5.2 The process of analyzing the data

This phase regains data and presents them to the decision maker (Figure 4).

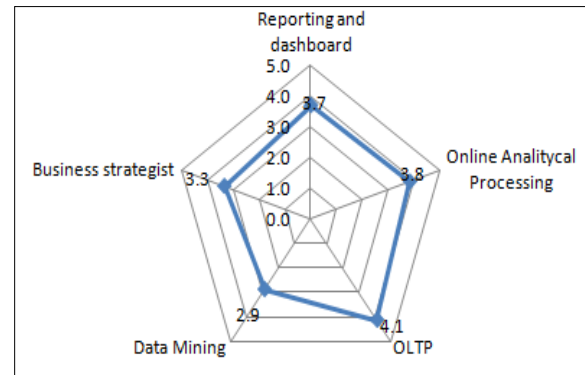


Figure 4: Chart for the process of data analysis

- Reporting and dashboard tool need to be as clear and straightforward as possible to get the data to employees who may want it. In Albanian banks, that is not any integrated system for extracting any report from that. There are systems in some banks that extract card switch transaction efficiency information from that.
- OLAP (OnLine Analytical Processing) permits the business person to present the data in multiple dimensions at time. In Albanian banks there are not specific analytically processes, but analyses are done by statistical tools or by manager according to the reports.
- OLTP (OnLine Transaction Processing) refers to processing and responding immediately to the user request by the system. An ATM (Automatic Teller Machine) is an example of this. OLTP systems are implemented in Albanian banking as the main database and all the processes are doing online on the data. OLTP should be monitored all the time and should be updated regularly.
- Data mining in Albanian banking industry is not integrated as classified and estimated.

5.3 The process of taking action based on the data

This phase is the main factor of BI process. Decision making process takes information from BI tools and

defines some course of action. Decision maker of the organization can be considered lower employees, partners and customers. The figure below show the entire questionnaires with the average value calculated. For each phase is the output and the maturity score.

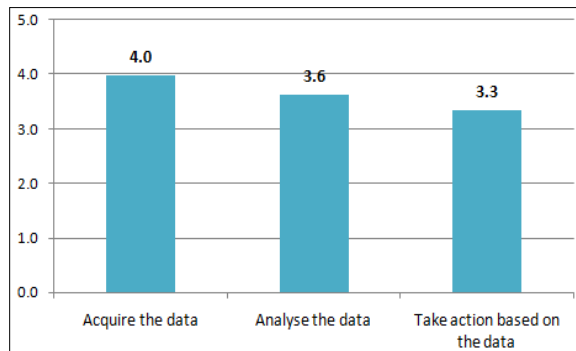


Figure 5: BI process maturity in Albanian banking

As it is shown all levels of the process are weighed 3.3 to 4.0 which mean that the BI process in Albanian banking industry is between level three and four, Defined and Quantitatively Managed, of CMMI.

6. Conclusions

According to the results from the questionnaires the maturity level of BI in Albanian banking industry is at level three and four. It means that we have some defined processes in the implementation of BI for doing BI and they are established quantitatively. BI includes three main processes of:

- **Acquiring the data is at level four.** It means that there are some measured and controlled processes for that. In more details we found out that data gathering, extraction, transformation and storing are better managed and applied. But data warehouse process is at level three, which means it is defined but it still needs to be more quantitatively managed.
- **Analyzing the data, is between level three and four.** It means that sub processes are well defined and becoming better managed. The worse sub process is data mining.
- **Taking action based on data is at level three.** The banks are interested in analyzing and taking actions based on the analyses of

the data. Practice processes are established in these banks.

In Albania there is only one public bank and the others are private. The research shows the maturity level of BI sub processes in the banking industry. A picture of each sub process is given in figure 6, where we can understand the worst and the best BI sub processes.

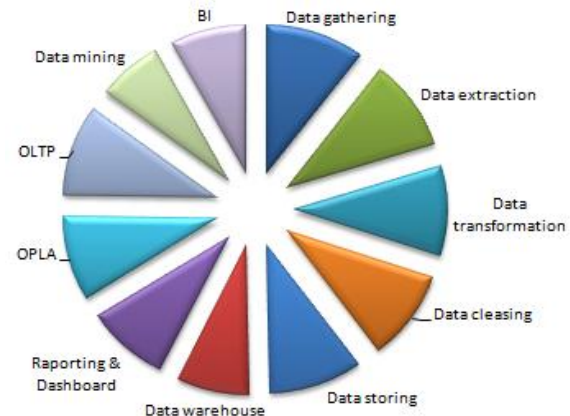


Figure 6: BI maturity level based on its sub processes

Considering that this research has started many years ago, we can definitely emphases that Albanian banks are embracing BI solution for their needs, but still there isn't a full integration BI framework in banks IT infrastructure. As clearly described during this article, the goal was to provide a snapshot of the current Business Intelligence usage in Albanian banking systems. The only suggestion that we could give for each bank is to improve the data warehouse as the key sub processes of BI, doing so they can improve their maturity level of BI. This opens new opportunity to present BI solution to Albanian banking systems from BI vendors.

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Blerta MOÇKA graduated on Computer Science at the Faculty of Natural Sciences where she obtained her MSc in 2009. Joined the PhD program March 2012. Interested in the field of Business Intelligence, Database and Programming. Current position Lecturer at Faculty of Economics and Agribusiness, Agricultural University of Tirana and part time lecturer at Faculty of Natural Sciences.
 Email: mocka.blerta@gmail.com



Gudar BEQIRAJ is Vice President of the Academy of Sciences of Albania. His research activity includes development of different algorithms and programs applied in Albania in domains such as geology, geophysics, agriculture, medicine, and other. Publications: Books in the field of informatics and its application in geophysics, many scientific articles, two books on the sport.



Daniel LEKA graduated on MSc Information Technology at the Pyrotechnical University of Tirana. Current position Smart Metering (SM) Operation Coordinator at SM Pilot for Albanian Distributor Electrical Energy, AMC. His research activity includes Cloud Computing, Virtualization, Business Analysis, Data Analytics, Open Source, Management and Quality assurances.