

A Conceptual Framework for Marketing Intelligence

Teresa Guarda, Manuel Filipe Santos, Filipe Pinto, Carlos Silva, and João Lourenço

Abstract—Nowadays, customers demand faster customer service, and expect that organizations know them and provide appropriate services and recommendations for products quickly. Many organizations are reacting to these market needs by driving toward pervasive business intelligence, augmenting traditional business intelligence (BI) with the ability to capture, interpret and act immediately on data to make faster decisions. With pervasive business intelligence, organizations data warehouse changes to a system that can proactively and reactively interact with the business stakeholders, and it provides appropriate decision options to help marketers to respond and take action based on knowledge discovery in current integrated data. This work based on the literature review presents the Pervasive Business Intelligence state of the art and related areas, leaving open for proposing a conceptual framework to guide the development of activities of Marketing Intelligence.

Index Terms—Business intelligence, marketing intelligence, pervasive business intelligence, database marketing.

I. INTRODUCTION

The pervasive impact of business computing has made information technology (IT) an essential part of regular operations and a strategic element or key to all organizations. It is not difficult to realize that organizations have accumulated large amount of data. This data has different origins and reaches the organizations through a range of channels. It is strategically important to make these data available for decision making, even because customers demand faster customer service. The growing volume of data generated every day in organizations and the crescent competitiveness of the market, leads to the need to use tools capable of generating knowledge from stored data. In the global market where competition is fierce, companies increasingly need to reduce their profit margins to remain competitive. Thus, it is essential to use the information proactively.

The fierce global competition leads organizations to consistently obtain accurate information for decision-making in order to sustain its competitive advantage. It's crucial for an organization to be proactive, acting before its competitors, by having a constantly updated vision of market development, then the Information processing becoming the platform that enhancing competitive advantage [1].

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The analysis of large volumes of data is impossible without resorting to the appropriate software tools, making it essential to develop frameworks that help to automatically and intelligently, analyzing, interpreting and correlating data, enabling the development and selection of strategies for action [2]. In order to assist companies in this exploration of data, concepts and tools for organizing information are critical, highlighting the Pervasive Business Intelligence (PBI) and Marketing Intelligence (MKTI) as pillars to support the decision-making. The economic decline is impelling organizations to examine ways of retaining customers, speed up their services, spending less capital be more efficient regarding their budgets, and observing regulations. Business intelligence (BI) is the ability to access data from multiple sources in an organization and deliver it to appropriate business users for analysis. Manage the performance of the business means know what questions to ask and have the facts at hand at time to answer them, and this is what business intelligence delivers. With pervasive business intelligence, organizations data warehouse changes to a system that can proactively and reactively interact with the business stakeholders, and it provides appropriate decision options to help marketers to respond and take action based on knowledge discovery in current integrated data. Pertinent and accurate information from relevant and reliable sources entails to be successfully processed. This implies that a company needs to be confident it has the right information, at the right time, and dissembled to right people [3].

We propose a framework to guide the development of activities of Marketing. A framework of satisfying information needs for decision-making is complex and is compound by different activities to be exploited. This paper is organized as follows: after this introductory part we present related background concepts. Then, the main contribution is presented in terms of a framework proposal. Finally we draw some conclusions.

II. BACKGROUND CONCEPTS

A. Business Intelligence

An increasing number of organizations are making BI more largely available to all decision makers inside and outside the organization. Internally, leads to greater responsibility by all employees and greater management stability. Externally, relationships with supplier and partners can be reinforced through effective sharing of key performance indicators for mutual benefits. However, it is not easy to implement [4] in SMEs because of the following factors: high price; high requirements for a hard-ware infrastructure; complexity for most users; irrelevant functionality; low flexibility to deal with a fast changing dynamic business environment; and low attention to difference in data access necessity in SMEs and large-scaled

enterprises. But it's more important (and difficult) than ever today for organizations to make the right customer decisions. Companies know that the ability to frequently make the right customer decisions is essential to profitable growth, risk management and general performance. Due to non-controllable factors like fast-moving markets, economic and regulatory change, and new sources of competition, the right decision isn't a peaceful matter.

Although Howard Dresner being considered the father of the term "Business Intelligence" since he used the term in 1989, at the time an analyst at Gartner, Hans Pete Luhn was the first to use the term "business intelligence" in a paper with the title "A Business Intelligence System", published in 1958 by IBM [5]. Dresner was looking for a term to define the best tools that enabled access to information and quantitative analysis of the same, and describe the area as "concepts and methods to improve business decision-making by using fact-based support systems" [6], for Negash [7] "Business Intelligence is a data-driven DSS that combines data gathering, data storage, and knowledge management with analysis to provide input to the decision process.", Luhn defined business intelligence as "the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal." [8]. According to Barbieri [9], the BI can be understood as the use of various sources of information to define the competitive strategies of an organization.

Business Intelligence bridges between different systems and users wishing to access information. Provides an environment that facilitates access to information needed for day to day activities, allowing analyze the current situation of the business and its performance. Systems and BI tools have a key role in the strategic planning process of organizations. These systems allow collect, store, access and analyze organizational data in order to assist decision making [10].

B. Pervasive Business Intelligence

Pervasive Business Intelligence (PBI) emerges as a natural evolution of the application of BI in organizations, with a movement in two directions, vertical (top-down) and horizontal (cross-Departments), with an application from the strategic level to the operational level. There are various PBI definitions, is the ability to deliver integrated right-time data warehouse information to all users, providing the necessary visibility, insight, and facts to make decisions in all business processes [11]; PBI is the improvement of the strategic and operational decision-making capabilities of an organization, through the design and implementation of it as a whole (organizational culture, business processes, and technologies) [12].

The implementation of PBI in organizations is supported in applications that access the data in real time, supporting the actions of CRM and marketing campaigns. The application of PBI is enhanced when the front-line employees are in contact with the client and can generate new sales opportunities, up-sell and cross-sell [11]. PBI aims to integrate and align all processes to enable the delivery of relevant information to users who need to support decision making. According IDC there are five key factors with large influence on BI pervasiveness [12]:

1) Design quality: users' expectations about BI solution components are met.

- 2) Degree of training: satisfaction level with training on use of BI tools, and the use of analytics to improve decision making.
- 3) Prominence of governance: importance of data governance and associated data governance policies in BI system.
- 4) Nonexecutive involvement: nonexecutive management involvement in promoting and encouraging use of the BI tools at the organization.
- 5) Prominence of performance management methodology: importance within the organization of a formal performance management methodology.

C. Marketing Intelligence

According to Mackenna [13], the information technologies are an essential key component to react to market changes and satisfy customers, helping marketers in decision making and implementation of marketing plans. A well-known example was the application made by a major U.S. supermarket chain, where it was discovered a universe of buyers of diapers also bought beer on the eve of the weekend in which games were broadcast on television. This knowledge has been used, thus increasing their sale.

The concept of general intelligence and MKTI in particular has evolved, being seen as a driver for strategy and market success [1]. A MKTI system is a set of procedures and sources used by marketers to get their daily information on relevant developments in the environment in which they operate [14]. Another definition, MKTI is a system to capture the information needed for decision making in marketing [15]. The fundamental purpose of MKTI is to help marketing managers to take the decisions they face every day in their various areas of responsibility, including pricing. Huster [16] define MKTI as the ability to understand, analyze and evaluate data from internal and external environment, related to the organization, customers, competitors, markets and companies to improve decision-making tactical and strategic, and the integration of competitive intelligence, marketing research, market analysis and analysis of business and financial information. The MKTI is a complex process, whose efficiency affects the quality of marketing decisions, including pricing [8].

For some authors, the MKTI can be defined as existing knowledge and prior knowledge about the external operating environment, obtained by concern opinions, attitudes, behavior and needs of individuals and organizations within the context of economic activities, environmental, social and everyday [21]-[22]. The ultimate goal of every process of intelligence is to facilitate the decision making that leads to action [22]. Is the key intelligence that motivates some authors to introduce the term as a synonym for competitive intelligence MKTI [16]-[23]. The American Marketing Association defines marketing [24] as the set of activities and processes for creating, communicating, delivering and exchanging offerings with value for customers, partners and society in general.

Although market research focus often in response to specific information need or set of needs, intelligence is indicated as a continuous process of developing a holistic view of the operating environment, including competitors, customers and markets. An intelligence process effectively

contributes to the knowledge base of the organization and leads to a cumulative organizational learning. Market research is a well-defined discipline with a long history of application in the business world, taking many forms and with the goal of increasing understanding that the company has in the market and its customers, and this is not MKTI [16]-[25].

In the future, efforts should be aimed at measuring the demands of not satisfied consumer, through their behavior, measuring consumer response to marketing activities, and analysis customer's feedback. Allowing identify trends in consumer tastes, and points of friction between the organization and customers. With modern technology can be done on a larger scale, with lower cost [17]. MKTI seeks to transform data into information, and information into intelligence. The data are the basis of all structure, from which we perceive and record a given reality [11].

D. Database Marketing

The use of databases in marketing has given rise to the concept Database Marketing (DBM) in the late '70s. A limitation of the interaction of actors, technicians and marketers of databases, the concept became hostage since neither the marketers had knowledge in technology, nor the technical know Database's business.

Another limitation to the proliferation of DBM, is the fact that many of the projects being conducted within private organizations, which may explain in part the abundance of scientific articles published in academic literature dealing with issues of DBM [26]-[28].

The DBM is now an essential part of marketing in many organizations. The basic principle of DBM, which is at least part of the organizations communication with customers, is direct (consumers) [29]. From this simple beginning has grown a new discipline, but without the maturity expected by some authors [30, 31]. Currently the DBM is mainly addressed by classical statistical inference, which may fail when data are complex, multidimensional, and incomplete. The DBM refers to the use of database technology for supporting marketing activities. Being a marketing process-driven information technology and managed by the database, which allows marketers to develop and implement better programs and marketing strategies.

There are different definitions of DBM with different approaches or perspectives, showing some improvement over the concepts [32]. In marketing perspective, "the DBM is an interactive approach to marketing communications, which uses addressable media" [31]-[33], or "a strategy that is based on the premise that not all customers or prospects are equal, and that the collection, maintenance and analysis of detailed information about customers and prospects, marketers can modify their marketing strategies"[34]. Statistical approaches have been introduced, "database marketing is the application of statistical analysis and modeling techniques to process individual data sets" [35], emphasizing some data types. "Put simply, the DBM involves gathering information about past, current and potential customers, to build a database that improve the marketing effort. The information includes: demographics, what the consumer likes and dislikes, tastes, purchasing behavior and lifestyle [33]-[36]."

With the advancement of information technology,

processing speed, storage space, and the data flow in organizations has grown exponentially, suggesting different approaches to the DBM. "Generally, it is the art of using the data already collected, to create new ideas to make money" [37]-[38] or "... save this response, and add other user information (style life, transaction history, etc..) on an electronic database, and use it as the basis for customer loyalty programs in the long term, to facilitate future contacts and to enable planning of all marketing." [33], [34], [20] and "... the DBM can be set to collect, store and use the maximum of useful knowledge about customers and prospects, to their benefit and profit [36]-[39]."

Some authors have referred to the DBM as a "marketing tool oriented databases, being increasingly, the focus of the strategies of organizations" [40]-[42] (Swift, 2001; Greenberg, 2002; Cross & Janet, 2004).

All definitions have in common a main idea, the DBM is the process that uses the data stored in database marketing, in order to extract relevant information to support marketing decisions and activities by understanding customers' which will satisfy their needs and anticipate their desires.

III. CONCEPTUAL FRAMEWORK PROPOSAL

The MKTI process is a complex approach, being important find a structured way for information processing, and being crucial that it are available in time for the decision-making process. It is also essential that the right people have access to information throughout the process of collection and analysis, provide feedback to the intelligence (information analysis) required. So, as it is vital to know where the information should be collected and how it should be organized. Which leads to the formulation of the following problem: How can the process MKTI are organized in a systematic way to improve the process of decision making?

To solve the problem, using a top-down approach, this will be fragmented into three problems:

- 1) How to organize the flow of information and intelligence within the organization in order to facilitate the process of decision making?
- 2) How must be organized and managed internally MKTI?
- 3) How can contribute to the process MKTI customers, information sources (internal and external), stakeholders and competition?

A process of satisfying information needs for decision-making is complex and is compound by different activities to be exploited. Our challenge is to propose a conceptual framework to guide the development of activities of Marketing Intelligence based in data modeling, as an add-on to PBI. Pervasive business intelligence provide support to managers decision-making with the tactical and strategic information they need for understanding, managing, and coordinating the processes in organizations [18].

It is intended evaluate, structure the process MKTI to improve decision making. The benchmarking process MKTI is measured either by the ability of logical abstraction on the environment and internal factors in order to identify and collect relevant data for their analysis. The process MKTI is a set of procedures and methods planned for collecting, analyzing and representation of information for use in making marketing decisions [20]. The design process MKTI

considers the type of information stored in the system, and how decision-makers want to receive the information. Managers can have direct access to this information (reports), through their computer terminals.

The MKTI framework assessment process is measured either by the ability to identify and collect data relevant to analysis, and extracting relevant knowledge to support decision making in marketing. The MKTI process comprises two primary activities: data in and data out, and a set of procedures and methods for collecting, analysis and representation of information for use in making marketing decisions (see Fig. 1). Getting data in, usually is referred as data warehousing, and includes the flow of data from a set of source systems and its integration into a data warehouse. The source systems represent internal and external data. We can say that getting data in is the most challenging aspect of BI, and it can requires about 80 percent of the time and effort and generating [19]. Getting data in delivers (data out) is the focus of attention of organizations, and consists of business users and applications accessing data from the data warehouse to perform enterprise reporting, OLAP, querying, and predictive analytics [19].

The MKTI process consists of a set of procedures and methods planned for collecting, analysis and representation of information for use in making marketing decisions [20]. We propose five basic processes for MKTI:

- 1) Planning,
- 2) Collection,
- 3) Analysis,
- 4) Representing,
- 5) Projections.

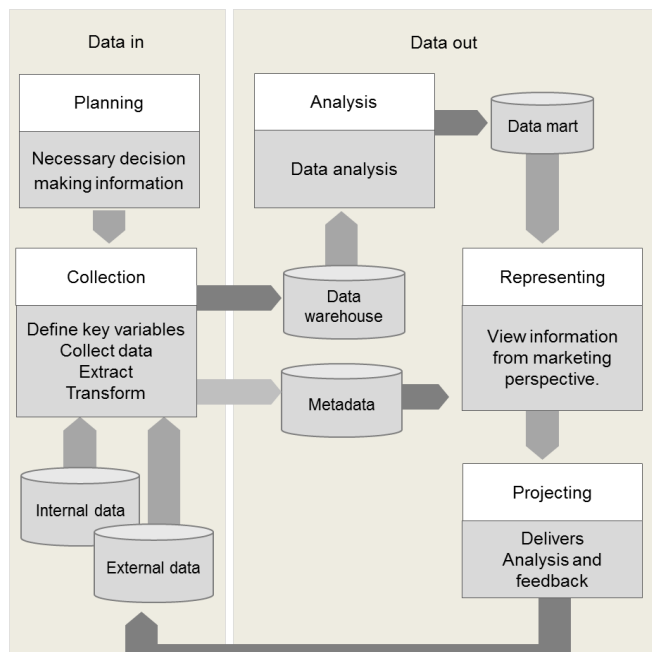


Fig. 1. Marketing intelligence conceptual framework

In planning process are defined the objectives and the necessary information for marketers marketing decisions. Then, the collection process, extract, transforms and load organization internal and external data sources, that include CRM, prospects data, market data and competition. The analysis process is the more complex and difficult, all activities should be developed in order to analyze the data,

looking for patterns, and loaded organized and coded information on marketing data mart, as subset of the data warehouse. The representing process, access mart data and apply marketing metadata models for representing information from marketing perspective. In the projection process, results will be distributed to marketers for review and posterior feedback if needed.

In MKTI conceptual framework one of the components presented is the metadata. The metadata model describes fields, values, sizes, ranges, field's definitions, data owners, latency, and transformation processes. Metadata provides transparency as data moves from sources to the warehouse to end users [19].

IV. CONCLUSIONS

BI is a management concept that refers to a set of programs and technologies that provide features \ capabilities for collecting, analyzing and accessing data on processes of organizations. In any organization, the main objective of BI is to assist in decision making, timely and at all levels of the organization.

With the intensification of competition between companies in open markets, organizations must learn about themselves and to the market, through the collection and analysis of data.

The strategic information is seen as a key resource for success in the business, this being provided by Marketing Intelligence.

The MKTI is a complex process that goes from the collection of data from the organizations environment, until the generated quality information to assist marketing and strategic decision making. Organizations must to avoid invade customers with the highest rankings, and the marketers must remember that customers with low rankings should not be neglected, but instead should be cultivated to become better customers.

The management of the future means not only being able to anticipate what will happen outside the organization, but also be able to represent the events through their own actions.

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