CHAPTER II
LITERATURE REVIEW

2.1 PREFACE

In this literature review, it is intended to summarize and compare the methods of Business intelligence in material management and soft computing techniques. 

2.2 BUSINESS INTELLIGENCE

"Business intelligence is designed to support the process of decision making" [5]. Arnott et al [5] define the role of business intelligence "to extract the information deemed central to the business, and to present or manipulate that data into information that is useful for managerial decision support". Negash notes that business intelligence is "used to understand the capabilities available in the firm; the state of the art, trends, and future directions in the markets, the technologies, and the regulatory environment in which the firm competes; and the actions of competitors and the implications of these actions".

Business intelligence systems combine operational data with analytical tools to present complex and competitive information to planners and decision makers, in order to improve the timeliness and quality of the decision-making process [90]. A business intelligence system is a package of tools, technologies and programmed products that are used to collect, integrate, aggregate and make data available [63]. Business intelligence systems provide actionable information delivered at the right time [90] when decisions need to be made.
The beginning point of this research work is to identify the key components that are common to all business intelligence systems. Business intelligence systems, as the term is typically used, is often confused with a specific "off the shelf" piece of hardware and with a software solution that businesses can simply purchase, turn on and utilize to create business intelligence to facilitate the decision-making process; but business intelligence systems is really just an umbrella term [68]. In reality, business intelligence systems refers to a vast collection of tools and techniques that can consist of dozens of hardware solutions with expensive software at one end of the spectrum and as little as one server with specialized software on the other end. While business needs dictate the necessity for different components and complexity for a business intelligence system, all business intelligence systems require, at a minimum, four specific components to produce business intelligence. These components are described throughout the larger literature to the degree that they are now taken for granted and they include (a) data warehouses, (b) ETL tools, (c) OLAP techniques and (d) data mining [94].

Business intelligence system components are used to support a set of managerial decision-making actions [17]. Actions are described as: (a) acquire (e.g. supported by the data warehousing component), (b) gather (e.g. supported by the load component), (c) analyze (e.g., supported by the use of on-line analytical products) and (d) report (e.g., supported by the data-mining component) data that come from different and dispersed sources [95]. The purpose of this research work is framed in two stages.

Stage One involves identification and description of aspects of each of the four most common components of a BI system. Once aspects are identified and described, they are aligned with the relevant managerial decision-making action of (a) acquiring, (b) searching/gathering, (c) analyzing, and (d) delivery of information. The goal of the study is to propose ways to better facilitate the managerial decision-making process.
2.3 PROBLEM AND CHALLENGES

There are several problems/challenges when trying to develop BI with semi-structured data, and according to Inmon & Nesavich,[50, 51] some of those are:

- Physically accessing unstructured textual data – unstructured data is stored in a huge variety of formats.
- Terminology – Among researchers and analysts, there is a need to develop a standardized terminology.
- Volume of data – As stated earlier, up to 85% of all data exists as semi-structured data. Couple that with the need for word-to-word and semantic analysis.
- Searchability of unstructured textual data – A simple search on some data, e.g. apple, results in links where there is a reference to that precise search term. Inmon & Nesavich [50, 51] gives an example: “a search is made on the term felony. In a simple search, the term felony is used, and everywhere there is a reference to felony, a hit to an unstructured document is made. But a simple search is crude. It does not find references to crime, arson, murder, embezzlement, and such, even though these crimes are types of felonies”.

2.4 COMPONENTS OF BUSINESS INTELLIGENCE

Celina M. Olszak and Ewa Ziemba, [17] University of Economics, Katowice, Poland, he is focused on three fundamental components of the BI systems, i.e.

- key information technologies (including ETL tools and data warehouses),
- potential of key information technologies (OLAP techniques and data mining)
• BI applications that support making different decisions in an organization.

A major part of the thesis is devoted to discussing basic business analyses that are not only offered by the BI systems but also applied frequently in business practice.

PROBLEM

The ability of a corporation to take advantage of all available information through the decision making process is a critical component for its success Cody, Kreulen, Krishna & Spangler [22]. Corporations use business intelligence systems mainly for corporate management, monitoring of business activities, reporting, planning and decision-making support, as well as optimization of customer relations [95]. More than ever, information supports all critical business decisions Matei [81]. Business intelligence seeks to provide the capability to access and analyze information (Matei, 2010), so that massive data from many different sources of a large enterprise can be integrated into a coherent group to provide a 360° view of its business [63].

Business intelligence is a relatively new term, coined in the early 1990's by Howard Dressner [116]. Business intelligence can be defined as "a broad collection of software platforms, applications, and technologies that aim to help decision makers perform more effectively and efficiently" [5]. At senior managerial levels, business intelligence systems provide the input to strategic and tactical decisions and "at the lower managerial levels... helps individuals do their day-to-day job (operational)" [90]. On a strategic level business intelligence systems create the information used in the forecasting of future results based on historical results; on the tactical level, they provide a basis for decision making to optimize actions for overall company performance; and on an operational level, business intelligence systems provide just-in-time analysis of departmental performance [95].
BI is designed to support the process of decision-making. It is not a new technology, rather a “natural outgrowth of a series of previous systems designed to support decision making” [40, 41]. After spending years and possibly millions of dollars invested dollars in ERP-style systems, many companies now store vast amounts of transactional data. The role of BI is to extract the information deemed central to the business, and to present or manipulate that data into information that is useful for managerial decision support. In their simplest form, these tools permit a decision maker to access an up-to-date, often consolidated, view of business performance. Vitt et al describe BI as a relatively new area; however, Luhn provided a definition of BI more than 40 years ago, with his Selective Dissemination of Information (SDI) technique. Vitt et al do acknowledge however that the term is multifaceted and is ‘used by different pundits and software vendors to characterize a broad range of technologies, software platforms, specific applications, and processes’. They define BI as “an approach to management that allows an organization to define what information is useful and relevant to its corporate decision making”.

There is little consensus on a definition for BI; often it depends on who is defining it, and frequently, what they are selling. For instance, ‘Business Intelligence: The IBM Way’ Whitehorn & Whitehorn [119] has a very specific focus on data warehousing and on-line analytical processing (OLAP). Not surprisingly, IBM’s product suite (IBM Visual warehouse and DB2 OLAP server) fits in perfectly with their BI focus. Whilst acknowledged that there is little academic research on BI [40, 5], there is a growing body of literature, largely vendor and industry focussed. This literature tends to centralise BI as the query, reporting and analysis functions of decision support systems, although these vendor definitions sometimes include analytical applications. This view is also supported by a number of the top BI vendors [12, 23, 87, 105]. BI is an important growth area in information technology, and as such, warrants academic attention.
Despite the current IT slowdown in industry, BI software vendors continue to report substantial profits Chen, Lei, Whiting [19, 69, 120]. As business profits decline, organizations are recognising that the provision of quality information is a key to gaining competitive advantage. Supported by increasing improvements in storage, data warehousing and OLAP solutions, the BI market is expected to continue to rise in the coming years. Forecasts predict the BI field will grow 23% annually, and report a total turnover of US$3.3 billion dollars, in the Asia Pacific region alone [38]. The worldwide market is expected to reach US$12 billion by 2006 [30]. The limited amount of academic research on BI makes it very difficult to determine whether the characteristics of BI are different enough to warrant new evaluation methods, and whether industry treats BI investment differently to other IT investments. According to a recent survey of 540 IT professionals, users, and consultants, intangible benefits outweigh many of the more tangible benefits, such as ROI and cost savings [110]. Better information, better strategies, better tactics and decisions, and more efficient processes were among the top five benefits considered most important in BI development. Little research that has been identified, describing how (if at all) these intangibles are identified and weighed, who the participants are, and how this is incorporated into BI business cases.

Business intelligence systems can be used to guide and improve decision making at all levels, strategic, tactical and operational. According to a Gartner survey of 1,400 CIOs, business intelligence projects were the number one technology priority [116], due to their ability to facilitate improved decision making through the delivery of information based on data analysis. A critical component for the success of the modern enterprise is the ability to take advantage of all available information and through the use of analytics such as On-Line Analytical Processing (OLAP) [21, 22].

Eckerson understood that BI must be able to provide the following tools: production reporting, end-user query and reporting, OnLine Analytical Processing
(OLAP), dashboard/screen tools, data mining tools, and planning and modeling tools. It uses huge database (data-warehouse) analysis, and mathematical, statistical and artificial intelligence, as well as data mining and OLAP [22]. BI includes a set of concepts, methods and processes to improve business decisions, using information from multiple sources and applying past experience to develop an exact understanding of business dynamics. It has emerged as a concept for analyzing collected data with the purpose to help decision making units get a better comprehensive knowledge of an organization’s operations, and thereby make better business decisions [3]. A BI system is a data-driven DSS that primarily supports the querying of a historical database and the production of periodic summary reports [10]. It can be presented as an architecture, tool, technology or system that gathers and stores data, analyzes it using analytical tools, facilitate reporting, querying and delivers information and/or knowledge that ultimately allows organizations to improve decision making [33] Lönnqvist and Pirittimäki [74] stated that term, BI, can be used when referring to the following concepts:

- Related information and knowledge of an organization, which describe the business environment, the organization itself, the conditions of the market, customers and competitors and economic issues;
- Systemic and systematic processes by which organizations obtain analyze and distribute the information for making decisions about business operations.

BI allows firms to apply information for supporting their processes and decisions by combining its capabilities in both of organizational and technical issues. Put another way, “business intelligence allows people at all levels of an organization to access, interact with, and analyze data to manage the business, improve performance, discover opportunities, and operate efficiently” [125]. Problems and a huge amount of data of enterprises are input into data mining systems for data analysis so that decision makers can obtain useful information promptly for making correct judgment; that is, in regard to
enterprise operating contents, abilities of fast understanding and deducing are provided, and thus enhancing the quality of decision-making and improving performance and expediting processing speed. From a technical perspective, BI systems offer an integrated set of tools, technologies and software products that are used to collect heterogenic data from dispersed sources in order to integrate and analyse data to make it commonly available. In some research, BI is concerned with the integration and consolidation of raw data into key performance indicators (KPIs). KPIs represent an essential basis for business decisions in the context of process execution. Therefore, operational processes provide the context for data analysis, information interpretation, and the appropriate action to be taken [46].

OLAP refers to the techniques of performing complex analysis over the information stored in a data warehouse to transform it into decision information. Although business intelligence systems are widely used in business, research about them is limited Negash [90]. It is important for businesses to understand the value of business intelligence systems because such systems support decision making at all levels of management: strategic, tactical and operational through data analysis and delivery [95].

SIGNIFICANCE

According to Arnott et al. [5], the role of business intelligence is to extract the information deemed central to the business and to present or manipulate that data into information that is useful for the managerial decision support through the use of business intelligence systems. Understanding business intelligence systems enables any organization to implement an analytical approach that transforms data into information, information into knowledge and then knowledge into decisions as illustrated in Figure 2.1, as shown by Olszak and Ziemba [95]. Factors such as an ever increasing number of very diverse internal and external data sources, the sheer volume of data
generated and used in everyday business, complexity of business processes as well as various compliance, privacy and other data related issues, have made cross-organizational data integration and analysis more complex.

The use of business intelligence systems has become popular in recent years as an approach to gather and analyze data for business use. Koronios and Yeoh [63] believe that this is because business intelligence systems can deliver meaningful data at the right time (when decisions need to be made) at the right location (the area of business that is to be affected) in the right form (the reporting tool that supports the decision being made).

![Figure 2.1 The Role of BI in decision making](image)

**AUDIENCE**

This research work is designed to inform organizational decision makers about the following levels of organizational decision-making: (a) operational, (b) strategic, and (c) tactical. These decision makers are IT professionals, CIOs (Chief Information Officer) and CTOs (Chief Technology Officer) alike who require the efficient and effective analysis of data "in order to get better understanding the situation of their business and improve the decision making process" [17]. According to Watson and Wixom [116]
"business intelligence is currently the top-most priority of many chief information officers".

OUTCOME

The outcome of this research work is structured as a set of guidelines to enable IT professionals (up to and including CIOs) to better utilize their business intelligence systems. The guide describes the key components of a business intelligence system in three areas: (a) a definition of each of the four most common components (data warehouses, ETL tools, OLAP techniques, and data mining) including identification of detailed aspects; (b) the specific role in the business intelligence system in relation to the relevant managerial decision-making actions, including acquiring/gathering, searching, analyzing, and delivery of information; and (c) how each component can be used in a better way to influence business decision, associated with each level of organizations: operational, strategic, and tactical.

DELIMITATIONS

FOCUS

This research work details the four most commonly identified components used in business intelligence systems (ETL tools, data warehouses, OLAP techniques, and data mining) that support managerial decision making with a focus on four pre-selected areas: (a) acquiring/gathering (e.g. data warehousing), (b) searching (e.g. extract-transform-load), (c) analyzing (using on-line analytical products) and (d) reporting (data mining) in order to build an understanding of business intelligence systems. This research work does not present the best known methods for decision making or detail the
different types, brands, or vendors of business intelligence systems as this goes beyond the scope of the purpose of this research work.

TIME FRAME

Business intelligence was born within the industrial world in the early 90s and a decade's worth of research has seen new techniques are transformed into mature tools Cella, Golfarelli [17]. In order to keep the information relevant to today's business climate and technology only those sources which one published in the last ten years, are used in this literature review.

COLLECTION AND SELECTION CRITERIA

The sources of literature for this research work are primarily derived from academic online databases as well as business journal databases. These databases have a high concentration of peer-reviewed scholarly sources and journal articles that are authored by recognized experts in their respective field of study. Generalized search engines are not used for this research work as preliminary searches provided content of little academic value. The one exception to this rule is Google Scholar, a site that searches academic and scholarly databases and provides results with a high degree of relevance to the search string provided. All sources selected for this research work are either focused on business intelligence or rooted in the technologies or processes related to the development of information creation for the purpose of business decision making. Preference is given to sources that directly refer business intelligence or business intelligence systems and have a significant portion of the literature detailing the concepts and technologies supporting business intelligence.

DATA ANALYSIS PLAN PREVIEW
This research work is designed as a literature review, "to summarize and evaluate the existing knowledge of this topic" Machi & McEvoy [76] in order to provide a concise, informed overview of the topic. This overview provides an understanding of the topic that encompasses a large body of literature that is analyzed to produce themes and descriptions of business intelligence system components. The literature used in this research work is obtained using both key words and phrases and evaluated to determine the application and authority of the content. All literature that meets these criteria is evaluated to find similar conceptual frameworks. This research work employs a qualitative research approach to data analysis known as conceptual analysis. A conceptual analysis is a type of analysis that “one find at the occurrence of selected terms within a text or texts, both in implicit as well as in explicit form” Busch, De Maret, Flynn, Kellum, Le, Meyers, Saunders, & White [11]. The analysis is conducted by providing coding for a low level generalization as the terms used to find the literature are specific enough to identify and evaluate the commonalities of the text.

WRITING PLAN PREVIEW

In order to identify the key components of business intelligence systems in an organization, this research work assembles, synthesizes and analyzes selected literature to form an understanding of the current knowledge on the topic [76]. The study is presented in a thematic approach organized around a topic or issue; in this case, the key components of a business intelligence system. The study addresses three related areas, which are the central themes of the inquiry: (1) a definition of each of the four most common components of a business intelligence system (data warehouses, ETL tools, OLAP techniques, and data mining) including identification of detailed aspects; (2) the specific role of each component in the business intelligence system and how; and (3) how each component can be used to better facilitate business decision making associated
with each level of management including operational, strategic, and tactical. The terminology used in this literature review is taken from references selected for use in this research work. Although many terms used within this review have multiple definitions, the definitions provided here are specific to the field of business intelligence and especially business intelligence systems. Some terms are given further definition in the text of this research work.

ACQUIRING

The automated sequence of collecting heterogenic data from dispersed sources and depositing this acquired data into a common repository such as a data warehouse [95].

ANALYZING

The practice of organizing structured and unstructured data into ordered patterns used to acquire, cleanup and integrate information for business decision making [90].

BUSINESS DECISION MAKING

Actions that define [46] the way in which a business process is performed at the operational, tactical and strategic level.

BUSINESS INTELLIGENCE

"An approach to management that allows an organization to define what information is useful and relevant to its corporate decision making" [5].

BUSINESS INTELLIGENCE SYSTEM

A set of integrated [63] tools, technologies and programmed products are used to collect, integrate, analyze, and make data.
DATA

Conversations, graphics, images, movies, news items, text, video and web pages are used as an input for analysis for the purpose of decision making [0].

DATA MINING

Tools specifically designed to identify patterns, relationships and rules within the data warehouse [46].

DATA WAREHOUSING

A systematic approach to collect relevant business in order to organize and validate the data so that it can be analyzed to support business decision making [21, 22].

DECISION SUPPORT SYSTEM (DSS)

A set of tools that analyze data and present it in such a way that it should support decisions [60].

DELIVERY OF INFORMATION

Task of the presentation component of a business intelligence system. This presentation includes graphics, and multimedia interfaces that allows information to be presented in a comfortable and accessible form [95].

EXTRACT-TRANSFORM-LOAD (ETL)

Processes and tools are used to extract data from legacy systems and external sources. These collected data are subjected transformation and pre-processing to get a useful format. Finally, these useful format is loaded into data warehouse for storage.

BUSINESS INTELLIGENCE HARDWARE
Infrastructure that exists in an organization is used in decision-making support. This infrastructure includes servers (file and compute), network equipment and workstations.

**BUSINESS INTELLIGENCE SOFTWARE**

Software that is used in an organization for decision-making support. This software includes OLAP, ETL, data mining and other analytical utilities.

**ON-LINE ANALYTICAL PROCESSING (OLAP)**

Tools that allow analyze multidimensional data known as cubes. Cubes are data that are extracted from the data warehouse and used by managers in decision-making situations.

**OPERATIONAL DECISIONS**

Decisions which are arrived at in any organization, on the basis of up-to-date financial data, sales and co-operation with suppliers and customers. These decisions have deep impact on all the operation of organization.

**SEARCHING**

The collection of raw, unprocessed data from a set of source systems and data structures. Data is moved from these sources (internal or external) into a data warehouse through an ETL process to deliver meaningful information for managerial decision support.

**STRATEGIC DECISIONS**

Decision not only set objectives but also help the organization to realise its objectives (e.g. development of future results based on historical results, profitability of offers and the effectiveness of distribution channels).
TACTICAL DECISIONS

Decisions related to marketing, sales, finance and capital management. Tactical decisions are often used to support strategic decisions.

2.5 KEY INFORMATION TECHNOLOGY

Key information technologies that are related with data acquisition and storing i.e. ETL (Extraction-Transformation-Load) tools and data warehouses.

Contemporary organizations do not face problems resulting from the lack of information. They are rather concerned about information overloading and information dispersion. Wishing to make effective decisions, it is necessary to use different sources of information and then, to integrate information required. Nowadays, data warehouses are thought to be major technologies that support heterogenic decision-making environment. They are collections of subject-oriented, integrated, non-volatile, historical data that support organizational decisions [41, 50, 51]. A design of a data warehouse may take a star schema, snowflake schema or fact constellation. In case of a star schema, factographic data are stored in the central table surrounded by reference tables including data in particular dimensions that are necessary while making decisions. In the snowflake schema, each dimension may have several own dimensions. It means that reference tables are not demoralized.

A data warehouse is predominantly used to store detailed summary data and metadata. Detailed data concern, for instance, sales or production volume in a given period. In order to increase effectiveness of queries, data in a data warehouse are subject to aggregation. Data e.g. on sales may be aggregated in a geographical dimension, a time period dimension or a product line dimension, etc. On the other hand, metadata include information on data themselves. They facilitate a process of extracting, transforming and
loading data through presenting sources of data in the layout of data warehouses. Metadata are also used to automate summary data creation and query management.

2.6 IT POTENTIAL

Information technologies potential that mainly refers to versatile analyses of data, and presentation of data, i.e. OLAP (On-Line Analytical Processing) techniques and data mining.

OLAP tools are mainly aimed at interactive report generation according to user’s pre-defined criteria (dimensions), and optimization of searching huge data files by means of automatic generation of SQL queries. They allow to carry out complex analyses of company performance, customer relations, product profitability, etc. They also provide answers for the questions ‘who?’, ‘what?’, ‘when?’, ‘what if?’ and ‘why?’ type. Multi-variant analyses carried out on historical data (stored in data warehouses) allow for predicting future, setting trends, customer behaviour, and competition behaviour. Their effective realisation enables organizations to detect weaknesses, threats and hidden opportunities and chances [94].

Data mining involves discovering various patterns, generalizations, regularities and rules in data resources [44, 58, 98]. Knowledge resulting from data mining may be utilised in two dimensions, i.e. to predict (prediction), and to describe (description) reality. Prediction involves using already known variables to predict future. For instance, a prognostic model help, on the basis of historical data, to assess incomes within particular assortment groups of products and customer groups. On the other hand, reality description by means of data mining techniques enables to create data and present in a understandable format such as graph, formulas, rules and table. So that interpretation of this data into information for human being is a viable option in the future in the context of taking some crucial decision.
2.7 IT APPLICATION

BI applications that support to take various decisions on production, sales, competition monitoring, finance, etc. BI systems beneficiaries include a wider and wider group of users starting from specialists in controlling, financial reporting and finance, through salespeople, up to members of the board. Sectors that use BI systems most frequently include trading companies, insurance companies, banks and a financial sector, telecommunications and manufacturing companies.

2.8 MARKETING INTELLIGENCE

2.8.1 MARKETING AS AN ORGANIZATIONAL FUNCTION

The abbreviated letter MA (Marketing Association) defines marketing is “an organizational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stakeholders”. Due to everyday connection of the marketing function to market environment, marketing function is especially under the influence of changes in cultural, technological and business environment and marketers need to provide decision-relevant information about opportunities for growth and plan effective strategies. These changes have caused the marketing function to change through the time and adapt to new situations and challenges but the concepts of knowledge, relationships, interactivity, accountability, and value will most heavily mark the role of today’s marketers [39]. Especially accountability or measurement of profitability is seen by some marketers as a potential constraint on their creativity, because “they think that if they calculate the return of every event, they will not be allowed to experiment or conduct events that have a long-term focus such as building brand awareness” [89]). Traditional decisions related to marketing are marketing mix...
decisions (product, promotion, pricing and distribution decisions), resource allocation decisions, customer segmentation decisions, positioning decisions, new market entry decisions, market estimation, competitive benchmarking, brand and key account management [1].

These decisions are usually made in the market planning process, which is a constant process conducted on corporate, business, and operational level. It consists of four stages: situation analysis, strategy development, marketing program development, and implementation (Figure 2.2).

2.8.2 MARKETING INTELLIGENCE AS PART OF BUSINESS INTELLIGENCE

Aaker, Kumar, Day, & Leone [1] see marketing intelligence as a component of business intelligence which is comprised of several other components including for
example financial and accounting intelligence (Figure 2.3). Several related terms to marketing intelligence include competitive intelligence, market intelligence, competitor intelligence, customer intelligence, strategic intelligence and technical intelligence [74]. Marketing intelligence is used to aid marketing-related decisions which is seen in definition by Huster [123]; as cited in [123] that Marketing Intelligence (MI) is “the ability to fully understand, analyze, and assess the internal and external environment associated with customers, competitors, markets, industry and use the acquired knowledge for long and short term strategic planning”. As stated by Wright & Calof [123] most comprehensive definition of MI is given by Tan and Ahmed: “Marketing intelligence is viewed in its totality as a continuing and interacting structure of people, equipment, and procedures to gather, sort, analyze and distribute pertinent, timely and accurate information for use by marketing it decision makers to improve their marketing planning, implementation and control.” It can support the marketing function or play a crucial role at corporate level and in establishing competitive intelligence since it presents a good platform from which to base an organization’s overall strategic and tactical intelligence capabilities start to thrive [86, 123].
In 2007 a special issue of the European Journal of Marketing entitled “The impact of competitive intelligence on marketing activity” has investigated the competitive intelligence field in marketing [123]. After making a literature review of specifically the term marketing [123] intelligence authors found that the concept is relatively unexplored and fall outside the preview of three dedicated journal (Marketing Intelligence & Planning, Competitive Intelligence Review and Journal of Competitive Intelligence and Management).

### 2.8.3 THE ROLE OF MARKETING RESEARCH IN MARKETING INTELLIGENCE

Marketing research “links the consumer, customer, and public to the market through information to identify and define marketing opportunities and problems; generate, refine, and evaluate marketing actions; monitor marketing performance; and improve understanding of marketing as a process” (Marketing Association). Marketing research thus plays a critical part in decision making process and correspondingly in marketing intelligence since it is mostly connected to information gathering and analysis inside the marketing department. Though some authors differ from each other in designing marketing intelligence and marketing research as components of Marketing Information Systems (MkIS). They view MI as a source of external information about company’s environment, competitors and government and marketing research as a source of data for specific problems, special studies like surveys of customers and
prospects [72]. Together with internal databases they develop information needed as one part of marketing information system [64]. This important differentiation of internal and external information is especially seen in marketing information which are complex and come from many different sources, so the phase of assessing information need to create intelligent systems is critical in marketing and creates marketing information system, together with information needed [64]. Marketing data can be collected from primary, secondary, and standardized sources (Figure 2.3).

From the definition of marketing we can see that marketing is a function assumes more responsibilities, comparing with other function which focus on customers and satisfy their needs. In order to do that it needs customer level information that would assist in business decision making [1]. Data analysis in marketing also uses the data on prospects, competition, products, markets and marketing environment in general while incorporating marketing concepts, methods, and quantitative tools, to make marketing related decisions more worthwhile [1]. Potential drawback for less important role of marketing research in marketing intelligence is its role in solving specific problems facing the company. Enabling marketing research to gain importance it is necessary to get a more general overview of business and marketing researchers must synthesize or grasp larger meanings emerging from their analyses, process information to render concepts and bigger ideas and make concise recommendations in order to reduce stress for managers [83].

2.8.4 MARKETING INTELLIGENCE (SYSTEM) AS PART OF MARKETING INFORMATION SYSTEMS

Marketing intelligence (system) is a part of Marketing Information Systems (MkIS) which were most thoroughly researched in the marketing literature (especially between years 1990-2000). It was established in the 90’s that “managing marketing
information by means of IT has become one of the most vital elements of effective marketing”. Although its tasks were at first (by the IT industry) seen as too unstructured and creative (idea generation, strategy formulation) to pay attention to, in the last two decades IT industry has widened its focus to cover this task. The importance of computers in marketing was highlighted by Kotler [64] and information technology-based marketing information systems have now been with us for many years [9]. The first definition of MkIS was presented by Cox and Good as “a set of procedures and methods for the regular planned analysis and presentation of information for use in making marketing decisions”. In relation to management information systems (MIS) and decision support systems (DSS) MkIS is seen as a part of both, but specifically related to marketing activities. Critique of MkIS models in 90’s was they were too much based on traditional bureaucratic, functional and hierarchical organizations, maximizing efficiency of specific activities but not the whole process with all its activities and its linkages. In a survey of Fortune 500 companies in 1999 they found out that only 67% of the managers indicated that their firms have an MKIS, a level that is down considerably from the period 1980-1990 when it was 77%, though availability of computers and daily usage has increased, which indicates that the computer is increasingly a vital part of marketing operations and management [72]. MkIS can also be seen as a natural expansion of traditional market research, the difference being constant availability of information and not ad-hoc project. In order to define the potential benefits of marketing intelligence we need to first establish the basis for their design [77]. We need to understand the business process, in our case marketing decision and planning process and define the marketing domain. Daniel, Wilson, & McDonald point out the need to integrate different marketing tasks, to look at the whole or at least substantial areas within marketing (including sales and customer service) and made them an “initial unit of analysis”.

2.8.5 ORGANIZATIONAL FACTORS AFFECTING THE PLEMENTATION OF BI

It has been noted that in the 90’s the marketing function was one of the last among business operations to adopt technology and use it in everyday business. Potential reasons found for the slow adoption, were the uncertainty in technology adoption and in the skill set of marketers, since technology implemented in marketing would require marketers to “take an active managerial role far beyond their traditional areas of competence and authority”[8]. Marketing education often overlooks changing requirements in knowledge and skills set and opportunities presented are often underexploited due to “lack of skills rather than due to lack of technology”.

2.9 SUMMARY

This chapter attempts to provide comprehensive survey of research on Business Intelligence, problem and challenges, components of business intelligence, operational decisions, strategic decisions, tactical decisions, key information technology, the role of marketing in market intelligence and the relative performance of methods is analyzed.