

Journal of Information & Knowledge Management
Vol. 21, No. 1 (2022) 2250007 (28 pages)
© World Scientific Publishing Co.
DOI: 10.1142/S0219649222500071



Effect of Business Intelligence on Competitive Advantage Case of Ankara IT Sector

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Published

Abstract. The main purpose of this research is to examine the effect of business intelligence (BI) on competitive advantage in Ankara IT sector. For this purpose, we followed a qualitative research design phenomenology and conducted face-to-face semi-structured interviews with BI staff of 14 organizations defined according to criterion sampling method. We applied inductive qualitative content analysis to interview data. As a result, four main themes emerged: (1) BI adoption (2) competition, (3) organizations, and (4) recommendations. We found that BI has a positive effect on competitive advantage, but the nature of competition in sector is unfair and changeable according to the origin of the product. Leader foreign companies adopt differentiation strategy in gaining competitive advantage and there is a severe competition between the sector leaders. Companies that produce domestic BI solutions adopt low-cost strategy, but they are far away from the high-level competition among foreign companies. Government support and guidance are required for domestic BI solutions to be competitive.

Keywords: Business intelligence; competitive advantage; IT sector.

1. Introduction

According to Malone (2008), developments in Information Technologies (IT) and in Internet, provided the possibility of harnessing intelligence of the masses. Such an integration of information has never been experienced through the human history. Malone adds that besides owning the technology, a deep understanding of technology is also required to benefit from these possibilities. In their seminal book *The Second Machine Age* Brynjolfsson and McAfee (2014) defined three basic features of

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the new age as “exponential”, “digital”, and “combinatorial”. The exponential development of technology digitalizes everything, and networks enable production and sharing of information almost free. However, transforming information to intelligence that effect decision-making is a vital issue in the business world. As, business strategist Daniel Burrus stated “*Information is power only if you can take action with it. Then, and only then, does it represent knowledge and, consequently, power*”. The power in business world is gaining and sustaining competitive advantage, and business intelligence (BI) systems provides this by presenting actionable information to decision-makers. Therefore, BI is a crucial strategic tool in today’s collectively produced big data-driven world, but only if it is used properly. Then, how can it be achieved? This question was one of the motives that directed us to conduct this research.

BI can be defined as the process of transforming information to intelligence for utilizing in strategic decision-making. BI systems provide organizations to gather and process information, deliver outputs to related units, support decision-making process, and predict future conditions. BI has an important role for executives in making appropriate and fast decisions (Foley and Guillemette, 2010; Rouhani *et al.*, 2012; Alnoukari and Hanano, 2017). It is possible for executives to make more effective decisions by transforming information to intelligence. According to research in BI field, BI has a positive effect on gaining competitive advantage (Chen, 2012; Peters *et al.*, 2016; Eidizadeh *et al.*, 2017).

In the literature review process, we found that majority of the studies on “BI and competitive advantage” are survey research that adopt quantitative approach or literature review. More in-depth research that adopt qualitative approach will likely contribute to the attempts of revealing the role of BI systems on gaining competitive advantage. In Turkey context, we defined several papers that examine level of BI adoption (e.g. Özçam and Coşkun, 2016), applications of BI in business (e.g. Akgül *et al.*, 2018) and the advantages it provides to organizations (e.g. Pekkan and Çalışkan, 2018; Yörük and Sökmen, 2020). We could not reach a research that examine the role of BI on competition through an industrial perspective in Turkey. This finding motivated us to conduct this research. We preferred to examine the subject in IT sector due to that the sector has the feature of both BI-user and BI-producer. Consequently, the purpose of this research is to examine the effects of BI on competitive advantage, specifically in Ankara IT sector in Turkey. We adopted a qualitative approach and conducted this research on the basis of following research questions:

RQ₁: *What is the role of BI in gaining competitive advantage in the sector?*

RQ₂: *What is the level of BI perception in the sector?*

RQ₃: *What are the main tools organizations utilize in BI processes?*

RQ₄: *What is the nature of competition in Ankara IT Sector?*

We followed phenomenology design to find answers to our research questions and conducted inductive content analysis to the data of 14-interviews collected from BI

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staff. As a result of this explorative research process, four themes emerged that describe the effects of BI on competitive advantage in the scope of Ankara IT Sector.

The paper continuous as follows: At first, we provide conceptual background of the core concepts of this research “BI” and “competitive advantage”. Right after, we discuss previous research that examines the impact of BI on competitive advantage. In the third section, we present the design of the research design and describe the research methods we employed. In the following section, we interpret our findings under four main themes with the support of figures and quotes of participants. We conclude the paper by presenting theoretical and practical implications of our findings, and recommendations for future research.

2. Conceptual Background and Literature Review

2.1. *Business intelligence*

The origin of BI, as a concept, can be traced back to Sun Tzu’s following quote from *The Art of War* (Ahmad, 2015, 14):

If you know yourself and your enemy, in a hundred battles you will never fear the result; when you know yourself but the enemy, your chances of winning or losing is equal; if you know neither yourself nor your enemy, you are certain to be in danger in every battle.

Sun Tzu’s words emphasize the fact that intelligence of your own and your enemies plays an important role in winning a battle. This fact is the essence of BI systems. The term “BI” was first coined by Richard Millar Devens in *Cyclopedia of Commercial and Business Anecdotes*, in 1865 (Hatta *et al.*, 2017) to describe “*how a banker profited by receiving and acting upon information*” (Davis and Woratschek, 2015, 24, cited from Devens, 1865, 210). Besides, a number of research refer to Hans Peter Luhn, an IBM researcher, first mentioned and defined the term in his paper in 1958 (Shollo and Kautz, 2010; Ahmad, 2015; Eder and Koch, 2018). Also, Stevan Dedijer was recognized as “father of BI” (Ahmad, 2015). However, there is a consensus in the field that BI is associated with business world and became popular in 1990s (Eder and Koch, 2018) after a Gartner analyst Howard Dresner used the term (Shollo and Kautz, 2010; Rouhani *et al.*, 2012; Ahmad, 2015).

BI concept is about gathering information to gain advantage over competitors or rivals. So, BI is an important strategic tool in today’s data-driven environment. The BI definitions in the literature vary, but commonly they emphasize strategic benefits of BI. Foley and Guillemette (2010) conducted an in-depth literature review on the concept of BI and defined that although BI definitions seem similar, they diverge, as some emphasize managerial aspect and some technological aspects. As a result of the review, the authors proposed a broad definition of BI as follows:

Business intelligence (BI) is a combination of processes, policies, culture, and technologies for gathering, manipulating, storing, and analyzing data collected

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from internal and external sources, in order to communicate information, create knowledge, and inform decision making. BI helps report business performance, uncover new business opportunities, and make better business decisions regarding competitors, suppliers, customers, financial issues, strategic issues, products and services (Foley and Guillemette, 2010, 4).

Shollo and Kautz (2010) reviewed 103 papers and found that concept of BI evolved in time “*from firstly conceptualizing BI as a process, then extending to include products, and now currently broadening to include technology*”. The traditional aim of BI was to collect internal structured data about processes in organizations but in time the concept have broadened and included external data. Today, BI is generally considered as a three-dimensional process consists of gathering and storing data, analysing, and transferring data to related units.

According to Foley and Guillemette (2010) framework, BI process consists of eight stages: (1) The BI strategy, (2) BI governance, (3) data collection, (4) data manipulation, (5) data analysis, (6) intelligence, (7) decisions, and (8) BI evaluation.

BI Strategy. Organizations develop and implement business strategies to be competitive. Organizations that adopt BI systems should align BI strategy to their business strategies in strategic planning process. Research show that this alignment has a positive effect on organization performance and success of BI projects (Foley and Guillemette, 2010; Dymarsky, 2011). Managers and executives utilize business performance management (BPM), executive information systems (EIS), scorecards and dashboards to monitor this alignment (Foley and Guillemette, 2010; Sharma and Djiaw, 2011). BI implementation is more important than adopting BI, and organization readiness is a crucial factor in implementing BI (Ali and Khan, 2019). According to Ali and Khan (2019) findings, “managerial proficiency” and “readiness of IS based environment” (p. 47) are the critical factors that represent organization’s readiness to implement BI in their business.

Success factors have a significant role in implementing a successful BI strategy (Foley and Guillemette, 2010). Eder and Koch (2018) defined 28 critical success factors have been mentioned in the literature for implementing effective BI systems. Fourteen of these factors are organization-based, nine of them are technology-based, and five of them are process-based factors. The most cited five factors are “management support”, “data quality”, “user acceptance and inclusion”, “project objective/vision”, and “project team” (for details see Eder and Koch, 2018, 32–35). Besides these prominent success factors, the authors found nine additional factors as a result of empirical study that are defined as “definition of terms/standards/KPIs”, “cooperation with the affected departments”, “usability”, “performance of the BI system”, “independence from other systems”, “organizational unit”, “business needs”, “fit of BI system into the IT landscape”.

BI governance. BI governance is a significant facilitator in implementing effective BI systems. Governance is a continuous process and includes “best BI practices” and

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provides better return on investments (ROI) (Foley and Guillemette, 2010). BI governance is a subset of corporate governance. Implementing BI strategy depends on a proper BI governance, and an alignment between BI governance and corporate governance is required (Chugh and Grandhi, 2013; Grandhi and Chugh, 2013). Fernández-González (2008) defined four values as a requirement for effective BI systems: “ongoing adaptability”, “teamwork”, “flexible hierarchies”, and “people before processes”.

Data collection. After establishing BI strategy and governance, organization are ready for collecting data (Foley and Guillemette, 2010). Today, organizations are exposed to complex and devastating data and the nature of information have been changed enormously in terms of “volume, availability and importance” (Albescu *et al.*, 2008). Organizations should understand the internal and external data to gain competitive advantage (Guarda *et al.*, 2013). Initially, BI accumulated structured internal data, but in the course of time its scope have expanded and included unstructured and external data (Shollo and Kautz, 2010).

The form of data is generally categorized as “structured” and “unstructured” (or semi structured) (Alnoukari and Hanano, 2017). Structured data are acquired from On-Line analytic processing (OLAP), data warehouse (DW), data mart (DM), EIS, decision support system (DSS), and customer relationship management (CRM) (Foley and Guillemette, 2010; Negash, 2004). The data as conversations, graphics, images, movies, news items, spreadsheets, text, videos, web pages, and business processes are the sources of unstructured (semi-structured) data (Negash, 2004). A quality decision requires quality information, and quality information are extracted from quality data, hence, data quality management is an important factor in implementing successful BI (Ali and Khan, 2019).

In today’s business environment, organizations require correct and just-in-time information for making on-time and appropriate decisions in order to be competitive (Rouhani *et al.*, 2012). Data sources have evolved in time; Internet of Things (IOT), mobile devices and social media broadened data concept by supplying instant data (Attaran and Attaran, 2018). The Internet and Web 2.0 provided free and open exchange of information. These tools also transformed traditional BI. The new form of BI that is leveraged by new technologies is generally termed as “Business Intelligence 2.0” (Al-lozi and Papazafeiropoulou, 2012).

Data manipulation. The kind of data organizations gather and store in DWs is a part of BI strategy. Data manipulation is applied to both structured and unstructured data to clean and correct. This process is termed as Extract-Transform-Load (ETL) in the literature (Foley and Guillemette, 2010). The process consists of acquisition, clean up, and integration of data (Negash, 2004).

At first stage, data are extracted from operational (e.g. ERP, CRM) and external data sources (e.g. market research data) (Davenport, 2010; Alnoukari and Hanano, 2017). Then, the extracted data are transformed and loaded in DW (Shollo and Kautz, 2010) Structured data are generally stored in DW, DM, and operational data

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sources (ODS), and unstructured data are handled by “content and document management systems” (Alnoukari and Hanano, 2017).

Data analysis. Data analysis is “the process of applying computer-based methodology to extract useful information” (Foley and Guillemette, 2010, 10). Data mining, OLAP, text-mining, and visualization (Foley and Guillemette, 2010; Negash, 2004; Rouhani *et al.*, 2016) are the common techniques for transforming data to information. After then, information is communicated to related areas in organizations (Foley and Guillemette, 2010). The outputs of the process can be presented in several forms such as “exception reports, routine reports, and responses to specific request” (Negash, 2004, 83). Dashboards, scorecards are the standard reports, make easier to evaluate the outcomes, produced in this process (Davenport, 2010). Information generated in this process can be loaded to DW again or presented to related business units usually through a “portal software -a harmonized graphical interface” and involve in decision making process (Foley and Guillemette, 2010, 11).

Intelligence and decisions. Intelligent is the actionable information and as long as the competition existed, intelligence would involve in decision-making process as a vital strategic toll (Ahmad, 2015). Today, in modern organizations, intelligence is a systematic process that is utilized by managers and executives to access daily market information (Bahrami *et al.*, 2012) and to consider internal business processes. Siegel (2000) defined intelligence as “*Intelligence is both process, a system for collecting and transforming information, and content, actionable knowledge that can be used to make business and marketing decisions*” (p. 91). As business environment is changeable and uncertain, in-time and instant information is required in decision-making process, therefore, competitive advantage is strictly related to the ability of transforming data to intelligence and acting with this intelligence (Hannula and Pirttimaki, 2003). That is the indication of proactive behaviour of organizations (Allozi and Papazafeiropoulou, 2012; Alnoukari and Hanano, 2017; Ali and Miah, 2018).

The ultimate output of BI process is making better decisions (Foley and Guillemette, 2010; Davenport, 2010; Shollo and Kautz, 2010). According to Negash (2004), intelligence can be used as an input in decision-making at tactical, strategic, and operational levels. At lower-level management, it is utilized by individuals in doing their day-to-day jobs, and at senior management level it involves in critical decision-making process. Types of intelligence and differences among them are presented in Table 1.

BI evaluation. BI provides intangible benefits to organizations. Alnoukari and Hanano (2017) stated that know-how, innovativeness, and market properties are the examples for intangible assets that are influenced by BI solutions directly. Foley and Guillemette (2010) exemplified these benefits as “new knowledge, improved decision quality, better satisfaction among users and customers, better information to support the decision-making process, better decisions, etc.”. As the benefits of BI are

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Table 1. Types of intelligence in organizations.

Types of intelligence	Definitions	Author (s)
Strategic	“Developed to support long-term corporate goals and objectives and applications include aggregations, statistical analysis, multidimensional analysis, data mining, and exploration”	Loftis (2007)
Tactical	“Developed for business analysts and experts whose daily jobs involve accessing and analysing data and were targeted at making short-term business decisions”	Imhoff and Pettit (2004)
Operational	“Used to manage and optimize daily business operations and evolved to meet the need to respond to specific events that happen in the operational world”	White (2006)

Source: Ahmad (2015).

intangible, determining the financial value of the output is difficult, hence, it is considered less valuable than it is (Davenport, 2010). Negash (2004) related this perception to high expectations of managers from BI systems. It is generally expected big-bang returns from successful BI systems to bring extremely high returns to the company, but this is impossible to forecast since such big returns are serendipitous and infrequent Negash (2004).

According to Foley and Guillemette (2010) BI managers should evaluate implementation costs and financial benefits. ROI is not an appropriate measure for evaluating value of BI investment. “Cost savings”, “decisions based on BI leading to enhanced revenues”, “the time saved”, and “cost avoidance” are generally cited as measurable benefits of BI. The authors also recommended that it is important for BI managers to perform all aspects of BI, thus, they can get feedback and evaluate the success or failure of BI systems.

Dedić and Stanier (2017) developed an evaluation tool for BI systems. The authors aimed to produce a tool that measures the success of modifications applied to BI systems, and accordingly improve the benefits of organization provided by BI. Dedić and Stanier handled the issue from the perspective of enhancing BI reporting capabilities. According to this view, the success of modifications applied to the BI systems are related to the “positive reporting experience” it provided for users. The very evaluation tool defines following criteria to measure success of modification: User satisfaction (technical users and business users), and technical functionality.

As a result, we summarized eight step BI process (Foley and Guillemette, 2010) in Fig. 1.

2.2. *Competitive advantage*

Strategic management theories are based on the aim of gaining competitive advantage (Alnoukari and Hanano, 2017). Strategy formulation and implementation is

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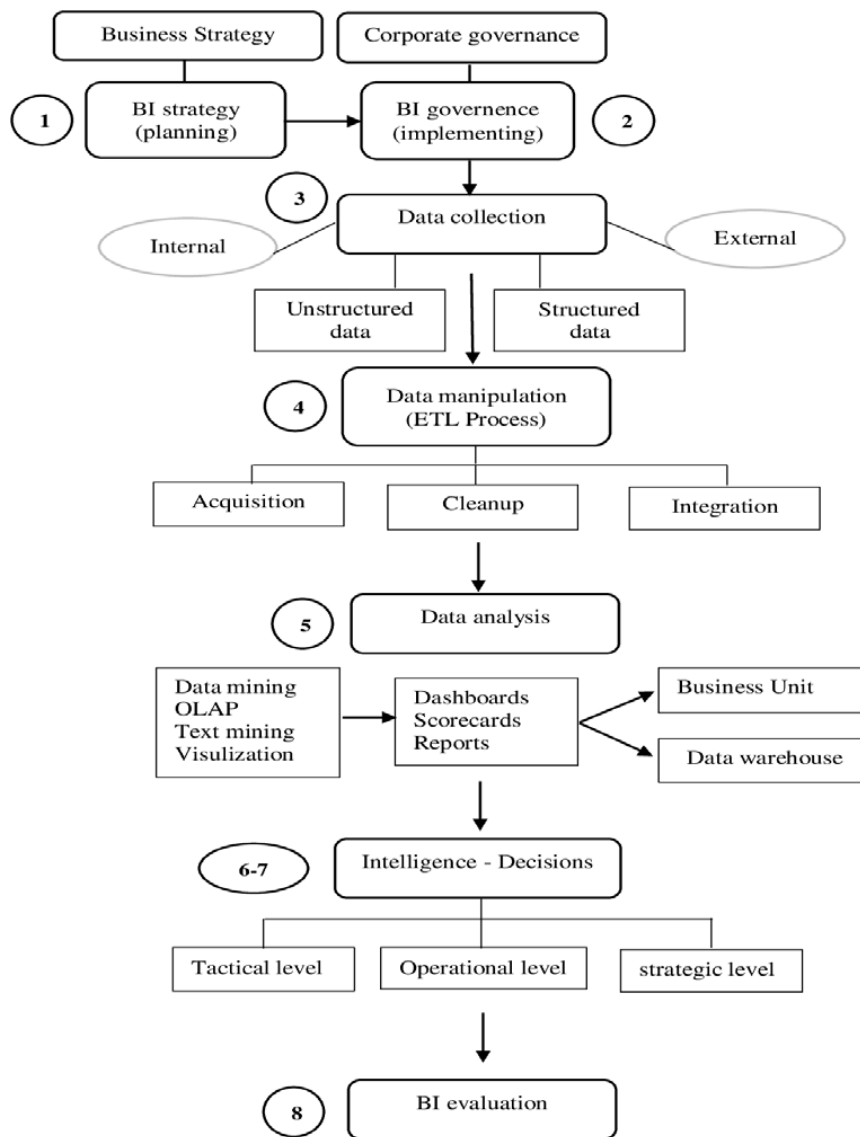


Fig. 1. BI process.

closely related to organization's performance. Therefore, every organization should have a strategy, even if it is not the absolute one. According to Brinkmann (2015) "*a more complete definition of strategy is based on competitive advantage or strategic capability. Competitive advantage is the object of most corporate strategy*" (p. 65). Chen (2012) reported that competitive advantage is generally defined in strategic management literature as "superior economic performance" (p. 16). Prominent definitions of competitive advantage concept are presented in Table 2.

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Table 2. Competitive advantage concept.

Author(s)	Definitions
Ansoff (1965)	"Properties of individual product/markets which will give the firm a strong competitive position" (Ansoff, 1965, 79).
Uyterhoeven <i>et al.</i> (1973) and Hofer and Schendel (1978)	"The manner in which a firm applies its skills and resources to an individual product or market" (Mooney, 2007, 111)
Porter (1985)	"A competitive advantage refers to organizational factors that enable a firm to outperform its competitors...sustaining competitive advantage should be the central purpose of an organization's competitive strategy and that creating value is the means to attaining it" (Mooney, 2007, 111).
Collis and Montgomery (1995)	"Competitive advantage, whatever its source, ultimately can be attributed to the ownership of a valuable resource that enables the company to perform activities better or more cheaply than its competitors" (Collis and Montgomery, 1995, 120).
Barney (1991)	"To be sustainable, a competitive advantage should be difficult to imitate or substitute" (Mooney, 2007, 112)
King (2007)	"Firms sustain competitive advantage when their competencies possess strong causal ambiguity because competitors are less likely to identify or understand such competencies well enough to imitate them" (Mooney, 2007, 112)

Source: Table 2 is composed by the authors according to Mooney (2007).

Mooney (2007) reviewed the evolution of competitive advantage concept through time and provided a comprehensive definition. According to Mooney, competitive advantage is "*A capability or resource that is difficult to imitate and valuable in helping the firm outperform its competitors*" (p. 112). Key differences among the interpretations of competitive advantage concept derive from different approaches dominating in the related period of strategic management research. According to Mele and Guillén (2006), the term "strategy" was defined in 1960s and conceptualized in 1970s. In this period, the focus of research was on context and process of strategic management. In 1980s, competitive advantage and generic strategies came forefront especially with Porter's studies on five competition forces. In 1990s, resource-based-view (RBW) dominated the strategic management research. According to RBW, competitive advantage is related to core competencies and VRIO (valuable-rare-inimitable-organized) resources of organizations Wernerfelt (1984); Prahalad and Hamel (1990); Barney (1991); Wernerfelt (1995). By 2000s, a new paradigm -knowledge-based view- arose and researchers have focused on learning, knowledge, and innovation concepts. In this dynamic strategic model, firms gather information, transform them into knowledge and produce intangible assets through learning process. Hence, strategic management research can be classified under two titles according to source of competitive advantage: (1) firm-specific models, and (2) environment-related models. Resource-Based View (RBV),

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Knowledge-Based View, and Capability-Based View are firm-specific models, and Porter's Five Competitive Forces is an environment-related model (Chen, 2012).

Wang (2014) also defined two dominant competitive advantage theories as Market-Based View (MBV) and the RBV. According to MBV organization's performance is dependent to industrial environment, and position of organization in industry is defined related to competitors. The prominent theories of MBV are Structure-Conduct-Performance (SCP) framework (Bain, 1968) and Porter (1980) Five Forces Model (based on SCP framework) (Wang, 2014).

Porter (2008) asserted that competition is not just a situation among competitors but includes buyers, suppliers, entrants, and substitutes. Porter (1979, 2008) defined five forces that shape competition in industry as "threat of new entrants", "bargaining power of suppliers", "threat of substitute products or services", "bargaining power of buyers", and "jockeying for position among current competitors". According to this view, the most effective force is not specific, but the dominant force or forces determine profitability of industry. The corporate strategist should determine a position in the industry; thus, organization can defend itself to threat of the forces or influence the forces in its favour (Porter, 2008). Porter (1980) defined three generic strategies to cope with Five Competitive Forces and gain advantage over competitors in industry: "cost leadership", "differentiation", and "focus". The main competitive advantage theories are presented in Table 3.

2.3. Literature review on BI and competitive advantage

Data is the new oil in today's business world. As BI information is transferred into intelligence in BI process, BI is considered as a vital strategic component for gaining competitive advantage (Chen, 2012; Guarda *et al.*, 2013; Rouhani *et al.*, 2016). In BI literature, several research works examined the effects of BI on competitive advantage.

Chuang (2004) examined the association of knowledge management (KM) capability and competitive advantage through a resource-based perspective. Chuang, identified KM resources as technical KM resource (BI) and social KM resource. According to findings, social KM has a positive effect on competitive advantage. However, findings on technical KM (BI) and competitive advantage are uncorrelated. This result was related to adopt appropriate or inappropriate technical

Table 3. Competitive advantage theories.

Theory	Focus	Source of competitive advantage
Resource-based view	Internal environment	Strategically important and useful resources and competencies
Market-based view	Industry	Strategic position of firm in industry
Knowledge-based view	Internal environment	Knowledge
Capability-based view	Internal environment	Capabilities

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KM resources and lack of understanding about the capabilities and benefits of BI systems. A small group of firms that utilize right BI tools can achieve competitive advantage. Therefore, technical KM resource was found “to be negatively significant predictors for competitive advantage”. Halawi *et al.* (2006) examined the relationship between KM and competitive advantage. Researchers adopted a resource-based approach and reviewed the literature on KM and strategy formulation. As a result, Halawi *et al.* (2006) related KM strategies to business strategy and highlighted that knowledge assets possess vital strategic importance and leverage intellectual assets for KM.

Muntean and Mircea (2007) asserted that decentralized decision-making requires transfer of information through organizations, and portal-based BI solutions as “Collaborative Business Infrastructure” and “DW Environment” possess vital importance to solve problems that emerge during this process.

In their review paper, Bogza and Zaharie (2008) attracted attention on Business Intelligence Competency Center (BICC) in gaining sustainable competitive advantage. Researchers asserted that BI provides sustainable competitive advantage by “driving revenues”, “managing costs”, “realizing consistent levels of profitability”, and “enabling prediction of future market and economic conditions” (p. 146). According to Bogza and Zaharie (2008) organizations that adopt BICG are able to align corporate and BI strategies. Therefore, they have more advantage of producing more intelligence at low cost.

Karim (2011) examined the relationship between competitive business intelligence (CBI) and business performance. According to the results, BI strategic plan, cooperation, information, and effective decision making are the factors that significantly affect business performance and competitive advantage.

Chen (2012) examined the effects of BI and IT infrastructure flexibility on competitive advantage from an organization agility perspective. The research argued that organizational agility is a dynamic capability. As a result of survey research, Chen found that “BI and IT infrastructure flexibility are significant sources of organizational agility, and organizational agility partially mediates the effects of BI and IT infrastructure flexibility on an organization’s competitive advantage” (p. 84).

According to Eidizadeh *et al.*’s research (2017), BI has a positive effect on competitive advantage by the virtue of knowledge sharing. Peters *et al.* (2016) found that BI quality enhances performance management capability and in turn positively affect competitive advantage. According to Elbashir *et al.*’s (2013) findings, BI assimilation enhances business value of BI by translating organizational resources into capabilities.

Majority of research works that examine the relationship between BI and competitive advantage are empirical or review research. In this research, we preferred to follow a qualitative design to examine BI adoption, BI processes, BI perception of organizations, and effects of BI on competitive advantage in depth.

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3. Methodology

We followed a qualitative design, phenomenology, to examine the subject in-depth. Phenomenology is a qualitative research design rooted in philosophy and psychology disciplines (Creswell, 2007) and attempts to describe meaning structures that are based on participant's experiences (Holroyd, 2001). The founder of phenomenology school, Husserl defined experience as "*intuition of 'real objects' that is, those objects that are in space and time and regulated by causality*" This distinction is important as it indicates that phenomenology concerns realizing real objects, not romantic or esoteric things (Giorgi, 1997, 236). Phenomenology practice is structuring persons' sentimental acts. Humans are responsive to things that happen in world and to situations and relationships that they involve in. Phenomenology examines sentimental responses through individuals' practices (van Manen, 2007). Therefore, phenomenology was preferred as a research design in this research to define organizations' BI perceptions and examine competition in the sector in depth through participants' experiences.

Creswell (2007) described phenomenology research process as follows: At first, researchers collect data from participants that experienced the phenomenon by staying away their own experiences as far as possible. Then, information is reduced to specific expressions and expressions are gathered under themes. By following this procedure, researcher follows textural description that reflects how participants percept the phenomenon through their experiences and structural description that reflects how they experience. The combination of textural and structural descriptions reflects the essence of experience.

In this research, we adopted five basic steps of empirical phenomenology approach: (1) collection of verbal data, (2) reading of the data in research process, (3) breaking of the data into some kind of parts, (4) organization and expression of the data from a disciplinary perspective, and (5) synthesis or summary of the data for purposes of communication to the scholarly community (Giorgi, 1997, 245–248).

(1) *Collection of verbal data.* In data collection process at first, we composed the sample. We defined the population as IT organizations operating in Ankara Province. Since Ankara is the capital city of Turkey, the central offices of public organizations founded in Ankara, and organizations that produce BI solutions and provide consultancy services work with public organizations. The sample of the research consisted of 120 organizations that were chosen by following criterion sampling method. We determined the criterion as "organizations should utilize BI solutions" and searched the web pages of IT organizations operating in Ankara to meet this criterion. We conducted interviews with the staff that have an expertise on BI.

We followed face-to-face semi-structured interview method for collecting data and prepared an interview guide according to research questions. Questions were open-ended and supported by probes. Interview guide consisted of two sections. The first section included demographic, and job-related questions. The second section

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consisted of 10 open-ended questions. We sent the interview guide via email to two academics that have expertise on BI research to ask their opinions. Then, we evaluated the feedbacks and arranged the final version of interview questions. Right after, we started the data collection process.

We selected participants according to their BI-related positions as BI-expert, project manager, data-base expert, big data manager, BI consultant, business analyst, and executive. We sent interview requests to participants via email that explain the purpose and context of the research. Fourteen participants accepted the requests and interviews were conducted by the first author at their offices. Eleven interviews were carried out in Ankara and three interviews in Istanbul since central offices of organizations are in Istanbul. An audio recorder was used to record data after getting permission from participants. Data collection process continued from May 21, 2019 to August 21, 2019. Interviews lasted between 15 min (minimum) and 81 min (maximum).

(2) *Reading of the data.* At first, we transcribed the interview data of 14 participants to a .docx file. Phenomenology is a discovery-oriented research design and researchers should adopt an open approach in order to discover underlying and unexpected meanings in the data (Giorgi, 1997). In this research, researchers read and coded the data separately, and in several times, to provide an overall, open, and common understanding.

(3) *Breaking of the data into some kind of parts.* We adopted Mayring's (2014) inductive content analysis steps in analysing the data. In inductive content analysis process, categories are developed by following an exploratory design. The aim of the analysis is to enable the categories to emerge from the data, not from theoretical considerations (Mayring, 2014). Therefore, we did not use a predetermined coding scheme through the coding process. At first, we applied open coding to the data. We coded the data separately in different times and defined initial codes at this step. Then, we compared the initial codes and negotiated about the concepts emerged from the data. We merged the similar codes under a common title. We omitted the codes that were not related to research questions and the ones that mentioned by single participant.

(4) *Organization and expression of the data from a disciplinary perspective.* We gathered the codes that represent the different aspects of the same concept under a common category, and similar categories under themes. In this procedure, we titled categories and themes in accordance with BI and organization research terminology.

(5) *Synthesis or summary of the data for purposes of communication to the scholarly community.* We described the findings under four main themes and supported with quotes of participants. We referred to figures to visualize our findings.

Validity. We employed four strategies to provide validity of the research by referring Creswell (2007): Prolonged engagement and persistent observation in the field, (2) peer review and debriefing, (3) member checking, and (4) Rich, thick description (pp. 208–209):

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Prolonged engagement and persistent observation in the field. In pre-research process we consulted with professionals from IT sector and academics that have expertise on BI field. In research process, interviews were conducted in participants' offices. Hence, working environments of participants were also observed.

Peer review or debriefing. As mentioned before, we consulted with academics and ask their opinions about interview questions. After evaluating the feedbacks, we reorganized the interview guide. In analysing process at first, we coded the data separately, then compared our initial findings, and finally, we met on a common ground.

Member checking. After we transcribed the audio records in to .docx files, we sent them to participants and asked for their approval. Then, we evaluated recommendations and opinions of participants and proceeded to coding process.

Rich, thick description. We interpreted findings under four main themes and supported with quotes, if considered necessary. Also, we used tables and figures to present an overall understanding.

Limitations. The research period is limited from May 21, 2019 to August 8, 2019. The sample is limited to IT organizations that uses BI systems operating in Ankara IT sector.

4. Findings

As a result of inductive content analysis, four main themes emerged: (1) BI adoption, (2) Competition, (3) Organizations, and (4) Recommendations.

4.1. Business intelligence adoption

The theme entitled "Business Intelligence Adoption" represents BI adoption levels of organizations and consists of four categories: "BI perception", "fields of application", "advantages of BI", and "technologies". Figure 2 presents distribution of codes over categories.

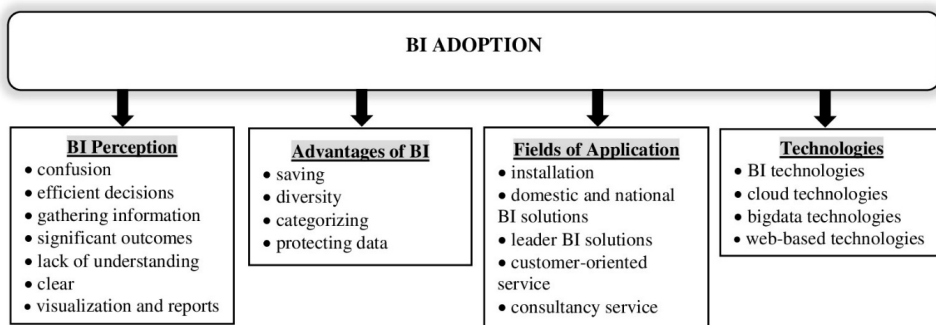


Fig. 2. The theme "BI Adoption" and its components.

BI Perception. The category represents BI perception in the sector. We found that participants generally define BI as a system that transforms raw data to clear and significant reports and visuals. BI perception is at the level of gathering information from various sources and presenting the output to executives. Besides, all the participants met on a common ground that BI is generally identified with reporting, and that a lack of understanding prevails in the sector. Four of participants mentioned that BI concept has not understood exactly yet in Turkey and generally the term is confused with “business analytics”. A participant emphasized that contradiction in terms may derived from translation of the term BI into Turkish:

I think the term was mistranslated into Turkish. It should be translated as ‘business prediction’ or ‘corporate intelligence’, we should make prediction. At present we are able to make prediction with Regression. At present, the definition of BI in Turkey is visualizing data and transforming raw data to significant outcomes. In foreign countries, the term is some more intended to prediction... predicting future based on current situation.

According to findings, we can say that organizations have an adequate level of BI perception. This can be associated with the fact that sample organizations are prominent ones in Ankara IT sector. However, opinions of participants indicate that BI perception is inadequate in sector wide.

Advantages of BI. The category consists of four codes “savings”, “diversity”, “categorizing”, and “protecting data”. Participants met on a common ground on advantages of BI and mentioned that BI facilitates the business and emphasized that organizations, suppliers, customers, and vendors should understand BI process appropriately. Participants especially put emphasis on the “savings” issue. BI systems provide organizations to save time and workforce at a considerable extent. Besides, diversity of outputs, to make categorizing easier, instant reports are the most mentioned advantages of BI.

Fields of application. Organizations in BI field can be categorized as organizations that set up BI infrastructure, produce BI systems, and offer BI consultancy service. Ten organizations in the sample provide consultancy services. Foreign BI applications are the leaders in the sector. Ten organizations provide consultancy for foreign products and provide consultancy services to public enterprises. Although processes they follow diverges, BI consultancy process is performed as below: At first, a “conceptual design” is structured for customer organization. This document was formed according to organizations’ raw data and requirement of reporting task. After analysing the situation of organization, conceptual design report is presented for approval to customer organization. If organization approved the conceptual design, technical analysis is conducted, and architecture is designed by consultant organization. The technical analysis report is presented for approval to IT department. Following these stages, project development process starts. As a result of this process, user test is performed and finally, the project goes in operation.

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Three organizations in the sample produce domestic BI solutions. A participant that takes part in production, distribution, and consultancy services of these products expressed his opinion as follows:

For example, we can receive an order in an exposition organized in a foreign country. They ask me that if I can process the given data in two months. In such a case, instead of calling central office and sending an offer, I can answer as “Yes, I have a chance to deliver you the project in two months, we can make an agreement right now” BI provides this, and many things for management.

Participant’s expression reveals that domestic products are also competitive in sector and in global market. The following sections handle the level of competitiveness and competitive strategies.

Technologies. The category represents the technologies used in BI systems. As a result of content analysis, four categories emerged: “BI technologies”, “cloud technologies”, “bigdata technologies”, and “web-based technologies”.

Organizations utilize BI technologies such as *Oracle BI*, *Power BI*, *HANA*, *SAP BO*, *SAP BW*, *IBM Cognos*, and “*Tableau*”. These are the tools that are generally used in the sector. Especially, *Oracle BI*, *Power BI*, *SAP BI*, and *Tableau* are widely used in the sector, and public organizations generally use *Oracle BI* and *SAP BI* products.

The sample also includes organizations that set up BI systems and provide consultancy services. Organizations generally perform according to customer expectations. Four organizations use domestic BI solutions besides foreign leader products. BI technologies are utilized in where the data is, in DWs, data mining, BI processes, and bigdata solutions. Organizations also give set up and consultancy services about the data base systems such as *PostgreSQL*, *ML SQL Server*, and *MySQL*.

Organizations mostly prefer *SAP BI*, *Power BI*, *Tableau*, and *Oracle BI*. *Tableau* is generally defined as a high costed product but provides better visual reports. *Oracle* and *SAP* provide extra services besides BI solutions and serve at lower costs than the other leader BI solutions. Besides, public organizations generally prefer *SAP BI* solutions. Participants complained about this situation since they have to make an extra effort to break the taboos. *IBM Cognos* that used to be a favourite BI solution is not preferred at present, since it has not renewed enough the BI services and solutions. The organizations that follow Gartner reports generally prefer *Power BI*.

Besides BI technologies, organizations utilize cloud technologies such as *Amazon Web Service* (AWS), *Google Analytics*, *Microsoft Azure*, and mobile technologies. Bigdata technologies are *Hadoop*, storage, data mining and, open-source technologies. Three participants stated that they utilize big data technologies and besides, they started to examine cloud technologies. This is because, large scale enterprises adopt new technologies systematically and small and middle scale enterprises turn towards cloud technologies to avoid data-based operating costs. We found that

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organizations' perception of bigdata technologies are at high level. Most of them utilize bigdata technologies besides BI technologies. Especially, data mining is a popular technology among organizations.

Organizations utilize web-based technologies such as Machine Learning, *PHP*, *Python*, *MySQL*. Participants generally stated that they have a good comprehension of Machine Learning, *Python*, and *MySQL*.

4.2. Competition

The second theme "Competition" consists of three categories that represent the competitiveness in the sector: "Nature of competition", "competitive advantage", and "structure of sector". The categories and codes are presented in Fig. 3.

Nature of competition. Three participants stated that competition in the sector is at low level; according to three participants it is changeable, for one participant it is at low level in terms of costs, and at medium level in terms of marketing; and seven participants stated as competition is at high level in terms of following and adopting new technologies. These findings indicate that competition in the sector is not stable. The level of competition changes in different fields of IT sector. For example, the dynamics of competition is different between large-scale enterprises that utilize BI systems and enterprises that develop software. The demand amount is changeable in software sector. Organizations struggle to gain competitive advantage with the services they provide. The ones that provide similar services try to step forward by adopting low-cost or differentiation strategies. For example, an organization provides hardware besides bigdata service, the other organization provides training besides their BI product. The way of providing BI solutions vary by organizations, and this situation increases the level of competition. A participant expressed his opinions about the nature of competition in the sector as follows

In Turkey, in IT sector BI is generally associated with providing license and staff. This is the fact of BI in Turkey in IT sector, in BI sector, in software

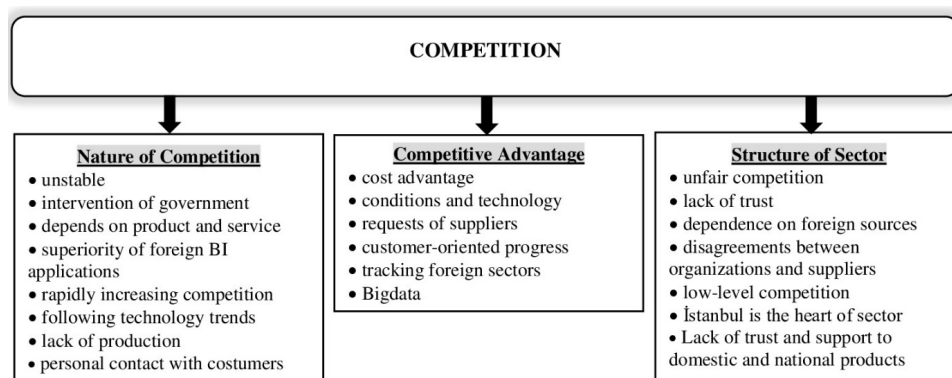


Fig. 3. The theme "Competition" and its components.

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sector. You should bear the Ar-Ge costs to build and develop a project, and you can get support if only your organization approve or from TUBITAK (The Scientific and Technological Research Council of Turkey). Therefore, at present, sector employees try to save the day in general. They don't involve in huge investments. They are mainly looking forward reducing the costs and increasing the profit margin. They utilize tools they have procured previously and try to pursue and develop prior business contacts.

Participant's expressions indicate that organizations in Ankara IT sector is generally trying to survive in competition and lack of financial support underlines this problem.

Competitive advantage. We found that the technologies adopted in BI processes are generally provided by leader foreign companies. These products are improved continuously according to organizations' requirements. BI tools that are improved according to technology and customer expectations provide competitive advantage. Leader foreign organizations such as *SAP, Oracle, QlikView*, and *Tableau* increase the level of competition in the sector since they adopt a renewing approach. Organizations that produce and utilize domestic BI products try to gain advantage by adopting a low-cost strategy. However, low-cost strategy is inadequate to gain competitive advantage over sector leader organizations. There has been an ongoing conflict between BI suppliers and customer companies. Public organizations generally prefer to use leader foreign BI products, and consultancy services of these organizations are at high cost.

Structure of sector. Participants met on a common ground on the issue that an unfair competition prevails in the sector between foreign and domestic products. Organizations operating in Turkey that use BI systems generally prefer foreign leader products. There is a lack of trust to domestic BI solutions. According to these findings, we can say that the sector is dependent on foreign organizations and their products. Domestic products have not been widely used yet, and some conflicts arise between foreign BI solutions suppliers and customer companies. Since organizations have not developed BI solutions as a core competency, they are dependent to suppliers in terms of BI consultancy services and BI-based decisions. In that case, we can say that the competition level between foreign and domestic is at very low level. Although organizations that produce and utilize domestic BI solutions adopt a low-cost strategy, it is inadequate to be competitive in the sector. However, competition between foreign product/service producers is at high-level. According to the findings, these leader companies adopt differentiation strategy to gain competitive advantage. Leader organizations differentiate their products in terms of presentation, features, and functioning in accordance with customer expectations.

Another finding is that Istanbul is considered as the hearth of IT sector in Turkey since central offices of most of the organizations are settled in Istanbul. These organizations think that central office staff is more capable of BI and technical skills.

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This finding can be interpreted as Ankara offices pass responsibilities to Istanbul, and even the competitive advantage.

4.3. Organizations

The third theme “Organizations” represents how BI processes are performed in organizations. The theme consists of four categories: “BI department”, “key points”, “decision making” and “challenges” Categories and codes are presented in Fig. 4.

BI Department. We found that the structure of BI department varies by organization. All participants stated that number of staff changes to organization. The department generally consists of BI consultant, business development manager, BI manager, and project developer. In some organizations, DW expert and BI expert work together in the same department. In some organizations, although there is not a separate BI department, a BI expert is assigned to every department including sales and marketing. This assignment is important as it provides information flow to top management.

We found that organizations generally do not have a separate BI department. Eight participants stated that their organizations incorporate a BI department. According to two participants, they prefer to take consultancy services. Six participants stated their organizations have a separate department. Participants also complained about the lack of qualified BI staff. As a result, participants agreed on that most organizations in the sector do not have a separate BI department. A participant’s opinion about issue is as follows:

Most organizations do not have a separate department. Some organizations in the sector and also some ministries organize a BI team. However, some organizations assign only one technician in IT department and even do not assign a manager. Therefore, this issue varies of scale of the organization and

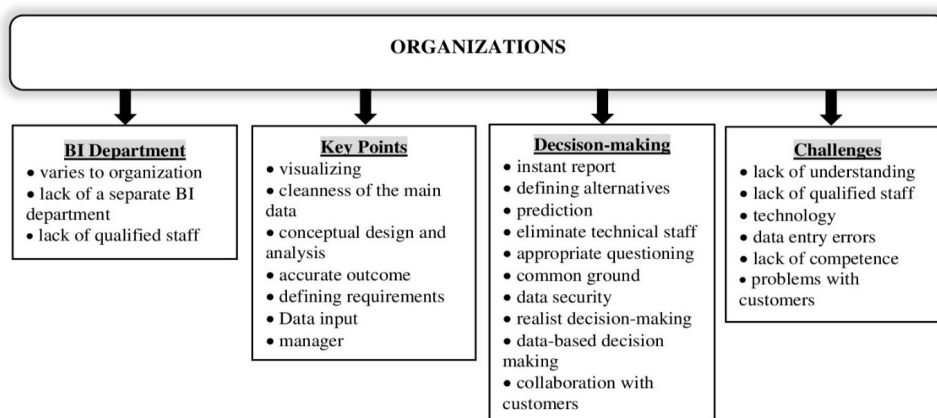


Fig. 4. The theme ‘Organizations’ and its components.

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the time, and also related to attaching value to the data. That is not the point. BI is an issue that requires a considerable extent of effort. For that reason, organizing a team is particularly important. As I mentioned before, some organizations employ technician in the position of computer engineer. It is really a hard work to organize a BI team in such organizations.

Key points. This category represents the requirements for using BI solutions effectively. According to the findings, an organization should clean the data, enter the data appropriately, interpret the outcome accurately, collaborate with the organizations that provide consultancy service in conceptual designing process, define requirements, and assign a BI manager.

Information gathered from various sources should be filtered in the initial step. This process provides cleanness of the main data. Additionally, output of BI process should be interpreted accurately. Four participants stated that when they are working on the data, they can miss the whole picture sometimes. Visualizing the data in various forms enables providing integrity.

Conceptual designing process is performed according to expectations and requirements of customer organization. Customer organization should present their situation appropriately to consulting firm. This process is crucial as it underlies the BI project.

According to the findings, monitoring the BI process is a requirement for a BI manager as the manager has an important role in guiding and controlling the qualified staff and also in informing the executives about BI systems and processes. Some executives consider BI processes costly. At this point, it is important to explain and clarify the intangible benefits of BI process and its advantages for competitive advantage.

Organizations should evaluate why they need to utilize BI solutions and express this issue accurately to their consulting firm. They should define what they expect to see as a result of BI process. Additionally, the staff should be qualified about BI systems and supported with trainings.

Decision-making. This category represents the effects of BI on decision-making process. We found that BI supports decision-making by providing instant reports and alternative options. Executives can make realist decision based on visuals and reports and make predictions about future conditions. Besides, BI systems save technical workforce and in turn reduce the costs. The key point is to provide data security and evaluate the output appropriately. Collaboration between supplier organization and customer organization is crucial in terms of managing the process and interpreting the outcomes appropriately. A participant who is an executive in a consulting firm explained the collaboration process as follows:

We conduct almost everything through correspondence. We prepare the conceptual design and request for original signed document. The architecture is presented to IT department. The improvement process is managed by BI

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developers. Before launching the project, unit tests are performed. If a problem defined during the tests, it is solved by developers, if not we present the project to customer organization for testing. We organize test cards that inform the user how to conduct the test. After customer conducted the test, we ask for their approval. After the testing process, project is ready to launch. If the organization has not ever used BI systems or the project is large, we consider system hardware and requirements.

Challenges. The category represents the challenges in BI processes and consists of six codes: “lack of understanding”, “lack of qualified staff”, “technology”, “data entry errors”, “lack of competence”, and “problems with customers”.

Eleven participants agreed on that there is a lack of understanding on benefits of BI. Some conflicts may arise during BI process. BI is considered a high-costed tool because of adoption, operating, licensing, and consultancy costs. To solve this conflict, it is especially important to explain benefits of BI to executives. For example, a participant stated that some executives still resist on using Excel program and believe that it is adequate to get same outcomes. Besides, six participants expressed that executives are not capable of BI process and insist on using traditional reporting tools. This situation indicates that novelty encounters with resistance, and conservatism prevails in the sector, especially in the executive level. On the other hand, consulting firms complain about that some customer organizations are lack of understanding. Six participants expressed opinion on this way. A participant expressed the problems arising in the process as follows:

We should get users addicted to BI. BI is a demanding process. Generally, users are not such patient. Duration of project contract is limited to one or two years. This period includes orientation, cleaning the data, comparing previous and current reports, and meetings. This process takes approximately eight or nine months. The period varies of organization. After this process, the report is presented. The contract expires precisely when customer is about to get accustomed. And the customer says, ‘We don’t utilize it anyway’ and they do not extend the period. Then, the project become just a trash, and a useless cost for organization.

Another challenge is that as technology is rapidly improving, the level of competition increases in the sector. However, every organization do not have the opportunity to adopt new technology. Leader companies have the advantage in this regard.

Moreover, organizations come across some problems during data gathering and storing processes. Some problems arise especially in cleansing and data input processes.

4.4. Recommendations

The fourth theme “Recommendations” represents solutions to challenges emerge in adopting and implication processes. The theme consists of three categories: “role of

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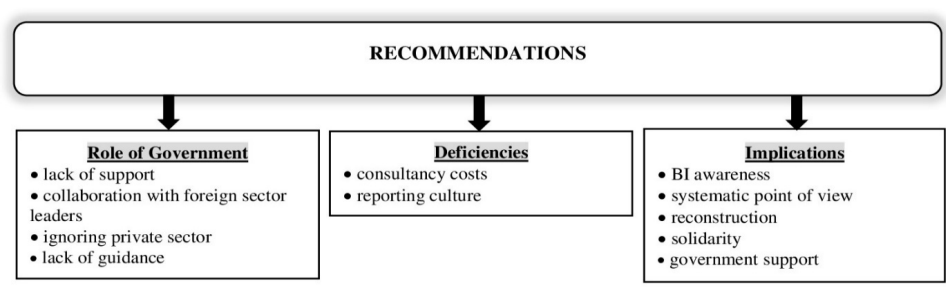


Fig. 5. The Theme “Recommendations” and its components.

government”, “deficiencies”, and “implications”. Figure 5 presents the distribution of codes over categories.

Role of Government. All participants agreed on that government should support domestic BI solutions. Public organizations (e.g. ministries) generally prefer using foreign BI solutions, and this fact effects competitiveness of domestic products negatively. Participants think that government should support and guide domestic organizations. A participant expressed opinion about this issue as follows:

Domestic products should be supported by both end-users and government policy. Government should encourage these products and prioritize them. And we, as technical staff and organizations, should allocate time to produce value added products, be product oriented, and take an inquisitive stand. There are so many foreign sources in the sector, and this situation causes current deficit in terms of import and export.

Deficiencies. We found that dependency to consultancy firms is a deficiency in the sector. Consultancy services cause high costs. Besides, the language of foreign products and services is different form the native language of the staff, and this causes lack of understanding and waste of time. Moreover, customer organization is dependent to consultancy services in every decision they make about BI. Hence, it would be better for organizations to consider some questions in utilizing BI, such as “Is using BI systems simple?” “Does it require consultancy service?”, “How often should we update BI tools?”

We defined another deficiency in the sector as “lack of reporting culture”. Reporting is perceived as a list that is organized systematically. Therefore, BI concept cannot be understood appropriately either. Improving understanding about the concepts is an important step for realizing the benefits of BI.

Implications. We found that it is possible to increase the level of BI perception in the sector by clarifying concepts. BI concept has not internalized yet in Turkey. Improvement of technology at high-speed increases ambiguity further. Participants supported the opinion that if organizations adopt BI technology successfully, they would gain competitive advantage. A systematic viewpoint is required for adopting

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BI. If this point of view articulated to staff and it leads to behavioural change, efficient results would be achieved. Thus, at first, current situation analysis should be performed appropriately. In this way, transformation and adoption can be achieved, and benefits of BI will be more recognized. Organizations that ignore these factors tend to use sector leader products and services, and they are most likely to face higher costs.

Additionally, government support is crucial for domestic BI solutions. The government should encourage and guide these organizations. If government organizations use domestic products it would inspire other organizations. A participant expressed the role of government as follows:

Data is important. Storing the data in cloud in Turkey is not adequate. Domestic solutions that process data should be supported. Especially, government should give priority to these products as a customer. We have also prepared reports for domestic software products. Government should use these products in order to develop by using software sector solutions. And should be a role model. Private sector would adopt quickly what public organizations use and won't bow to the foreign products. They will also utilize foreign products and collaborate with foreign companies but if you don't have the source code you won't be able to do anything. I don't mean that government must write the source code, this will increase the costs as it is not under the responsibility of government. I mean it will be better to outsource. Besides, we have difficulty to sell a domestic product to foreign companies. Namely, at first public organizations should adopt it, then we will be able to export our products.

5. Conclusion

In this paper, we examined the effects of BI on competitive advantage in the context of organizations operate in Ankara IT sector by following a qualitative design, phenomenology. We applied inductive content analysis to the interview data of 14 participants. As a result, four main themes emerged: "BI adoption", "competition", "organizations", and "recommendations". We found that BI has a positive effect on competitive advantage in Ankara IT sector. BI provides organizations to save time and workforce, instant access to the data, and alternative outcomes.

We found that 14 organizations have an adequate perception level of BI. Participant's definitions are in accordance with BI literature. However, participants asserted that there is a lack of understanding about BI in the sector. Especially, ambiguity about concepts, lack of understanding about BI processes and benefits, lack of a separate BI unit, adhering strictly to traditional methods and resistance to change were defined the main reasons of lack of BI perception in Ankara IT sector. The conflict between the sample and the rest of the sector in terms of BI perception may be derived from our sampling method. The criteria of choosing organizations from the population was "to utilize BI systems". For that reason, the level of BI perception and understanding may be higher than the other organizations.

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Organizations utilize BI technologies, cloud technologies, and web-based technologies in BI process. We found that these technologies are majorly foreign and leader products. A limited number of organizations utilize domestic products. This situation also effects the nature of competition in the sector. Participants defined lack of government support and utilizing foreign leader BI products in public organizations as one of the important factors that leads unfair competition. Domestic solutions are not able to compete with leader BI solutions as a substitute product. As organizations have not developed their own BI solutions as a core competency and know-how, they are dependent on consultancy firms. The cost of consultancy services is a disadvantage for customer organizations. Although domestic products provide cost advantage, they are not preferred in both public and private sectors. Hence, according to findings, the intensity of competition is at high level between leader foreign products, and at very low level between domestic and foreign products.

We found that leaders in the sector adopt Porter's (1980) differentiation strategy in gaining competitive advantage. Organizations practice differentiation strategy in terms of product design, set-up, and functioning. The differences are designated according to customer's expectations and requirements. Organizations that produce and utilize domestic products struggle to survive in the sector by adopting Porter's (1980) low-cost strategy. However, capability of adapting to technology quickly, progressive viewpoint, and financial power of leader organizations effect competitiveness of domestic products negatively. Bargaining power provides an important competitive advantage to foreign products, a domestic product even cannot serve as a substitute. Accordingly, an "unfair competition" (in participants' words) prevails in Ankara IT Sector. Government has a vital role in overcoming this situation. If public organizations prefer using domestic products this would encourage organizations to develop their own BI technologies as a core competency.

Although sample organizations have an adequate level of BI perception that is not the case for whole sector. Hence, collaboration is required between consultancy firms and IT firms to overcome this ambiguity about BI. Especially in conceptual designing process, customer organizations should present their expectations and requirements accurately to supplier organizations. Besides, training is required for the staff that participate in BI process. BI manager has an important role in adopting BI culture through organization. A separate BI department has a critical position in this respect.

This study is important as it provides the nature of competition between foreign leader products and domestic products in Ankara IT sector. We found that these two groups adopt different competitive strategies, and the level of competition is changeable in the sector. Consequently, findings of this research are limited to Ankara IT Sector and more in-depth research on different samples are required. We recommend for future research to examine unique strategies that provide competitive power for domestic organizations. Research on IT sectors in different countries and regions will enable comparison.

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