Business Intelligence Systems Adoption Model: An Empirical Investigation

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ABSTRACT

Decision support and business intelligence systems have been increasingly adopted in organizations, while understanding the nature of affecting factors on such adoption decisions need receiving much academic interest. This article attempts to provide an in-depth analysis toward understanding the critical factors which affect the decision to adopt business intelligence (BI) in the context of banking and financial industry. In this regard, it examines a conceptual model that shows the impacts of different technological, organizational, and environmental factors in the decision to adopt BI by a firm. Structural equation modeling (SEM) was used for data analysis and test the relevant hypothesis. The results of this article which are derived from theoretical discussion of hypothesizes show that from nine hypothesized relationships—perceived tangible and intangible benefits, firm size, organizational readiness, strategy, industry competition and competitors absorptive capacity—affect BIS adoption in the surveyed cases.

KEYWORDS

Adoption Model, Business Intelligence, Partial Least Squares (PLS), TOE Framework

1. INTRODUCTION

To compete in today's volatile environment, firms are increasingly attempting to generate, collect and transform their data into actionable knowledge (Delen & Demirkan, 2013). In response, business intelligence (BI) is designed to resolve special problems business and managerial decision-making issues (Martins, Oliveira, & Popovič, 2013; Petrini & Pozzebon, 2009). Put simply, Vukšić, Bach, and Popovič (2013) believed that BI is targeted to analyze the available information and turned them into valuable knowledge to abate informational needs. Previous studies have completely shown the importance of using BI as one of the main concerns of most chief information officers (CIO) (Howson, 2008; Işık, Jones, & Sidorova, 2012).

Alongside all benefits discussed in previous research, it should be noticed that BI implementation may impose significant costs (Rasmussen, Goldy, & Solli, 2002). The outcome of Ramamurthy, Sen, and Sinha (2008) study, also revelead the fact that attempting to adopt and implement BI within an organization environment require a tremendous cost which should be considered precisely. Thus, given to the remarkable costs, it is better for organizations to focus on different aspect of this issue, as well as consider influential factors associated with adoption process (Ravasan & Savoji, 2014).

Previously, several studies have been conducted to explore different factors which may affect the information systems adoption decision such as e-procurement (Teo, Lin, & Lai, 2009), e-commerce (Al-Qirim, 2008; Grandon & Pearson, 2004), e-business (Zhu & Kraemer, 2005), data warehouse (Hwang, Ku, Yen, & Cheng, 2004; Ramamurthy et al., 2008), customer relationship management (CRM) (Hung, Hung, Tsai, & Jiang, 2010), knowledge management (KM) (Xu & Quaddus, 2012), electronic data interchange (EDI) (Kuan & Chau, 2001). However, relatively few attempts have been conducted to determine the influencing factors associated with the adoption of BI systems. Thus, in considering the rapid increase in the amount of data throughout the organization and also with regard to the importance of managerial decision making, it is obvious that determining the most appropriate factors in terms of BI adoption have a deep impact on the decision to employ it (Hou, 2013, 2014). Further, it will be necessary for organizations as a strategic, broad map to take the proper action in the way of BI adoption.

As a result, the main objective of this study is to examine the adoption factors which affect on BI implementations in the financial industry in the context of Iran. Specifically, the paper seeks to address the following research question.

RQ1: What are the key tailored factors related to the adoption of BI systems regarding technology, organization, and environment (TOE) framework?

RQ2: What are the major differences between adopters and non-adopters groups in the relationship with BI adoptive construct?

In response to the above research questions, this study attempts to identify the critical factors influencing the adoption of BI in the financial sector from the different perspective through survey data. Finally, there are several important contributions to IT adoption literature as follows:

- *It offers a model incorporating a set of technological, organizational, and environmental in BI adoption that is validated using partial least squares (PLS).*
- *It provides an insightful understanding for enterprises to the forefront importance of perceived tangible and intangible benefits in BI adoption.*
- *We target a large number of financial services include banking and insurance enterprises to validate the research model and hypotheses, which had been spotted not so obviously in the past.*

The rest of this paper is organized as follows. First, a literature review related to BI concept, the role of BI in particular in the financial services sector, and pertaining framework from an information systems adoption perspective is presented. Second, the proposed research model and hypotheses for investigating the adoption of BI is outlined, followed by the research method, data analysis, and results. For the next part, the discussion of main findings, limitations, and implications for both associated researchers and practitioners is provided. Finally, this paper concludes with a brief overview of the whole paper and proposes further possible directions for future research.

2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1. Business Intelligence (BI)

According to prior literature, various definitions and approaches of BI have been appeared by Ghazanfari, Jafari, & Rouhani (2011). In managerial perspective, BI is introduced to prepare a

decision support context for decision-makers to make better understanding and managing organizational processes. Bose (2009) believed that BI intends to prepare the right information to the right people at the right time to improve decision making, further improve managerial proceeding and enterprise performance. In general, this approach sheds light on data gathering from different sources and use the achieved results in decision-making process (Ghazanfari et al., 2011; Petrini & Pozzebon, 2009). Technological perspective introduced BI as set of analysis tools such as data mining and On-Line Analytical Processing (OLAP), to provide automated decision making around business conditions, sales, customer demand, product preference, and so on. This perspective highly focused on technological tools used in managerial decision making to make the most acceptable results (Ghazanfari et al., 2011; Petrini & Pozzebon, 2009). Ghazanfari et al. (2011) introduced a new approach called system enabler in which the value added features on supporting information is on the focal point. In this regard, some researchers have benefited this approach in their studies that can be seen as a proof of the claim (W. W. Eckerson, 2010). In light of the above discussion, we adopt a balanced perspective and define BI as "…a strategic decision aid for organizations to collect, and analyze data sources using diverse technological tools to support organizational decision making and finally increasing organizational performance…"

Nowadays, the financial industry is seen as one of the most important industries with great scope of information demands insofar as organizations struggle for achieving valuable insights from their data. To this end, enterprises attempt to make benefit from BI as a momentous tool to improve both information and service quality. Using BI help decision-makers to inform overall aspects of the organizations by analyzing the required information in detail and lead them toward desirable goals. Prior studies have completely stated about the key benefits of BI to firms. (Howson, 2008; Işık et al., 2012; Turban, Sharda, Aronson, & King, 2008). For instance, Lin, Tsai, Shiang, Kuo, and Tsai (2009) found that "…BI systems assist in understanding a business condition, improve stakeholder satisfaction, create beneficial opportunities, and measure organizational performance…" Castellanos, Gupta, Wang, Dayal, and Durazo (2012) declared that BI adopters gain competitive advantage by increasing situational awareness which can influence operational decisions. The outcome of previous research shows that using BI systems have positive and significant influence on profit margin, revenue, and also internal process. In this area, BI systems attempts to improve the state and the performance of the organization at four following items: (1) the ability to obtain customer insights, (2) information delivery as fast as possible, (3) performance delivery in more efficient mode, and (4) risk

management (Kerensky, 2013).

However, BI systems are widely used in various industries in response to meet their business needs from a simple query and reporting function to advanced analytics such as data mining and dashboards (Petrini & Pozzebon, 2009; Popovič, Hackney, Coelho, & Jaklič, 2012), but rarely mentioned the attributes influencing the adoption decision of BI by firms. In this regard, we propose a conceptual model by employing TOE framework which is described in the following section.

2.2. IT/IS Adoption Theories

Reviewing earlier research clearly shows the fact that adoption models are increasingly applied from different angles to investigate factors influencing technology's intention to use (Lee & Xia, 2006). In terms of innovation adoption/diffusion, Premkumar and Roberts (1999) proposed several factors that influence the decision to adopt an innovation. Kwon and Zmud (1987) claimed that the foremost factors influence IT implementation stages classified into five groups, namely user/individual characteristics (e.g., education, job tenure, resistance to change), organizational characteristics (e.g., centralization, formalization, specialization), technological characteristics (e.g., complexity), task related characteristics (e.g., task autonomy, variety, and uncertainty), and environmental characteristics (e.g., uncertainty, interdependence). In general, a significant amount of IT adoption research has been conducted at both individual and organizational levels (Hameed, Counsell, & Swift, 2012). In individual perspective, research has focused on the individuals and what influences their decisions to use a particular technology. In turn, organization perspective has focused on factors considered to influence IT on firm-level adoption and its impact on the overall performance of the organization (Yang, Kankanhalli, Ng, & Lim, 2013). In general, the diffusion of innovation (DOI) theory (Rogers, 1995), technology acceptance model (TAM) (Davis, 1989), and the technology-organization-environment (TOE) perspective (Tornatzky & Klein, 1982) are the most important theoretical lens which has been used in earlier IS research.

The DOI theory has been widely applied as a theoretical foundation in IT adoption field (Premkumar & Roberts, 1999). This theory depicts five attributes of innovation such as relative advantage, compatibility, complexity, trialability, and observability (Rogers 1995). Further, the TAM model is proposed to predict user acceptance of IT and behavior of individuals in this term. In this theory, Davis (1989) assumed that IT adoption by users has two perceived attributes,

namely “perceived ease of use” and “perceived usefulness”. Both mentioned theories have been used extensively in the innovation literature (Park & Kim, 2014). However, these approaches are from the individual perspective and take no account about the influence of organizational and environmental attributes (Hameed et al., 2012). By the same token, Brancheau and Wetherbe (1990) believed that the DOI theory is unable to explain IT adoption at an organizational level.

TOE model approaches IT adoption issue from three separate dimensions, i.e., technology, organization, and an environment. Considerable scholarly research has focused on examining the impact of such framework and validated in influencing IT adoption (Gu, Cao, & Duan, 2012; Lu, Lin, & Tzeng, 2013; Premkumar & Roberts, 1999; Teo et al., 2009; Yang et al., 2013; Zhu & Kraemer, 2005; Zhu, Kraemer, & Xu, 2006). According to Tornatzky, Fleischer, & Chakrabarti (1990), technological dimension consider both internal and external relevant technologies to the firm Tornatzky and Klein (1982) indicated that the aim behind research in terms of innovation characteristics is to explore the relationships between the attributes of an innovation and the adoption decision. In this regard, they have found the top 10 technology-related attributes entail relative advantage, complexity, communicability, divisibility, cost, profitability, compatibility, social approval, trial ability, and observability. However, their findings expressed this issue that just three of them, namely relative advantage, compatibility, and complexity have a significant influence on adoption. The factors associated with organizational dimension are those that directly related to the organization which aims to adopt an innovation. These include several factors such as top management support, firm size, centralization, formalization, and presence of a champion. Finally, the environmental dimension explains the industrial settings in which an organization conducts its business. For the environmental dimension, there are fewer factors than other dimensions include factors like degree of competition, the level of uncertainty, industry type, and regulations.

As a result, unlike the DOI and TAM theories just focus on the adoption process in a standpoint of the individual, it is apparent which the TOE perspective shed light on adoption decisionas a unified framework in firm level by encompassing all required and effective aspects. Hence, we find it consistent for this study as a starting point in our proposed framework and case analysis.

2.3. TOE Perspective

Based on prior studies, the lists of potential salient factors which have taken place under these three perspectives are lengthy. Hence, we have chosen to highlight those that have been

suggested by prior research, are more important and clearly related to the adoption of BI. In light of the above arguments, it will be significant to have an accurate understanding of the key factors to ensure the successful adoption of BI technology. However, it was not feasible to comprise all potential factors affecting the adoption of BI, the election of the theoretical constructs in our model was determined through a widespread literature review as well as an informal interview with several BI specialists. Hence, this study examines the effect of various factors on the decision to adopt BI. As the research framework in Figure 1 show, we identified the following nine factors which are considered to have an association with the adoption of BI in organizations. These factors include: (1) perceived tangible benefits; (2) perceived intangible benefits; (3) perceived costs, (4) perceived complexity; (5) business size; (6) organization's readiness; (7) organization strategy; (8) industry competition; and (9) rival's absorptive capacity. Perceived tangible and intangible benefits (inferred to relative advantage in the innovation literature), perceived costs, and perceived complexity is listed under technological factors. Under organizational factors, we have business size, organization readiness and organization strategy. Finally, under environmental factor, we explored the role of industry competition and rival's absorptive capacity that somewhat was applied in similar studies. In the next section, we will discuss our research model and hypotheses based on the three mentioned dimensions.

2.3.1. Technological Attributes and BI Systems Adoption

Technological attributes indicate the perceived characteristics of the innovation (Teo, Tan, & Buk, 1998). Several studies have been accomplished around the main drivers of IS adoption. Among all factors, benefits, costs, and complexity of IS adoption are known as the most cited attributes in literature (Al-Qirim, 2008; Premkumar & Roberts, 1999; Ramamurthy et al., 2008). As Premkumar & Roberts (1999) note, perceived benefits are the major stimulus in adopting new technologies. Tornatzky and Klein (1982) believed perceived benefits of an innovation directly and positively affect the adoption decision. Perceived benefits stem from BI systems are expected benefits that can be provided to the organization. BI can bring several benefits include cost reduction, increase revenue, real-time data, and time reduction (Turban et al., 2008). These benefits can be divided into two main sections including tangible and intangible (W. Eckerson, 2003). Tangible benefits are those directly related to gain dollar figure in organizations. Tangible benefits include time savings, cost savings, ROI, new revenues, the total cost of ownership, and shareholder value. In addition, intangible benefits are those difficult or

sometimes impossible to quantify (Gibson, Arnott, Jagielska, & Melbourne, 2004). Intangible benefits include single version of the truth, better strategies and plans, better tactics and decisions, more efficient processes, greater customer/supplier satisfaction, greater employee satisfaction. Both tangible and intangible benefits affect the decision to adopt BI and can be utilized in this context. Given these potential stated benefits, we posit the following hypotheses:

H1: Perceived tangible benefits are positively related to the adoption of BIS.
H2: Perceived intangible benefits are positively related to the adoption of BIS.

From innovations costs perspective, the advantages of each new innovation should be higher than the costs of adopting it (Premkumar & Roberts, 1999). In this respect, BI technology is no exception. For any organization, the adoption of BI systems accompanied with a very high cost of ownership. For example, the potential administrative and implementation costs which will get companies into trouble by developing BI. Furthermore, the relatively high cost of maintaining and implementing a BI system is a major factor which affects the adoption of BI. In this regard, the costs of a new technology have a major bearing on the decision to its adoption (Lu et al., 2013). In general, firms would like to hold the balance between both benefits and costs associated with the adoption of innovation (Teo et al., 2009). Tornatzky and Klein (1982) believed that technologies with lower perceived costs are more likely to be adopted. In other words, perceived cost of an innovation can be seen as an inhibitor in the adoption of new innovation (LaValle, Hopkins, Lesser, Shockley, & Kruschwitz, 2010). Considering the above discussion, we posit the following hypothesis:

H3: The lower perceived costs the BIS have, the more positive the impact on the adoption of BIS.

Previous studies have been cited complexity as one of the major innovations-related attributes influencing the willingness of enterprises to adopt or not to adopt a new technology (Damanpour & Schneider, 2009). Complexity refers to the degree to which an innovation is perceived as difficult to use and understand in the business environment (Thong, 1999). Put simply, complexity shows the difficulty in adopting an innovation, which may be presumed as the inverse of perceived ease of use in technology adoption research (Davis, 1989). Tornatzky

and Klein (1982) found a significant and negative relationship between the complexity of an innovation and its adoption. Rogers (1995) believed that due to lack of required skills and knowledge, perceived complexity leads to resistance to employ new technology. Because, organizations are attempting to get ahead from their competitors through an appropriate response to three principal questions: (1) what is happening now, (2) what is likely to happen next, (3) what actions should be taken to obtain competitive results. Thus, lack of understanding of how to use BI and analytic have been found as the most important obstacle in adopting BI (LaValle et al., 2010). Hence, it is reasonable to expect that there is a negative relationship between perceived complexity and the decision to adopt BI systems in the financial sector. Therefore, we have the following hypothesis:

H4: The lower perceived complexity the BIS have, the more positive the impact on the adoption of BIS.

2.3.2. Organizational Attributes and BI Systems Adoption

Based on Teo et al., (1998) definition, organizational attributes are those variables affecting the organizational structure that the organization could adjust or change to adapt its changing environment. Orlikowski (1993) believed that there is a meaningful relationship between the characteristics of the organization and the decision to employ a new technology. Organizational attributes, in turn, include business size (Damanpour, 1992; Teo et al., 2009), organizational readiness (Grandon & Pearson, 2004; Tsai, Lai, & Hsu, 2013), and organization strategy (Naranjo-Gil, 2009). Particularly, the size of the business has been defined in terms of organization's resources, transaction volumes, or workforce size (Lee & Xia, 2006). Former studies have been widely focused on the relationship between the size of the organization and the decision to adopt an innovation (Kuan & Chau, 2001; Sawang & Unsworth, 2011). Based on prior research, the greater the size of organizations is more likely to invest in new technologies and absorb the related risk because of having further financial and technology resources (Grover & Goslar, 1993). Conversely, small organizations encounter suffering condition, include resource poverty arising from various condition include financial constraints, lack of professional expertise and so on (Thong, 1999). Because small organizations have more difficulty in IS adoption, Sawang & Unsworth (2011) noted that these orgamization are less likely to adopt. Hence, the size of the business is positively associated with the adoption of BIS. Thus, we proposed a

hypothesis for the adoption of BI in the financial sector as follows:

H5: The larger the size is, the more positive the impact of the adoption of BIS.

Organizational readiness as a specific firm-related factor plays an important role in the decision to adopt an innovation (Grandon & Pearson, 2004; Tsai & Tang, 2012). Iacovou, Benbasat, and Dexter (1995) suggested that readiness is the main driver for organizations behind the adoption of technological innovation with respect to two aspects including financial and technological resources. Financial readiness refers to the organization capability to invest on new technologies, whilst technological readiness is focused on expertise and the level of technology sophistication. By the same token, given the several well-known characteristics related to BI containing require thousands of dollars and also high degree of technological expertise to use outcome analytics, it is not surprising to expect there is a positive relationship between organizational readiness and the adoption of innovation (Lu et al., 2013; Wang & Ahmed, 2009). Hence, we proposed the following hypothesis for the adoption of BI:

H6: The greater readiness the organization has, the more positive the impact of the adoption of BIS.

The strategy can be defined as an effective management tool which affects the competitive position of the firm. In (Miles & Snow, 1978) point of view, strategy inferred as the patterns of both major and minor decisions in terms of possible future whenever it is implemented within the organization structure and process. Miles and Snow (1978) established a well-known business strategy typology in three viable types including prospector, analyzer, and defender. In this paper, we use this typology to differentiate between two opposite strategies: defender vs. prospector. According to Miles & Snow (1978), prospectors are those that are more dynamic than the other organizations in the same industry. They are continually striving to become a first in the marketplace by focusing on new opportunities and responding to a wide range of services and products quickly. Although, organizations with prospector strategy, invest heavily for product/services R&D and environmental scanning, but this emphasis leads firms to a lack of controls as well as reducing operational efficiency. In contrast, defenders refer to organizations which pursue a stable position with a focus on a narrow segment of a market. Within this limited domain, organizations tend to ignore developments and offer a relatively small range of

services and products rather than becoming a pioneer (Miles & Snow, 1978). In other words, they do not stress on new opportunities through searching in the outside domain, and most of their efforts are around the process improvement instead of product innovation (Sabherwal & Chan, 2001).

Between the two mentioned strategic types which resides at the opposite ends of the continuum, there is one other type of organization called analyzer (Miles & Snow, 1978). In fact, the analyzer is a combination of prospector and defender, which attempts to simultaneously achieve the following:

(1) minimizing the risks, and (2) maximizing the profits. In the simplest sense, analyzers are seeking to combine the strengths of prospectors and defenders into a single one. In this regard, they are interested in employing dual-core technologies mean simultaneously have both stable and flexible components. In sum, they do not eschew changes unlike defenders; additionally, they do not classify into initiator category to adopt new changes. Indeed, they will plan to follow the pioneers in response to the related changes (Miles & Snow, 1978). However, Li and Tan (2013) represent that due to the hybrid nature of analyzers approach, both strategic and managerial features are not clearly articulated as like as defenders and prospectors.

Prior researchers widely used business strategy in a different context, such as organization performance (Li & Tan, 2013), innovation success (Ritter & Gemünden, 2004), and organizational innovativeness (Yu, Dong, Shen, Khalifa, & Hao, 2013). However, few studies focus on the impact of business strategy on the adoption of innovation (Bruque & Moyano, 2007). For instance, Naranjo-Gil (2009) argued that hospitals with prospector strategy were more apt to adopt an innovation than those with using defender strategy. Furthermore, Bayo-Moriones & Lera-López (2007) viewed strategy as an important factor which influences the diffusion of an innovation process. Consequently, we posit that the adoption issue can be better understood by taking into account the prospector strategy of the organizations. Therefore, we have the following hypothesis:

H7: The prospector strategy is positively related to the adoption of BI.

2.3.3. Environmental Attributes and BI Systems Adoption

Environmental attributes are defined as changes in the business environment that create both threats and opportunities for an organization, also are usually beyond the control of management (Teo et al., 1998). As Orlikowski (1993) states, an external environment has a significant role in

an organization's decision to adopt new technology. In here, we adopt two factors, namely competition throughout the industry and rival's absorptive capacity as an environmental attribute which naturally affects the decision to adopt BI by enterprises. Barney (1991) stated, competitive advantage can be realized in strategies that increase effectiveness or efficiency, and is valuable, rare, and difficult to imitate. Both types of innovation comprise radical and incremental, are following this aim for organizations to provide better competitive situation and also differentiate itself from its competitors (Gu et al., 2012; Hung et al., 2010). As Ramakrishnan, Jones, and Sidorova (2012) note, competitors are known as one of the key stimulus for organizations to use BI for reaching better insights. Furthermore, Cokins (2013) claimed that BI is the only way in making better decisions and gaining sustainable competitive advantage. Innovation and IS, in particular, are well recognized as a key driver of economic development and a basic source of competitiveness in the global marketplace. By the same token, Zhu et al. (2006) and Hwang et al. (2004) believed that competition as environmental context can drive firms to employ new innovation to preserve competitive advantage. In addition, previous studies discussed that businesses with a higher competitive environment are more likely to turn to IT to achieve a competitive advantage. Therefore, it is reasonable to expect that the higher level of competition in industry environment will result to employ BI by enterprises. Based on the above arguments, we proposed the following hypothesis:

H8: Industry competition is positively related to the adoption of BIS.

Now, organizations extremely rely on external sources of information to enhance innovative actions to stay ahead of the competitors. Nevertheless, firms confront several difficulties in profiting from the external source of information (Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011). Therefore, firms require developing their capabilities in exploiting the external domain knowledge through a term "absorptive capacity". An organizations' absorptive capacity represents the ability to exploit outside knowledge, recognize the value of new information, assimilate, and apply it more effectively to gain productive ends (Cohen & Levinthal, 1990). Based on Cohen and Levinthal (1990) definition, absorptive capacity within organization attempts to identify and apply external knowledge from certain areas. In other words, it brings value to organizations by extracting new knowledge from external sources such as customers, suppliers, or competitors (Liu, Ke, Wei, & Hua, 2013). In this regard, Hollenstein (2004) believed that there are two main

aspects of a firm's absorptive capacity for new technologies: First, the ability to assess technological opportunities in the context of new products and production techniques which primarily depends on the firm's endowment with human and knowledge capital. Second, learning effects that may happen from former use of a technology with an antecedent of a specific technology containing constituent elements of later applied more advanced outputs. Likewise, to help innovative activities, organizations with a higher level of capacity to absorb new knowledge are more talented in harnessing new knowledge from the others. The main aim of this capacity is to absorb inputs, then generate outputs. Thus, without such capacity, different sectors cannot learn and consequently transfer knowledge from one to another (Lane, Salk, & Lyles, 2001; Tsai, 2001).

Recently, scholars characterized it as a crucial capability associated with knowledge creation and utilization in knowledge-based competition, which can assist firms to gain competitive advantage (Liu et al., 2013; Ramamurthy et al., 2008). Particularly, it has been used in the diverse areas such as knowledge management, IT governance, IT business value, and IT innovation (Roberts, Galluch, Dinger, & Grover, 2012). Although previous studies (Vowles, Thirkell, & Sinha, 2011) emphasized on the importance of this capability with respect to awareness about what it can provide, and how it can be prepared through it for organizations; but it has rarely been criticized from competitor capability and examining the relationship between this capability and the decision to adopt an innovation. In competitive environment, this capability reacts in two ways. On one hand, it seems to have a pulling roll from innovative activities when around rivals equipped with a greater absorption capacity. In such situation, an organization will not be able to cope with around competitors in terms of knowledge acquisition and utilization. On the other hand, it might provide additional efforts to be ahead of the competitors by innovating continuously. In here, this capacity between rivals plays a role in pushing the enterprise to focus on applying innovation in a business environment.

With such knowledge-intensive case, the competitive position of the firms is increasingly relying on their ability to use external sources of information to not only enhance organizational performance (Kostopoulos et al., 2011), but also remaining in the competitive environment and marketplace (Sahay & Ranjan, 2008). Although, enterprises with greater ability to absorb both internal and external knowledge into their operations are more talented in adopting an IT innovation; however, other enterprises are forced to be in a similar vein for two main reasons encompass: retaining both customers and competitive

position. To this aim, regardless of the capability of other competitors, organizations will likely to increase the ability required to absorb external information, create valuable knowledge, and finally apply it to commercial ends (Cohen & Levinthal, 1990). In sum, we assumed that there is a positive relationship between the capability to absorb external sources of information by competitors and the decision to adopt an innovation within the organizations. Hence, we pose our final hypothesis:

H9: The more absorptive capacity the competitors have, the more positive the impact of the adoption of BIS.

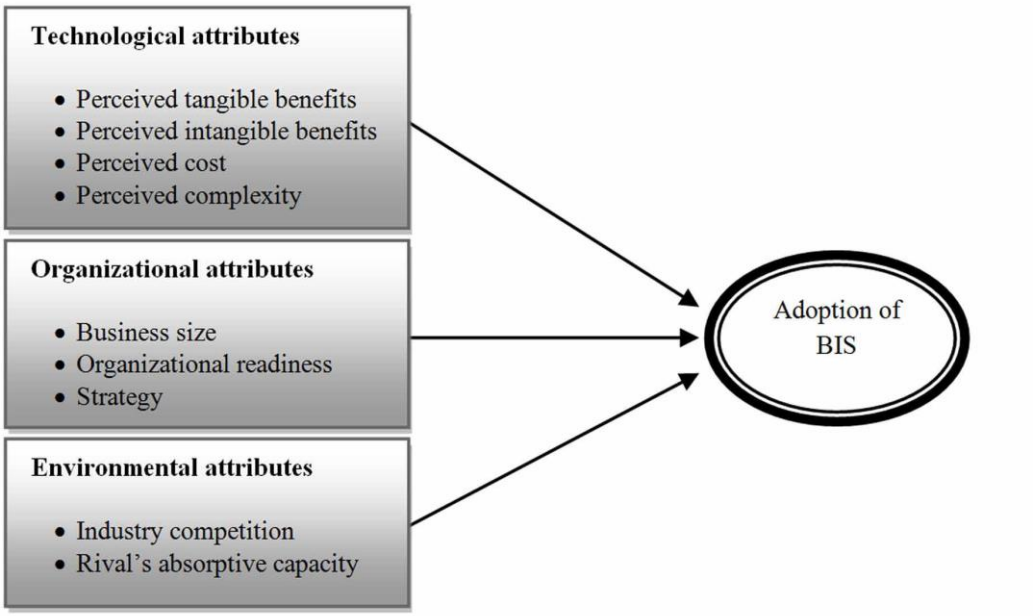
Based on the above - proposed hypothesis, the total research model which includes BIS adoption factors is presented in Figure 1.

3. METHODOLOGY

3.1. Sample and data Collection Procedure

We built an empirical survey in Iranian financial service industry to test the research model and hypotheses. Because of high information volume in this section, comparing to others, firms in this category endeavour to find more efficient ways to exploit their growing data to get smart and get ahead from the competitors. Research samples were identified through databases of Central Bank of Iran, and Securities and Exchange Organization.

Figure 1. Research model



Banking industry is noted as one of the critical elements in both developed and developing economics. Due to existence of several limitations and strict governmental regulations in Iran's economy, the role of banking sector is completely crucial. Put simply, we can categorize the evolution of Iran's banking industry into two main stages as follows:

A. The first stage is related to several policy enacted by central bank of Iran (CBI) toward liberalizing the banking sector. This period and structure of the banking industry lasted till 1998.

B. The second stage is related to the time that "Law for Authorizing the Establishment of Private Banks" was passed. After that time, private banks were established. Now, there are three types of banks:

1. Governmental specialized banks (on which the most strict regulations are imposed)
2. Governmental commercial banks that are operating under less strict regulations than the former but face with more constraints than private banks
3. Commercial private banks

From each of these financial samples, one Chief Information Officer (CIO) was selected as the key informant, because he/she is an executive-level manager who knows about the firm's strategy, as well as IT issues (Chun & Mooney, 2009). The data for this study was collected by a survey sent out via mail and e-mail from October 2013 to December 2013. The survey questionnaire along with a cover letter was sent to the respondent of each firm. The letter served as a guide to fill out the questionnaire as well as to highlight the research rationale. About 274 surveys were sent to the firms. The returned questionnaires were 135, which showed the response rate of 49%. 12 of the returned questionnaires were discarded, so the number of valid questionnaires reduced to 123; that is, the response rate reached 45%. A detailed summary of the sample characteristics is shown in Table 1.

3.2. Measures

We conducted a survey based questionnaire in the following form: (1) first, we selected the instruments from the previously validated measures; (2) then, we tested and modified the early version of the questionnaire based on several expert members of target population;

(3) finally, we distributed the final version of the questionnaire between identified participants within financial sector. All measures in this paper were assessed with five-point Likert scale, ranging from "(1) strongly disagree" to "(5) strongly agree" (with two exceptions of business size, and strategic posture). The questionnaire used for data collection contained scales to measure the various factors of the research model. To ensure content validity, at first six IS managers of high academic levels and more than 10-year experience reviewed the questionnaire and provided some comments. Their suggestions were incorporated into the final version of the questionnaire and therby the content validity of the instrument was assured. Also, for evaluating the reliability of the questionnaire, test-retest method was used which determines whether an instrument will produce the same results from the subjects every time. For evaluating the reliability of the questionnaire, the authors asked 25 academic and professional BI experts in a 15-day interval to fill the questionnaire. The result Cronbach's alpha estimated to be 0.89 (greater than 0.7) that implies good reliability of the instrument. The supporting references for the variables studied in this research are listed in the following sections.

3.2.1. Independent Variables

Perceived tangible benefits were measured by six items adapted from Eckerson (2003). These items are time-saving, cost-saving, greater return on investment, achieving new revenues, lower total cost of ownership, and greater shareholder value. *Perceived intangible benefits* were measured on a six-item scale adapted from (W. Eckerson, 2003), which covers single version of the "truth", better strategies and plans, better tactics and decisions, more efficient processes, greater customer/supplier

Table 1. Sample characteristics

Demographics	**Adopters (N = 89)**		**Non-adopters (N = 34)**	
	Frequency	**%**	**Frequency**	**%**
Category of financial industry				
Banks	27	30.3	3	8.0
Insurance	16	17.9	6	17.6
Credit institute	8	8.0	6	17.6
Investment and stock companies	17	19.1	11	32.3
Accountancy companies	21	23.5	8	23.5
Number of employees				
Less than 50 employees	7	7.0	8	23.5
51-100 employees	9	10.1	12	35.2
101-500 employees	15	16.8	5	14.7
501-2000 employees	24	26.9	7	20.5
More than 2000 employees	34	38.2	2	5.0
Average annual revenue				
Less than US$1 million	16	17.9	13	38.2
US$1 to US$10 million	12	13.4	11	32.3
US$10 to US$20 million	12	13.4	6	17.6
US$20 to US$50 million	18	20.2	2	5.0
More than US$50 million	31	34.8	2	5.0
Number of IT staff				
Less than 10	8	8.0	22	64.7
11-50	6	6.0	6	17.6
51-100	11	12.3	2	5.0
101-200	28	31.4	3	8.0

More than 200	36	40.4	1	2.0
Respondents tenure				
Less than 5 years	5	5.0	14	41.1
6-10 years	13	14.6	8	23.5
11-15 years	41	46.0	5	14.7
16-20 years	21	23.5	5	14.7
More than 20 years	9	10.1	2	5.0
Strategy				
Prospector	76	85.3	8	23.5
Defender	13	14.6	26	76.4

satisfaction, and greater employee satisfaction. *Perceived costs* were measured based on Premkumar and Roberts (1999) and Kuan and Chau (2001) studies with a focus on adoption costs, training costs, and maintenance and supporting costs. Respondents were asked to evaluate the impact of *perceived*

Table 2. Types of technologies used in the financial industry (multiple choices)

Technologies	**Frequency**	**Percent**
Data warehousing	53	38.4
Business reporting	41	29.7
Dashboards	28	20.2
Data mining	16	11.5

complexity derived from BI on the decision to adopt based on the three-item scale provided by Ramamurthy et al. (2008). *A business size* was measured through (Hanafizadeh & Ravasan, 2011) measurement items includes number employees, annual revenues, and IT staff. *Organization readiness* was assessed with respect to the three-scale item based on

measurement provided by Grandon and Pearson (2004) and Tsai et al. (2013). To evaluate *business strategy*, we used self-typing approach advocated by Vorhies and Morgan (2003). In this approach, respondents were asked to represent their perception about which paragraph better demonstrated their business strategy by providing unlabeled descriptions for prospector and defender enterprises. This measure has been widely approved in previous research (Zaefarian, Henneberg, & Naudé, 2013). The continuum anchored to this construct was evaluated with five-point Likert scale ranging from "(1) completely defender" to "(5) completely prospector". *Industry competition* which measured the degree of competition throughout the industry on the decision to adopt BI systems was evaluated based on (Premkumar & Roberts, 1999). Following Zahra and George (2002) and Hurmelinna- Laukkanen and Olander (2014), we used *competitors' absorptive capacity* (defined as the perception of firms about their competitors in the context of exploiting and using new knowledge) through 10 items to evaluate the absorptive capacity of competitors at the organizational level.

3.2.2. Dependent Variable

BI is known as a new IT issue in Iran market, specifically financial industry. In parallel, in research target population, due to growing necessity of analytics on environmental information to achieve the required knowledge to take a higher competitive position, organizations are increasingly attempting to employ different types of analytics and BI systems to obviate disabilities in terms of using a wide range of information. As above, the measurement items for the decision to adopt construct were adapted from Hung et al., (2010). Five items covering (1) Our firm have not adopted, (2) Our firm was already planning to adopt BIS, (3) Our firm have partially adopted BIS, (4) Our firm have adopted BIS and promotion is in progress, and (5) Our firm have fully adopted BIS with profits, attempts to measure the decision to adopt BI systems throughout the industry (see Table 8 in Appendix A). In line with measurement item's definition, 1 and 2 refer to non-adopters, while 3, 4, and 5 denote BI adopters. The complete list of BI technologies used within the financial industry is presented in Table 2. With this in mind, 89 out of 123 respondent cases have adopted some sort of BI system. Among the 34 others, 27 organizations expressed that they intend and plan to adopt BI in the near future, but the remaining 7 organizations had no plan or any intention to adopt BI systems in their business environment in near future.

4. ANALYSIS AND RESULTS

Structural Equation Modeling (SEM) has been used to validate our hypotheses. We used the Partial Least Squares (PLS) technique of SEM that utilizes a variance-based approach for estimation. SmartPLS 2.0 (Ringle, Wende, & Will, 2005) has been used to create and analysis SEM model. wo assessments are supported by PLS: (a) the measurement model assessment (i.e., reliability, convergent and discriminant validities of the measurement items), and (b) the structural model assessment (i.e., strength of paths in models).

4.1. Assessment of the Measurement Model

Since we had both reflective and formative measures, we began with the assessment of the reflective measures using both convergent and discriminant validity analysis. Factor loadings, composite reliability and average variance extracted (AVE) were used to assess convergent validity. The loadings for all reflective items exceeded the recommended value of 0.6. Composite reliability values (see Table 3), ranged from 0.77 to 1.0, which exceeded the recommended value of 0.7. The AVE values was in the range of 0.63 and 1.0 which exceeded the recommended value of 0.5.

We formatively measured the “perceived cost”, “business size”, and “organizational readiness” constructs because their measurement items are not parallel. Cenfetelli and Bassellier (2009) and Petter, Straub, and Rai (2007) suggest that items of well-specified formative constructs have significant weights. Non- significant weights may be caused by multicollinearity, indicated by a high variance inflation factor (VIF above 3.33). In the absence of multicollinearity, items with non-significant weights should be retained in the model. Table 4 shows the acceptable construct validity.

Next, the discriminant validity (for reflectice constructs) was tested. It was examined by comparing the correlations between constructs and the square root of the AVEs. As shown in Table 5, the square root of the AVEs in each column is greater than the correlation with other constructs

Table 3. Reliability of reflective constructs

Dimensions /Constructs	Items	Loadings	AVE	CR
Perceived tangible benefits	PTB1	0.78**	0.64	0.91
	PTB2	0.79**		
	PTB3	0.85***		
	PTB4	0.80**		
	PTB5	0.75**		
	PTB6	0.81**		
Perceived intangible benefits	PIB1	0.85***	0.60	0.90
	PIB2	0.82**		
	PIB3	0.74**		
	PIB4	0.75**		
	PIB5	0.74**		
	PIB6	0.73**		
Perceived complexity	PCX1	0.72*	0.65	0.85
	PCX2	0.84**		
	PCX3	0.85***		
Strategy	TSR1	1.00**	1.00	1.00
Promote competition in the industry	ICO1	0.81**	0.63	0.77
	ICO2	0.78**		
Competitors absorptive capacity	ABS1	0.67*	0.63	0.95
	ABS2	0.71**		
	ABS3	0.84**		
	ABS4	0.71*		
	ABS5	0.90***		
	ABS6	0.73**		
	ABS7	0.89***		
	ABS8	0.81**		
	ABS9	0.80**		
	ABS10	0.85***		

Note: CR = Composite Reliability, AVE = Average Variance Extracted; * $p < 0.0.5$; ** $p < 0.01$; *** $p < 0.001$

Table 4. Validity of formative constructs

Dimensions /Constructs	Items	Weights	VIF
Perceived cost	PCO1	0.37***	1.63
	PCO2	0.53***	1.52
	PCO3	0.36***	1.31
Business size	BSZ1	0.36***	1.76
	BSZ2	0.31***	1.91
	BSZ3	0.33***	1.90
Organizational readiness	ORE1	0.26**	1.47
	ORE2	0.65***	1.50
	ORE3	0.37***	1.76

Note: * p < 0.0.5; ** p < 0.01; *** p < 0.001

indicating adequate discriminant validity. Thus, the reflective measurement model demonstrated adequate convergent and discriminant validity.

4.2. Assessment of the Structural Model

SmartPLS 2.0 provided the squared multiple correlations (R^2) for each dependent construct in the model and the path coefficients (β) with other constructs. The R^2 indicates the percentage of a construct's variance in the model while the path coefficient indicates the strength of a relationship between constructs (Chin, 1998). Although, SmartPLS 2.0 does not generate a single goodness-of-fit metric for the entire model, both the β and R^2 are sufficient for analysis.

All except one of the nine research hypotheses were supported as depicted in Table 6. Contrary to our prediction, hypothesis (H3) was not supported by the data. That is, perceived cost was not found to have a significant negative association with BI adoption (β = -0.065, t = 0.61).

The hypothesized path (H1) between perceived tangible benefits and BI adoption (β = 0.451, t = 5.57) was confirmed. The data supported a hypothesis (H2), which predicted a significant, positive relationship between perceived intangible benefits and BI adoption (β = 0.476, t = 6.53). Similarly, the data supported a hypothesis (H4) in which complexity was found to have a significant negative association with BI adoption (β = -0.20, t = 2.10). Also, the data supported a hypothesis (H5) indicating that business size and BI adoption are positively related (β = 0.262, t = 3.80). Organization

Table 5. Discriminated Validity of the Constructs (Square Root of the AVE and Correlations)

Dimension	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Perceived tangible benefits	**0.80**								
2. Perceived intangible benefits	0.37	**0.77**							
3. Perceived cost	0.23	0.20	**NA**						
4. Perceived complexity	0.11	0.13	0.40	**0.81**					
5. Business size	0.26	0.19	0.17	0.30	**NA**				
6. Organizational readiness	0.10	0.15	0.19	0.24	039	**NA**			
7. Strategy	0.12	0.15	0.15	0.16	0.35	0.36	**1.00**		
8. Industry competition	0.26	0.18	0.23	0.06	0.11	0.27	0.44	**0.79**	
9. Competitors absorptive capacity	0.20	0.16	0.16	0.19	0.19	0.33	0.35	0.41	**0.80**

Note: (a) The bold fonts in the leading diagonals are the square root of AVEs which are not applicable for formative constructs; (b) off-diagonal elements are correlations among constructs. (c) AVE is Not Applicable (NA) for formative constructs

Table 6. Summary of the results

Hypothesis	Path coefficient	t-Value	Result
H1: Perceived tangible benefits ➔ BI adoption	0.451***	5.57	Supported
H2: Perceived intangible benefits ➔ BI adoption	0.476***	6.53	Supported
H3: Perceived cost ----> BI adoption	- 0.065	0.61	Not supported
H4: Perceived complexity ----> BI adoption	- 0.20*	2.10	Supported
H5: Business size ➔ BI adoption	0.262***	3.80	Supported
H6: Organizational readiness ➔ BI adoption	0.356*	2.25	Supported
H7: Strategy ➔ BI adoption	0.328**	2.86	Supported
H8: Industry competition ➔ BI adoption	0.180*	2.24	Supported
H9: Competitors absorptive capacity ➔ BI adoption	0.250*	2.48	Supported

Note: * Significant at p < 0.05. ** Significant at p < 0.01. *** Significant at p < 0.001

readiness has a significant, positive relationship with BI adoption (β = 0.356, t = 2.25) to provide support for the hypothesis (H6). Also, the data supported a hypothesis (H7) indicating that prospector strategy and BI adoption are positively related (β = 0.328, t = 2.86). Our data found support for the existence of a positive association between industry competition (β = 0.180, t = 2.24) as well as competitors absorptive capacity (β = 0.250, t = 2.48) and dependent construct; BI adoption.

As seen in Table 6, the relationship with the largest path coefficient is from perceived intangible benefits of BI adoption (β = 0.476). While, the least significant path coefficient values are seen in the path from industry competition to BI adoption (β = 0.180). Further discussion is presented in the next section. All the preceding constructs totally explained 48% of the variance in the dependent construct; adoption decision.

4.3. Further Analysis (Adopters Versus Non-Adopters)

In this paper, to answer our second research question, we used a discriminant analysis to determine all distinguishing variables between the groups. Therefore, the Wilk's lambda value for this aim is achieved 0.76 (Chi-square=12.63, significance=0.01). The results showed us, there are the significant differences between two groups which are adopters and non-adopters of BI systems. All required information such as discriminant loading, discriminant coefficient, mean and variance of each group are presented in Table 7. According to Hair, Anderson, Tatham, and Black (1995), we only considered variables with discriminant loading value greater than 0.3 as the main discriminators. In our case, the factors which have discriminant loadings greater than the significant threshold are perceived tangible benefits, perceived intangible benefits, complexity, the size of the organization, strategy, organization readiness, industry competition, and competitors' absorptive capacity.

5. DISCUSSION

This study aims to empirically investigate the factors influencing the decision to adopt BI systems in the context of the financial services industry. In this study, we propose a conceptual model based on a well-known framework, namely TOE in which the decision to adopt an IT innovation influenced by three main attributes including technological, organizational, and also environmental. By reviewing prior research, we found four factors linked to technological attributes, namely perceived tangible benefits, perceived intangible benefits, perceived cost, and perceived complexity. In the organizational context, we used business size, organizational readiness, and strategy as the main organizational drivers which influence the decision to adopt or not to adopt an IT innovation. As final dimension, we examined the impact of industry competition and absorptive capacity from the competitors side as environmental attributes. In the following section, we argue about factors that have been considered in the proposed model in detail.

Table 7. Results of discriminant analysis

Variables	iscrimina nt loading	Discrimin ant coefficien t	Adoption		Non-adoption	
			Mean	Varia nce	Mea n	Varia nce
1. Perceived tangible benefits	0.618	0.593	2.87	0.53	2.58	0.68
2. Perceived intangible benefits	0.632	0.430	3.21	0.68	2.26	0.70
3. Perceived cost	- 0.212	0.074	3.09	0.56	3.14	0.55
4. Perceived complexity	0.367	0.458	2.82	0.59	2.63	0.52
5. Business size	0.328	0.562	3.47	0.75	3.21	0.45
6. Organization readiness	0.413	0.275	3.14	0.62	2.95	0.52
7. Strategy	0.502	0.332	2.88	0.65	2.71	0.72
8. Industry competition	0.311	0.048	3.06	0.51	2.83	0.63
9. Competitors' absorptive capacity	0.457	0.356	2.95	0.59	2.75	0.66

5.1. Technological Attributes (Hypotheses 1-4)

Within the technological context, both perceived tangible and intangible benefits have strong and positive, but the different effect on the dependent constructs; adoption decision. Surprisingly, data analysis results have shown that intangible ones are more important instead of tangible benefits. In our case, it can be analyzed that enterprises tend to focus on long-term benefits with more strategic importance. Although, tangible benefits such as time saving, cost saving, and gaining new revenues for stakeholders are known as the main benefits. However, intangible ones represent a broader scope of benefits such as preparing better strategies and plans, developing more efficient processes, and increasing in employee satisfaction which focused on strategic positioning and long run instead of immediate benefits. As a result, in terms of such decision aid adoption focusing on long-term benefits are much more important for organizations and have a higher effect on the

perception of senior executives.

Contrary to our prediction, the data analysis did not support the hypothesis perceived cost. Furthermore, as Wilk's lambda test shows, our logical reasoning approved about there is no differences between adopters and non-adopters in terms of perceived cost. One plausible reason is that although using the BI system may be costly, but it will be acceptable compared to a vast range of benefits prepared for organizations in strategic decision making and environmental awareness. Moreover, fostering the amount of internal and external data has forced enterprises to operate competitive tools with more capabilities in analytics rather than the others. Hence, it seems that the importance of utilizing IS with great analytical capabilities and long run benefits are higher than the perceived cost in the perception of senior executives in our cases.

Regarding with previous studies (e.g., Ramamurthy et al., 2008; Yang et al., 2013), it is also not surprising that the negative relationship between perceived complexity and the decision to adopt BIS was supported. Similarly, LaValle et al., (2010) research report released by MIT Sloan Management Review focused on the adoption barriers of BIS through a survey of 3000 executives. In their research paper, existing low understanding in terms of how to use analytics in business processes and lack of required knowledge to excavate environmental information are known as the most important inhibitors in organizations to adopt BIS. In this line, migration from the former systems to new technology and change in IT infrastructure of the organization in order to replicate it efficiently, surely face with several difficulties which deviant organizations in adopting new types of technology. Furthermore, as shown in Wilk's lambda test, the perceived complexity is known as one of the discriminating factors among the others. With attention to this fact that most of BI technology adopters in our case have an IT department with more than 50 IT staff (Table 1-Sample characteristics), it can be inferred that with a greater size of IT staff, the required knowledge and technical capability of organizations in the adoption process will improve intensely.

5.2. Organizational Attributes (Hypotheses 5-7)

Consistent with prior research (e.g., Lee & Xia, 2006; H.-F. Lin, 2013), we found that the size of a business has positively influenced the decision to adopt BIS. In this relationship, larger firms tend to use BIS extensively compared to their smaller counterparts in their business processes. In addition, larger firms equipped with more technological and financial resources to

adopt IT innovation, which significantly proposed before (Hung et al., 2010; Teo et al., 2009). One plausible explanation for this finding about business size is that enterprises with more employees in IT department may have upper capabilities and expertise in applying IT-related changes. Also, it can infer that enterprises with higher annual revenues have more capacity to assign adequate budget in order to employ an IT innovation. In addition, another reason which could be considered for this result is that due to the existence of more hierarchical and multiple levels of decision making within larger organizations, those are more intended to use this capability to gain the specific benefits such as faster decision- making process (H.-F. Lin, 2013).

This study shows that the readiness of organizations has significant positive influence on the decision to adopt BIS. In line with Tsai et al. (2013), our finding implies that the organizations with more readiness level are more likely to adopt BIS. One reasonable explanation for this phenomena is that firms with the greater level of financial and technological capacity to have more ability and chance to employ BI technology. Furthermore, it can be argued that the existence of top management support affects the perception of senior executives profoundly.

For the final attribute of organization dimension, we found that the strategy of the business has profoundly affected on the dependent construct. In this vein, enterprises with prospector-oriented strategy takes more efforts to be in a competitive posture by using continuing innovation to make more progressive decisions in their business environment. In response to this plea, BIS with a capability to excavate environmental data and create new useful knowledge seems to be an appropriate innovation. In addition, firms with prospector strategy focus further on the main benefits derived from this kind of innovation. On this basis, one possible reason is that due to a wide and specific range of BIS benefits, prospector organizations trying to adopt this technology. Another explanation for this finding is that with respect to intensive competition throughout the industry, prospector organizations requires day to day innovative activities to keep their competitive position.

5.3. Environmental Attributes (Hypotheses 8-9)

We found the high industry competition makes BIS adoption more likely in Iranian financial industry. Financial institutes compete in rapid policy making, products development and novel services presentation and their managers usually prefer to use the BIS and real-time information for decision making. Therefore, with an increasing degree of competition throughout the

industry and market, BIS adoption would be more likely.

In line with our prediction, the data analysis results showed that there is a positive relationship between the absorptive capacity of competitors and the decision to adopt BIS. One possible reason for this significant relationship is that although there are several internal factors can influence the decision to adopt an innovation by enterprises, but continually growing in environmental information forced enterprises to act more appropriately to this issue. In this vein, firms with higher capacity to absorb and utilize new knowledge in their business processes are more successful instead of lower firms. On this basis, we argued that enterprises within the same industry, in which competitors have more capacity to absorb environmental information throughout the business processes, have more tendency to adopt BIS. It is due to the fact that they want to increase their capacity in order to prevent from falling behind the competitors or even to surpassing them. Furthermore, with respect to the growing competition level in this area, the need to take an appropriate and real-time course of action using special analytics tools leads enterprises to employ such decision aid systems.

6. IMPLICATIONS FOR RESEARCH ANd PRACTICE

Since, there are few studies assessing the main determinants of BIS adoption specifically in the context of the financial industry, our findings could provide several insightful implications for both academicians and practitioners as follows.

6.1. Managerial Implications

With regard to technological attributes, we hypothesized that BI systems prepare relative advantages in here divided into tangible and intangible for an enterprise. The positive relationship between intangible benefits and BIS adoption suggests that BI is considered as a sophisticated approach by organizations to enhance decision-making ability and process the higher amount of information into the helpful pattern which enable the firms to achieve greater advantages in a long term. Surprisingly, our finding shows that intangible benefits from using BIS are more important in comparison with tangible benefits. For managers and decision makers, it suggests that excluding the obvious benefits, applying this new technology at work have an upper level of benefits which will appear during a time. Hence, it could be seen as an idealistic system for enterprises that have capacity in improving daily practices, besides taking greater attention on the strategic perspective to be competitive.

6.1.1. Technology Related Attributes

Given that IT adoption is accompanied with spending higher cost and time, it is related to the view of the organization which considers the initiative costs as a long term investment. So, financial managers are recommended to see the long run benefits of using BI and consider the first costs of adoption as an investment which can return it two or three times greater by analyzing the required information and create a new way to be innovative at work. The outcome of this research uncovers that the perceived complexity of BI adoption should be considered as a crucial element by managers. For successful adoption, they must precisely expect the complex level of technology to deploy it in a specific environment. In this regard, it is preferred for firms to pay more attention of both required technological platform and knowledge and compare with the current status of firms' internal skills in order to find the gap. As a result, this finding prepares a chance for firms to decrease the distance between current and required state before any activity in line with adoption. Put simply, we can conclude that finding the best set of technological attributes including higher relative advantages as a facilitator and lower level of complexity; by taking cost as a long run investment into account will prepare the firm to adopt BI in the context of technological attributes.

6.1.2. Organizational Related Attributes

Besides the significant role of technological attributes, managers should also note internal environment. in this regard, the paper results suggest that firm size influence the decision to adopt BI. In here, we conducted the firm size measurement based on three items including a number of employees, number of IT staff, and finally annual revenue. The adoption of BI is not limited to large organizations. However, as well as earlier research, larger firms are more appropriate for using BI solutions. In this regard, it is recommended to financial managers to consider this reality that having an IT engineer's team into the firm could be desired in the face with IT-related changes. Also, managers should consider that using BI and analytics at workplace requires a high amount of the budget for the whole process of adoption and must plan before to apply it efficiently. In terms of strategic orientation, our finding claims that firms with prospector strategy tend more heavily to use this kind of analytical systems to achieve required gains. Put simply, the results steers the financial managers to see BIS as a competitive tool which can enhance their abilities in analyzing environmental data and brings a sustainable competitive advantage.

6.1.3. Environment Related Attributes

The final results shows that there is a positive relationship between the rivals absorptive capacity and decision to adopt BI. This issue clearly prepare an insightful fact that financial industry must pay more attention than before for utilizing analytical tools in order to cope with a large volume of the dataset and improve their capacity in using external sources of data. In other words, managers need to a higher amount of information to process and reach a realistic view from the surrounding environment. So, the growing trend of external information must be considered by managers for gaining the desired goal. Hence, this issue could act as an important guidline for firms within the industry to evaluate their current situation and evaluate with the leading firms in the same category. The results could be beneficial to not only preserve but also improve the competitive position in specific industry. In here, managers should consider that competition in the financial industry is based on raw data. Hence, they need to use highly sophisticated and complex systems in their firms to process the achieved information and generate high-value knowledge for increasing firm performance.

Furthermore, because of the great importance of adoption-related factors for adopting a new technology within the firms, the related decision-makers must completely evaluate the mentioned attributes in their own organizations before any acting in line with the adoption of BIS. Finally, we can mention the issues like policy making for suitable derivers and mechanisms to deploy business intelligence in banking and financial organizations based on discussed factors of this research; knowledge about the diversity of BIS and its adoption requirements for IT managers and discovering best combinations of organization size, type, market and strategy to facilitate BIS adoption.

6.2. Implications for Research

First of all, to the best of our knowledge, this study is the first research which theoretically argued about the decision to adopt BIS in the context of the technology-organization-environment framework and empirically tested the attributes influencing BIS adoption in the context of the financial industry. This study extended the knowledge of IT adoption in the financial business profile. Considering the growing interest in using advanced analytics, our funding has a remarkable value for enterprises in the financial area to obtain the promised benefits of BI systems at work. In this sense, the current study strengthens our understanding about the related, influencing factors which prepared the financial company to adopt BI.

In this research, we use the TOE model as one of the most popular organizational models

in terms of adoption issues. Moreover, we divided the relative advantages of technology into tangible and intangible that has no study empirically validated it on BI adoption. It argues that intangible benefits from using BI have more addressed than tangible ones which shows us firms using BI as a competitive weapon to increase their knowledge processing and applicant it in their environment and gain competitive advantage. Further, the current study is among the first to examine the role of firms' strategic orientation on the adoption and validate it by an empirical investigation into the financial industry environment. In a similar vein, our study reaches this fact that firms with strategy orientation have more interest to use BI to preserve competitive position in industry area.

6.3. Limitations and Future Research

There are several limitations in our study. First, we conducted our research model and hypotheses based on the TOE framework to test the key variables associated with the adoption of BI systems. For future research, adoption decision could be examined by other theoretical perspectives such as an institutional theory or expanding TOE framework by adding more dimensions (e.g., Gu et al., 2012) to achieve full understanding for making the best decision on BI adoption. Second, we restricted ourselves to sampling based on merely financial industry. It means that we are not confident about the extent of achieving results are similar to other industries. Hence, we suggest in order prove and generalizing the results of this study, it must be exercised in an overall lens by validating within different industries. Third, the results of this study reflect the Iranian perspective. Put simply, cultural differences may have significant influence and create different results. Hence, it is recommended for future research to focus on cultural issues besides the other spects of BI adoption map it appropriately in their own business environment.

7. CONCLUSION

In this research, factors influencing BI adoption were empirically investigated in banking and financial industry. A conceptual model based on TOE framework was proposed and tested with surveyed data and PLS technique. Highlighted achieved contributions are: (1) offering the comprehensive model incorporating a coherent set of technological, organizational, and environmental in the adoption of BIS (2) resulting that factors perceived tangible benefits, perceived intangible benefits, complexity, business size, organizational readiness, strategy, industry competition and competitors absorptive capacity affect on BIS adoption in

surveyed industry (3) consequent it was not proved that perceived cost affects on BIS adoption. Helping in policy making for suitable drivers to deploy business intelligence and supply knowledge about the diversity of BIS and its adoption requirements and proposing important adoption factors to facilitate business intelligence systems and tools are among the insights and outcomes of this study.

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APPENDIX A

Research Questionnaire

Table 8. Questionnaire

Measurement items	Key sources
Perceived tangible benefits (1 = very disagree; 5 = very agree)	*(Eckerson, 2003)*
The benefits that can be derived from BI include:	
Time saving	
Cost saving	
Higher ROI	
New revenues	
Reduced total cost of ownership	
Improved Shareholder value	
Perceived intangible benefits (1 = very disagree; 5 = very agree)	*(Eckerson, 2003)*
The benefits that can be derived from BI include:	
Improved single version of the "truth"	
Better strategies and plans	
Better tactics and decisions	
More efficient processes	
Greater customer/supplier satisfaction	
Greater employee satisfaction	
Perceived cost (1 = very disagree; 5 = very agree)	*(Premkumar & Roberts, 1999) and (Kuan & Chau, 2001)*
The adoption costs of BI is high	
The training costs of BI is high	
The maintenance costs of BI is high	

Perceived complexity (1 = very disagree; 5 = very agree)	*(Ramamurthy et al., 2008)*
BIS is difficult to understand.	
Using BIS requires high effort.	
BIS is easy to use (R)	
Business size	*(Hanafizadeh & Ravasan, 2011)*
Number of employees (<50, 51-100, 101-500, 501-2000, >2000)	
Annual revenues (<1m, 1-10m,10-20m,20-50m,>50m)	
Number of IT staff (<10, 11-50, 51-100, 101-200, >200)	
Organization readiness (1 = very disagree; 5 = very agree)	*(Grandon & Pearson, 2004) and (Tsai et al., 2013)*
We have required financial resources for BI project	
Our top management supports BI project	

continued on following page

Table 8. Continued

Measurement items	Key sources
We have technological expertise for BI project	
Business strategy (1 = completely defender; 5 = completely prospector) Defender strategy vs. prospector strategy	*(Vorhies & Morgan, 2003)*
Industry competition (1 = very disagree; 5 = very agree)	*(Premkumar & Roberts, 1999)*
We will lose our customers, if we do not adopt BI	
We will need to adopt BI because of our strategic necessity	
Competitors' absorptive capacity (1 = very disagree; 5 = very agree)	*(Zahra & George, 2002) and (Hurmelinna- Laukkanen & Olander, 2014)*
Our competitors have invested heavily in acquiring new knowledge Our competitors can identify and quickly acquire information they need Our competitors try to obtain new knowledge as soon as it is available Our competitors constantly try to increase the number of information sources they have Our competitors can learn new things effortlessly Our competitors can easily interpret the information they acquire Our competitors are good at connecting new and existing knowledge Our competitors are good at combining information from different sources to their advantage Our competitors' existing practices make it possible to use new and current capabilities Our competitors are good at using new knowledge in their operations	

- Note: (R) denotes reversed items.

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