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Research Article

Relationship Between Business Intelligence Components and Financial Reporting Quality in Firms

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Abstract

The purpose of this research is to study the impact of business intelligence on the financial reporting quality of listed companies in the Tehran Stock Exchange using structural equation modeling. The instruments of this research were the business Intelligence Questionnaire (Provich, 2012) and the financial statements of listed companies in The Tehran Stock Exchange. For this purpose, the data of 182 listed companies in the Tehran Stock Exchange in 2018 was collected and processed. To analyze the data, Partial Least Squares Method and PLS-3 software were used. The findings of the research showed that each of the components of business intelligence including data integrity, analytical capabilities, information content quality, information access quality, use of information in business process, and analytical decision - making culture has a positive and significant effect on the financial reporting quality.

Keywords: Business Intelligence; Financial Reporting Quality; Tehran Stock Exchange.

1. Introduction

In today's world, due to the expansion of capital markets and increasing investment, one of the most important issues is financial information quality reported by companies. The higher financial information quality means that more correct decisions will be made and more appropriate financial resources will be allocated and the welfare will be greater. The usefulness of financial statements and other financial statements is influenced by financial reporting quality; in this regard, consistency and accuracy of information are the key aspects of quality. Also, the quality of financial reporting leads to better forecasting of the company's future cash flows for investors and other users of financial statements; accordingly, it is widely believed that financial reporting quality directly affects capital markets (Levitt, 1998).

Today, all companies are faced with a vast amount of data and information, and the key to their business success in this age is the correct use of data to make the desired decisions, quickly and flawlessly. Therefore, to achieve this goal, companies have turned to business intelligence as a new approach in the field of organization and management to facilitate the process of converting data and information into knowledge with the help of business intelligence technology. In addition, today, the business environment is changing rapidly and business processes are becoming more complex, and it will be very difficult for managers to have a comprehensive and complete understanding of their business environment. Meanwhile, many large companies have resorted to business intelligence to help them understand and control business processes to achieve competitive advantage (Ahmad Khan, 2012). Thus, it can be said that in the current situation, business intelligence provides the grounds for rapid access to information and increased competition in the business environment, so that companies are constantly forced to monitor the business environment, make decisions and react quickly to opportunities and threats.

A stock exchange is an economic market in which securities are traded under specific rules and regulations. The decisions of potential and actual investors in this market are not only based on quantitative and rational analysis, but also financial reporting quality will have a great impact on their decision-making to market interactions. In addition, business intelligence has been considered by many researchers and experts as a source of improving decision-making capabilities; and the information systems literature emphasizes the positive impact of information provided through business intelligence systems on decision-making, especially when companies are in a highly competitive environment, but limited efforts to evaluate business intelligence to improve financial information quality are emphasized (Ho and Papamichail, 2010). In addition, the role of business intelligence as a new paradigm in the field of organization and management and the field of finance, in particular, is not well explained. Therefore, the present

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study examines the effect of business intelligence on financial reporting quality of listed companies in the Tehran Stock Exchange to fill the research gap in explaining the effect of business intelligence on financial reporting quality and shedding light on the effect of investment in evaluating information technology, including business intelligence systems, to improve financial reporting quality.

The novelty of the present study is that the effect of the process of converting raw data into information and information into knowledge in the form of a business intelligence system on the quality of financial reporting of listed companies on the Tehran Stock Exchange has been investigated using structural equation modeling. The structure of the continuation of the research is such that first, the theoretical foundations of the research are presented and after reviewing the background and proposing the hypotheses, the data are analyzed. Finally, after estimating the model and testing the hypotheses, conclusions, and suggestions derived from the research results are presented.

2. Literature Review

2.1. Financial reporting quality

Since the early 1990s, the tasks and skills required for accounting professionals in the global business environment have changed significantly, in which the issue of financial reporting quality is very important. Since then financial reporting quality has been defined based on two approaches: user needs and investor support. The first approach is based on the needs of the user and the quality is determined according to the usefulness of the reports for the users. The second approach emphasizes investment support, and quality is defined primarily in terms of "complete and fair disclosure" to shareholders. These two approaches are fundamentally different. The user needs approach focuses more on providing financial information for appraisal and capital allocation decisions, but the investor support approach seeks to reassure users that information is sufficient (information adequacy) and transparent (information completeness). Thus, the quality of financial reporting depends, on the one hand, on the operational and transactional characteristics of the company and, on the other hand, on how these characteristics are presented and reflected in the financial statements (Francis, Olson, & Shaper, 2006). In this regard, today, various tools are being used to improve the quality of information and their optimal presentation; one of these tools is the business intelligence system.

2.2. Business intelligence

Business intelligence is a huge umbrella term that was recognized in 1958 with the publication of Hans Peter Lohan, an IBM computer expert. Lohan's article was entitled "Business Intelligence System" and described an "automated system" designed to disseminate information to different parts of any industrial, scientific, or governmental organization. Business intelligence is a set of technologies and processes that allow people at all levels of the organization to access and analyze, and ultimately make precise decisions. Gushal and Kim (1986) first defined business intelligence as a management philosophy and a tool to help organizations manage and refine business information to make efficient decisions in the business environment. In 1989, Howard Dresner of Gartner Analysts developed business intelligence to describe a set of concepts and methods for improving business decision-making using computer support systems.

Business intelligence has emerged as the forerunner of information systems and on-line analytical processing technology (OLAP) in the early decade of the 21 century. Accordingly, business intelligence includes various technologies such as real-time processing that takes information from the data warehouse and allows companies to make decisions based on the latest available information (Molio, Isabel and Nicholas, 2015). Business intelligence has now been replaced by other terms such as executive information systems and management information systems (Turban, Ramesh, & Delen, 2011). Thus, business intelligence systems can be considered as the next generation of decision support systems.

In the organizational sense, business intelligence covers a deep knowledge of all factors such as customers (community and audience, client), competitors, economic environment, operations, and organizational processes (financial, sales, production, human resources) that have a great impact on the quality of managerial decision making. The organization leaves. Because the reporting system in organizations is hierarchically defined and top executives of organizations need to be summarized information, the information must be formatted, summarized, and then reported several times. To overcome this problem, process technology, called business intelligence, has come to the aid of organizations and companies and has taken on the task of analyzing, strategizing, and predicting information for making better decisions. Simply put, business intelligence is nothing more than the process of increasing an organization's profitability in a competitive marketplace that uses intelligent data in the decision-making process (Olson, 2004).

In short, business intelligence includes the various processes, tools, and technologies needed to turn data into information and knowledge into knowledge; business intelligence applications accelerate the process of making business decisions about data quality (Hubble, 2010). Also, business intelligence is a framework for increasing organizational efficiency and integration of decision-making processes at different levels of the organization, so that increasing the quality of data in the business environment through business intelligence systems leads to improved corporate performance and ultimately enhance financial reporting quality.

2.3. Research background

Paul Ricard Sonn and Egan (2018) in a study entitled "Business Intelligence and Business Analysis in Management Accounting" concluded that many managers use business intelligence and data analysis technologies in the contemporary business environment to achieve organizational goals. Homociano and Dino (2018) in a study entitled "Business intelligence features with their applications in financial auditing and reporting" concluded that business intelligence features increase performance, accuracy, speed, quality, flexibility, and access to data and information in the field becomes financial auditing and reporting. Wang (2016) concluded in a study that managers by using business intelligence can relate the long-term and strategic goals of the organization to operational and short-term goals and make appropriate, accurate, timely, and intelligent decisions in an organization leading to an increase in the productivity and profitability of an organization. Alpar, Engler, and Michael (2015) in a study emphasized the software infrastructure for collecting, storing, analyzing data, and providing appropriate access to data as critical factors in the success of business intelligence. Wieder and Osimitz (2015) in a study examined the effect of business intelligence on the quality of managers decision-making, and the results of their research showed that business intelligence has a significant effect on the quality of managers' decision-making.

Popovich, Hackney, Kahlo, & Jaklich (2012) in a study entitled "Towards Business Success System Success: The Effects of Maturity and Culture on Analytical Decision Making" concluded that the maturity of business intelligence system (data integration and analytical capabilities) and managers decisions and investors have a significant impact, as well as the quality of information content, the quality of access to information, the use of information in the business process and the culture of analytical decision-making are closely related. Accordingly, the impact of each component of business intelligence on each other and ultimately on the decisions of the organizational unit will be both direct and indirect. In addition, among the mentioned components, the quality of information content has the greatest impact on the decision-making and performance of the business unit. Simoes, Coelho, Popovich, and Jaclich (2010) in a study "entitled the role of business knowledge in improving the quality of information through the business intelligence system" concluded that the business intelligence system increases the quality of information created by employees in the organization. In addition, the maturity of the business intelligence system through the integration of data and analytical capabilities causes the quality of information content and the quality of access to information. Lane et al. (2009) designed and presented a network-based model for evaluating the performance of the business intelligence system based on critical success factors, which is examined in this model of business intelligence independent of the organizational system. Popovij, Coelho, and Jaklich (2009) in a study entitled the effect of business intelligence system maturity on information quality concluded that data integrity, analytical capabilities, information content quality have both direct and indirect effects on information quality. Petrini and Pozbon (2008) in a study defined business intelligence as a set of tools based on technical approaches; the focus of this approach is on technologies, algorithms, and tools that create the ability to store, retrieve, aggregate, and analyze data and information. Al-Bashir, Kalier, and Dauren (2008) in a study entitled "Measuring the Impact of Business Intelligence System: The Relationship between Business Process and Organizational Performance" concluded that the business intelligence system improves management decisions and business unit activities. He said that business intelligence through information technology strengthens the performance of the organization. Razazi Borujeni and Kahid (2015) conducted a study entitled "Investigating the effect of using business intelligence on the success of the insurance industry." The results indicate that business intelligence is the most important development factor in the competitive market of the insurance industry. Rouhani and Zare (2012) conducted a study entitled "Model for assessing the level of business intelligence in organizational systems." Their research led to the development of a business intelligence model that assists organizations in designing, purchasing, and implementing systems and software to support better decision making at all levels. Ghazanfari, Jalali, Rouhani, and Jafari (2009) in a study entitled "Business Intelligence (BI) Assessment in Organizational Resource Planning Systems (ERP)" First, the basic needs of managers at different levels of the organization of organizational resource planning systems to support management decision making and intelligence Commercially identified. Then, using the Shannon entropy method, they determined the weight of criteria (requirements) and using the TOPSIS interactive optimization model prioritized the implementation of the most appropriate solutions. Their research has led to the provision of a practical framework for applying strategies to support management decision making.

3. Research Hypotheses

To explain the research problem and achieve the objectives of the study, the following hypotheses have been designed.

1. Data integrity affects the quality of financial reporting.
2. Analytical capabilities affect the quality of financial reporting.
3. The quality of information content affects the quality of financial reporting.
4. The quality of access to information affects the quality of financial reporting.

5. The use of information in the business process affects the quality of financial reporting.

6. Analytical decision-making culture affects the quality of financial reporting.

4. Research Methodology

This research is applied in terms of purpose since by examining the relationships between variables, we try to explain these relationships and provide the necessary suggestions. In terms of the data collection method, it is descriptive-survey research with an approach based on structural equations. The tools of this study included the Business Intelligence Questionnaire (Provich, 2012) and the financial statements of listed companies in the Tehran Stock Exchange.

In this study, similar to Provich's (2012) study, the main target of the business intelligence questionnaire was the financial managers of listed companies in the Tehran Stock Exchange, because financial managers have sufficient information and knowledge of the business intelligence system and information provided in financial reporting. In this regard, in this study, listed companies on the Tehran Stock Exchange that met the following conditions were selected and surveyed for the statistical population:

- In terms of increasing comparability, the company's fiscal year should end on March 20
- The financial information required to conduct this research is fully available.
- Have the main activity except for investment, financial intermediation, banking, holding, and leasing.

The companies with these characteristics included 335 companies. The research sample was selected by the entire statistical population to increase the validity of the research. Accordingly, 335 questionnaires were sent to the sample companies to be completed by their financial managers. This process continued three times by e-mail; finally, 182 financial managers completed the questionnaire. The return rate of the questionnaires was 54%. Therefore, 182 companies were included in the statistical analysis of the study. Business Intelligence

Questionnaire (independent variable) has 6 components including data integrity, (2 questions), analytical capabilities (6 questions), information content quality (7

questions), information access quality (4 questions), use of information in the business process (9 questions), analytical decision making culture (3 questions) and it covers 31 questions. The scale for measuring the components on the Likert scale questionnaire includes 5 options that are scored from 1 to 5. Table 1 shows indicators of the measurement of business intelligence.

Table 1
Indicators of the measurement of business intelligence

Variables	Label	Indicators
Data Integration	DI1	Data scatter across databases, spreadsheets, and applications.
	DI2	Complete data integrity, the possibility of real reporting and analysis.
Analytical Capabilities	AC1	Provide paper reports.
	AC2	Provide interactive **r**eporting.
	AC3	Existence of online analysis process.
	AC4	Existence of analytical process including process analysis, "why-if" scenario.
	AC5	Existence of data mining.
	AC6	Dashboards include metrics, key performance indicators (KPIs), and alerts.
information content Quality	CQ1	Adequacy of the scope of information in the organization.
	CQ2	The accuracy of the organization's information is sufficient and accurate.
	CQ3	Alignment of information with the goals of the organization.
	CQ4	Comprehensibility of organizational information by the target group.
	CQ5	Non-contradictory information in the organization.
	CQ6	The organization's information is free from any complexity or incomprehensibility.
	CQ7	Up-to-date organization information.

Information access Quality	AQ1	Provides information following the needs and habits of users by the organization.
	AQ2	Information processing in the organization quickly and immediately.
	AQ3	Invisible background information (such as author, date, etc.).
	AQ4	Consumer access to information interactively.
Use of information in business process	UI1	Awareness of stakeholders about the problematic aspects of the business
	UI2	The value of organizational information for identifying ongoing improvement processes.
	UI3	The Impact of Organizational Information on Creativity in Internal and External Business Processes.
	UI4	The impact of organizational information in reducing decision making, improving operational efficiency, and reliability.
	UI5	The Impact of Organizational Information on Reacting to Business Events and Dynamic Business Planning.
	UI6	Changing strategies and modifying key performance indicators (KPIs) through information.
	UI7	Add value to customer service through information management.
	UI8	Reduce business risk through information management.
	UI9	Reduce the cost of business processes and service delivery
Analytical Decision-Making Culture	AD1	Establishing the decision-making process in the organization and identifying it to stakeholders.
	AD2	Inclusion of available information in any decision-making process in the form of organizational policy.
	AD3	Involvement of information provided by the organization in decision making regardless of the type of decision.

In this study, two indicators have been used to measure the quality of financial reporting as a dependent variable. The first indicator for measuring the quality of financial reporting, similar to Verdi's research (2006), is the quality of discretionary accruals. To estimate the quality of companies' optional accruals, the modified Jones model given in Kotari, Leon, and Wesley (2005) is used, which is obtained from the following equation.

$$DA_{it} = \left(\frac{TA_{it}}{A_{it-1}}\right) - NDA_{it}$$

DA_{it}: Optional accruals.

TA_{it}: The sum of accruals derived from the difference between net profit and operating cash.

A_{it-1}: Total assets of the company (i) at the end of the year t-1.

NDA_{it}: Non-voluntary accruals were obtained through the following equation.

$$NDA_{it} = \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \varepsilon_{it}$$

ΔREV_{it} : The difference between the amount of income of the company (i) at the end of year t and t-1.

ΔREC_{it} : The difference between accounts receivable at Company (i) at the end of year t and t-1.

PPE_{it} : Net assets, machinery, and equipment of Company (i) at the end of year t.

ε_{it} : Total regression error.

The second indicator for measuring the quality of financial reporting is the quality of optional accruals of the Kaznik Model (1999). This model adjusts the Jones model by adding a change in net operating cash. The Kaznik Model is obtained from the following equation.

$$NDA_{it} = \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \alpha_4\left(\frac{\Delta CFO_{it}}{A_{it-1}}\right) + \varepsilon_{it}$$

ΔCFO_{it} : The difference in the net operating cash of Company (i) at the end of year t and t-1; other variables are calculated similarly to the Jones model.

5. Research Findings

5.1. Descriptive statistics

Table 2 shows the descriptive statistics of the research variables. Comparing the coefficient of variation (the result of dividing the standard deviation by the average) of the research variables shows that the highest coefficient is related to the quality of financial reporting. In addition, among the components of business intelligence, the use of information in the business process has the lowest and the data integration variable has the highest coefficient of change. These results show that the variable of using the information in the business process in the sample companies has more stability than the other components of business intelligence in the period under study.

Table 2
Descriptive statistics of research variables

Variables	Mean	maximum	Minimum	standard deviation	coefficient of variation
financial reporting quality	0.126	0.674	0.000	0.104	0.825
Data Integration	3.21	5	1	1.240	0.386
Analytical Capabilities	3.24	5	1	1.192	0.368
information content Quality	3.19	5	1	1.218	0.381
Information access Quality	3.22	5	1	1.224	0.380
Use of information in business process	3.35	5	1	1.190	0.355
Analytical Decision-Making Culture	3.16	5	1	1.192	0.377

5.2. Data analysis

In studies where the sample size is less than 200 observations and the research model is complex due to a large number of structures and indicators, the structural equation approach of Smart-PLS software is used to analyze the data (Davari and Rezazadeh, 2013). In the present study, because the statistical sample includes 182 companies, the PLS software of the partial least squares method has been used, in which the high sample size and normal distribution of data are not necessary for data analysis.

PLS modeling is done in two steps. In the first step, three criteria of reliability, convergent validity, and divergent validity are used to fit the external model (measurement model). Reliability is also assessed in three ways: confirmatory factor loading, Cronbach's alpha, and combined reliability. In the second stage, the internal model (structural model) is examined by estimating the path between variables, which measures the relationship between hidden variables and other hidden variables (Hulland, 1999).

5.2.1. The study of the external model (measurement model)

In the structural equation modeling method, it is first necessary to study the reliability of the structure to determine if the questions selected to measure the structures are accurate. For this purpose, confirmatory factor analysis (factor load) is used and the values of the factor load of each variable with its variable should be higher than 0.4 (Hulland, 1999). The results of the afore-mentioned tests are shown in Figure1.

Cronbach's alpha and combined reliability (CR) is also used to evaluate the reliability of the measurement model. Cronbach's alpha coefficient is a coefficient that measures the degree of reliability of research tools internally between structures. This coefficient is a value between zero and one variable and for applied research, if its value is more than 0.7 for the structure that measures the variable, it will have acceptable internal reliability (Moss et al, 1998). Also, the combined reliability coefficient higher than 0.7 for each structure indicates its appropriate reliability (Nonali, 1978).

In this study, convergent validity and divergent validity have been used to assess validity. The mean developed variance (AVE) is used to evaluate the convergent validity, which is a factor above 0.5 (Forel and Larker, 1981). The results of the afore-mentioned tests are presented in Table 3.

In this study, divergent validity has been used to investigate the measurement model. Divergent validity covers two issues: a) Comparing the degree of correlation between the indices of a structure with that structure versus the correlation of those indices with other structures. b) Comparing the degree of correlation of a structure with its indices versus correlation that structure with other structures (Davari and Rezazadeh, 2014). As shown in Table 4 taken from the method of Fornell and Larker (1981), the value of the AVE root of the latent variables in the present study in the cells in the principal diameter of the matrix is greater than the value of the correlation between those in the cell. The lower ones of the main diameter are arranged, the more. Therefore, it can be stated that in the present study, constructs (latent variables) in the model interact more with their indicators than with other structures. In other words, the divergent validity of the model is adequate.

Table 3
Results of Cronbach's alpha coefficients, combined reliability (CR) and convergent validity

Variables	**Cronbach's alpha**	**combined reliability (CR)**	**Mean Extraction Variance (AVE)**
financial reporting quality	0.788	0.904	0.825
Data Integration	0.795	0.907	0.830
Analytical Capabilities	0.819	0.868	0.525
information content Quality	0.920	0.936	0.676
Information access Quality	0.822	0.882	0.651
Use of information in business process	0.888	0.911	0.537
Analytical Decision-Making Culture	0.786	0.875	0.699

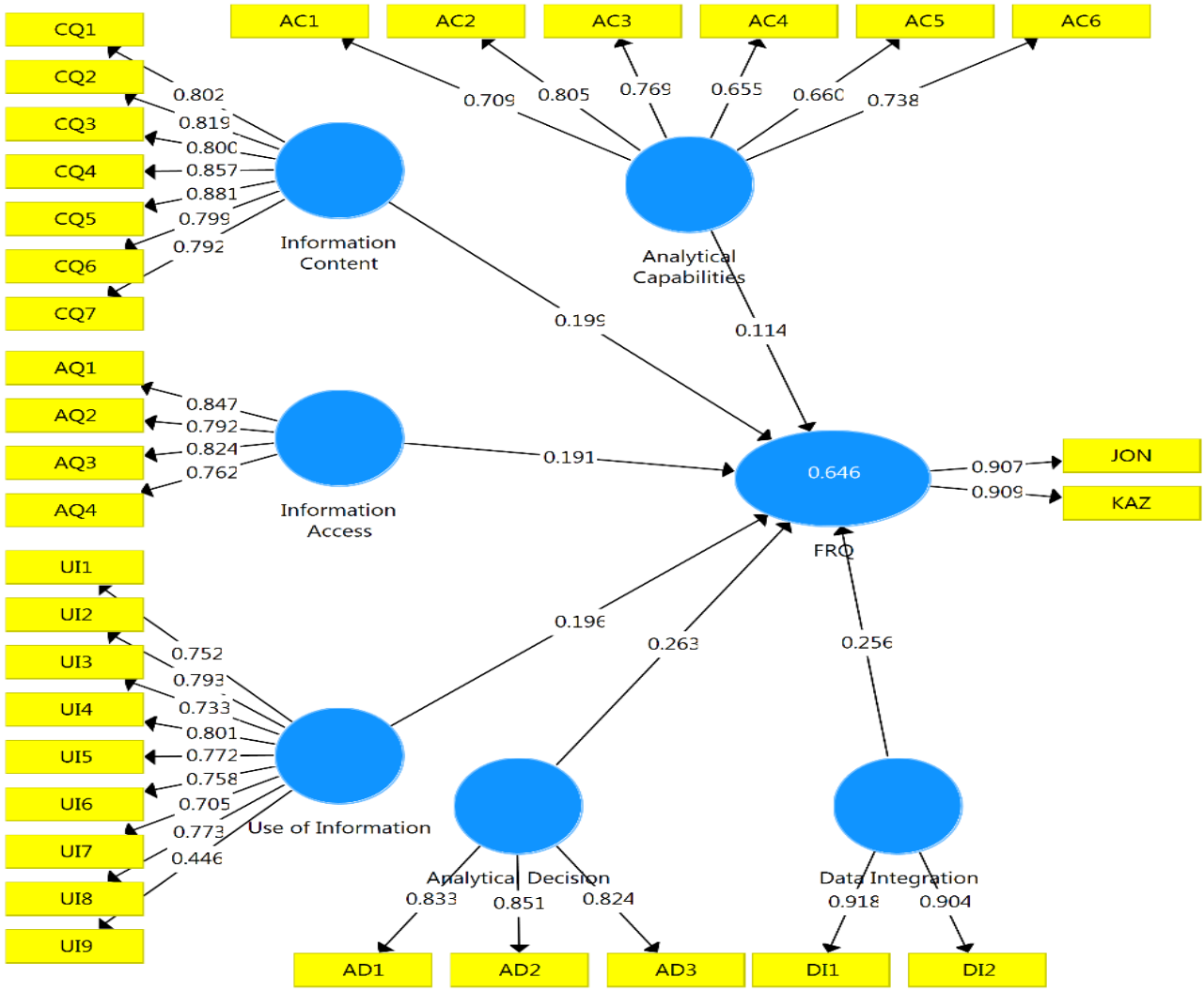

Fig. 1. Drawn model with values of standardized factor load coefficients

Table 4
Divergent validity results

Variables	Analytical Capabilities	Analytical Decision-Making	Data Integration	financial reporting quality	Information access Quality	information content Quality	Use of information in business
Analytical Capabilities	0.725						
Analytical Decision-Making	0.211	0.836					
Data Integration	0.441	0.193	0.911				
financial reporting quality	0.471	0.550	0.524	0.908			
Information access Quality	0.201	0.447	0.100	0.499	0.807		
information content Quality	0.560	0.266	0.540	0.592	0.321	0.822	
Use of information	0.196	0.382	0.208	0.508	0.396	0.300	0.733

Considering the results of convergent reliability and validity and divergent validity of the research, it can be said that the accuracy of the relationships in the research measurement model is confirmed.

5.2.2. The study of the internal model (structural model)

The internal model indicates the relationship between the latent variables of the research. Using the internal model, research hypotheses can be examined. If the t-value is higher than 1.96, it indicates
that the path coefficient is significant
(Davari and Rezazadeh, 2013). The T-values for the paths of each of the hypotheses are shown in Figure 2.

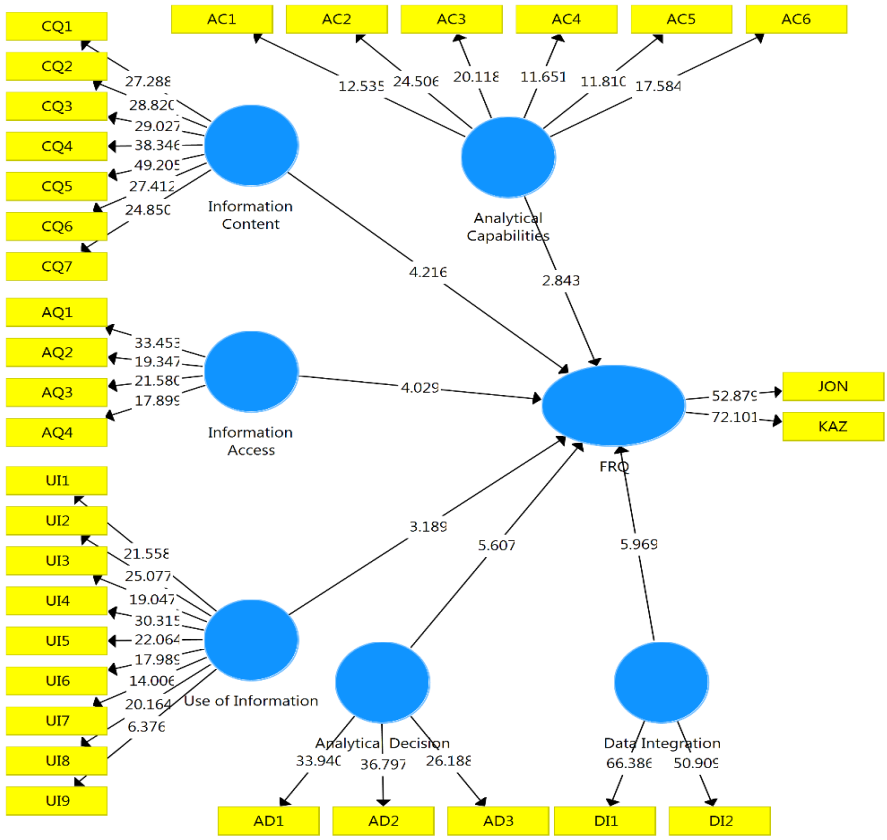

Fig. 2. Drawn model with T-values

As shown in Figure 2, the significance coefficient t for all variables is greater than 1.96 and at a 95% confidence level, the effect of business intelligence variable on the quality of financial reporting can be confirmed. According to the coefficients of t and the factor load extracted from Figures 1 and 2, the test results of the research hypotheses are given in Table 5.

Table 5
Results of research hypotheses

Hypotheses	Path coefficient	Statistics t
Data Integration ⟶ financial reporting quality	0.256	5.969
Analytical Capabilities ⟶ financial reporting quality	0.114	2.843
information content Quality ⟶ financial reporting quality	0.199	4.216
Information access Quality ⟶ financial reporting quality	0.191	4.029
Use of information in business process ⟶ financial reporting quality	0.196	3.189
Analytical Decision-Making Culture ⟶ financial reporting quality	0.263	5.607

Impact coefficient criterion or determination coefficient: The second criterion for examining the fit of a structural model in research is the R^2 coefficients related to the endogenous (dependent) latent variables. R^2 is a criterion that indicates the effect of an exogenous variable on an endogenous variable and three values of 0.19, 0.33 and 0.67 are considered as the criterion values for weak, medium and strong values of R^2 (Davari and Rezazadeh, 2014). According to Figure 1, the value of R^2 for the endogenous structure of financial reporting quality is calculated to be 0.646, which confirms the strong fit of the structural model according to the three values of the criterion.

Model Predictive Power Criterion:
This criterion determines the predictive power of the model and if the value of Q^2 for an endogenous structure achieves three values of 0.02, 0.15, and 0.35, respectively, it will have a weak, medium, and strong predictive power of the structure or related exogenous structures (Davari and Rezazadeh, 2014). The value of Q^2 related to the financial reporting quality structure of this research is 0.492, which is more than 0.35. Therefore, a strong fit confirms the structural model.

Criteria of the variability of indices: This criterion indicates the amount of variability of the indices of an endogenous structure that is affected by one or more exogenous structures and by multiplying the common values of an endogenous structure by the amount R^2 related to it is obtained (Davari and Rezazadeh, 2014). According to Table 6, the common value of the financial reporting quality variable is 0.389. The calculated R^2 value for the financial reporting quality variable is 0.646, so the redundancy value of this variable is equal to:

$$R_{F.R.Q} = Communlity_{F.R.Q} \times R^2_{F.R.Q} = 0.389 \times 0.646 = 0.262$$

Table 6
Common values of model structures

Variables	Communality
financial reporting quality	0.389
Data Integration	0.401
Analytical Capabilities	0.326
information content Quality	0.526
Information access Quality	0.411
Use of information in business process	0.400
Analytical Decision-Making Culture	0.381

This value is calculated for use only in the GOF benchmarking formula that will be described below.

5.3. The study of the overall model

The general model includes both the measurement model and the structural model, and by confirming its fit, the fit check is completed in a complete model. Only one criterion

called GoF is used to check the fit of the overall model. This criterion is calculated through the following equation:

$$GOF = \sqrt{\overline{Communalities} \times \overline{R^2}}$$

$\overline{Communalities}$: The average values of the variables are obtained.

$$\overline{Communalites} = \frac{1}{7}(0.401+0.326+0.526+0.411+0.400+0.381+0.389) = 0.405$$

$$\overline{R^2} = 0.646$$

$$GoF = \sqrt{0.405 \times 0.646} = 0.511$$

Considering the three values of 0.01, 0.25, and 0.36, which have been introduced as a weak, medium, and strong values for GoF (Davari and Rezazadeh, 2014), and obtaining the value of 0.511 for GoF, a very good fit of the model. The whole research is approved.

6. Conclusions and Suggestions

In the past, the business intelligence system was used as a tool for strategic decision-making, but today this technology is used to improve operational and technical processes, supply chain, production, and customer service. Also, technological advances and organizations' willingness to use new technologies have intensified the focus on business intelligence systems as specialized tools for data collection, storage, data analysis, inquiry, reporting (such as OLAP and dashboards), and financial reporting. Accordingly, the purpose of this study was to investigate the effect of business intelligence on the quality of financial reporting. The most important achievement of the present study is to provide a model based on structural equation modeling to determine the effects of business intelligence dimensions on the quality of financial reporting. The modeling results of the extracted structural equations are presented in detail below.

Findings of the first hypothesis of the study showed that data integrity as a component of business intelligence has a positive and significant effect on the quality of financial reporting, and the path coefficient of 0.256, and the statistical significance of 5.969 confirmed this hypothesis. The results obtained from this hypothesis show that the surveyed companies focus on the integration of reliable and homogeneous data in the organization to improve the quality of financial reporting. In addition, with the help of business intelligence, they have been able to have different information with different dimensions and from all parts of the company together leading to the strengthening of financial reporting through cause and effect analysis. These findings are consistent with the findings of Simoes, Coelho, Popovich, and Jaclich (2010).

As can be seen in Table 5, the second hypothesis with a path coefficient of 0.114 and a statistic of 2.843 shows that analytical capabilities affect the quality of financial reporting. The results of this hypothesis showed that the surveyed companies have strengthened financial reporting through inquiries, online analytical processing, and reporting. Their set of actions has led to the maturity of the business intelligence system by combining data integration and analytical capabilities.

The maturity of the business intelligence system has a great impact on the quality of access to information, which ultimately leads to improved financial reporting. The results of these findings are consistent with the results of the studies of Alpar, Engler, and Michael (2015), Wieder and Osimitz (2015), Lin et al (2009), Petrini, and Pozbon (2008), Razazi Borujeni and Kahid (2015).

Based on the path coefficient of 0.199 and the statistic of 4.216, it can be said that the third hypothesis is accepted, which indicates the effect of the information content quality as a component of business intelligence on the quality of financial reporting. Thus, the quality of information content has led to the usefulness of the information in the business process and the usefulness of information has led to favorable decisions in financial reporting. In addition, the results of the study showed that companies have used quality and timely information to advance and develop the goals of the business unit by using a business intelligence system. These findings are consistent with the findings of Popovich, Hackney, and Jaklich (2012).

The results of the fourth hypothesis of the study showed that the quality of access to information as a component of business intelligence has a positive and significant effect on the quality of financial reporting. This claim has been confirmed with a path coefficient of 0.191 and a statistic of 4.029. Quality of access to information later expresses the dominance of data in the organization, that is, it defines the levels of data access and determines what level of data each person can access. Access to information can help manage the entire supply chain and manage business and decision-making processes. The quality of access to information can be assessed through the knowledge of employees when using the business intelligence system. According to the results of this hypothesis, it can be said that companies using the business intelligence system can have access to information, accurate economic and financial analysis of customers, market and the internal environment of the organization and with the right decisions while developing customer relationships. Add to the added value of your services and products, the added value of your services and products leads to the quality of profits and ultimately the quality of financial reporting. These findings are consistent with the findings of Homocyano and Dino (2018).

The results of the fifth hypothesis of the study with a path coefficient of 0.196 and a statistic of 3.189 showed that the use of information in the business process as a component of business intelligence has a positive and significant effect on the quality of financial reporting, so using the information in the business process can be appropriate

strategies. Provide innovative ideas in line with the goals of the organization and their leadership in the capital market. In other words, business intelligence as a mechanism bridges the gap between business process management and business strategy. These findings are consistent with the results of Paul Ricard Son and Egan (2016), Al Bashir, Caliro Davern (2008).

Finally, the sixth hypothesis of the research indicates that the culture of analytical decision-making with a path coefficient of 0.263 and a statistic of 5.607 as a component of business intelligence has a positive and significant effect on the quality of financial reporting. The results showed that the culture of analytical decision making has an important role in using quality information in business unit decisions so that business intelligence has created practical information to improve decision support by combining data from internal and external sources of the company; besides, improving decision-making capabilities through business intelligence has led to improved financial reporting quality. These findings are consistent with the results of research by Wang (2016), Ghazanfari, Jalali, Rouhani, and Jafari (2009), Rouhani, and Zare (2012).

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