Designing the Model of Financial Statement Transparency Based on the Hierarchical TOPSIS Method

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ABSTRACT

The main objective of this paper is to realize the factors and design a model for financial statement transparency. This paper is practical, in terms of objective and is among the descriptive studies which are carried out using the survey method. In this paper, the Hierarchical TOPSIS method is used to show the relationship between indices. The statistical population, at the first step, includes scientific articles and those authentic local and international articles during 1990-2019 in the field of financial statement transparency which is selected using the non-probabilistic sampling method. In the second step, the opinions of 41 experts were used, who were well-informed of non/financial reporting including financial managers, investors, independent auditors, senior managers, and expert academicians in this field. The primary concepts were classified in the form of 42 codes. The results indicate that related information, timely information, financial reporting quality, internal audit quality, the presence of sufficient and appropriate internal controls, admitting international standards, etc., contribute to financial statement transparency. Finally, a model is designed for financial statement transparency in two dimensions of direction power and dependency power of transparency factors.The results of which reveal that some factors like disclosure value of the firm, regulating ethical principles among senior managers of an organization by integrating financial reporting, information related to the board, timely information, disclosure of corporate governance mechanisms, the presence of healthy competitive space, and presentation of related information depend on different risks of the firm with direct power and dependency power.

Keywords: transparency, integrated reporting, Hierarchical TOPSIS Method.

1. Introduction

Several studies approve the value of disclosure of the investors. Financial transparency is of great significance for gaining the trust of investors. Moreover, financial transparency for the financial supply of the market is more important than financial supply by building relationships (Balakrishnan et al., 2014; Barth et al., 2008). As expressed by Coase (1960), within an ideal financial system, there is no difference that financial supply is private through connections or general via the market. Within a defected economy, however, other factors should also be considered. Hence, it is important to find these factors in a defective economy. After the financial crisis in 2008, one of the criticisms was that financial reporting does not obviate the needs of financial statement users. By presenting a study in 2009, the financial accounting assembly of Great Britain has issued some principles for reducing the complication of firm reports. The principles have increased the responsibility of managers about presenting financial reports to allow the investors to better assess the financial status and performance of the firm. Moreover, the financial-accounting standards compilation board presented the disclosure framework in 2012, according to which the aim of presenting financial information is to aid the users in their economic decision-making. Provided that the quality and transparency of reported information are low, the receivers of such information may make false decisions that lead to non-optimal allocation of economic resources. Financial transparency refers to the real reflection of the economic performance of the firm via information report in financial statements. Chih et al., (2008) express within a study that financial statement transparency is of great significance for shareholders and other beneficiaries because it brings about the decline of information asymmetry. Information transparency is extremely important in financial reporting. Several studies show that transparency is one of the major factors from the investors' view. Some of the previous studies have used the signalling and the agency theory for evaluating financial transparency (Leuz et al., 2003; Koh, 2007; Peasnell et al., 2005). Information transparency has a significant role in solving the agency problem (Narib et al., 2019). Lack of transparency can lead to uncertainty and consequently false valuation of a firm (Barth et al., 2010; Lang & M. Maffett, 2011; Narib et al., 2019). Traditional financial reporting contains historical information, shows the firm performance, and lacks the required transparency (Minnis et al., 2017). Traditional financial reporting does not reflect the value of the business firm and users should use other information resources for value estimation of the firm (Abor, 2007). Atkins (2006) expressed that transparent disclosure of financial information can increase the trust of investors that one of these factors is social responsibility information. Moreover, Prior et al. (2008) state that according to the stakeholders' theory, managers are likely to disclose social responsibility information, opportunistically. According to the theory, financial disclosure related to social responsibility is of great significance for improving transparency in financial reporting (Narib et al., 2019). Firms disclose management analysis reports and other reports through financial reports, including financial statements, attached notes, and social responsibility reports to enhance transparency (Healy, Palepu, & Ruback, 1992).

Bushman, Piotroski, and Smith (2004) show that financial reporting transparency can increase the trust of the investors' community. According to Bushman, Piotroski, and Smith (2004), financial transparency is the availability of related and trustful information about the period, financial position, investment opportunities, firm value, and risk. Besides, the realization of contributing factors to financial transparency can be significant for regulators, investors, and users and the creation complete and competitive market (Chih et al., 2008). The users of financial reporting are willing to be informed of the financial status of the firm and search for complementary information. Such information is mostly available in integrated financial reporting and since the presentation of such information is important for the stakeholders, firms require to deal with the needs of them by presenting financial and non-financial reports. Integrated reporting is indicative of the entire image of the firm and future objectives of the firm. Moreover, integrated reporting leads to more transparency about the financial and non-financial performance of the firm. Integrated reporting can present corporate governance, financial capital, intellectual capital, social capital, and environmental capital. The notion is an element of appropriate commercial reporting (Reimsbach et al., 2017) and provides a more extensive and transparent content for performance data, sheds light on the manner of sustainable development appropriateness in operation or commerce, and facilitates the stability in the firm decision-making process (Hopwood et al., 2010).

The innovation of the present study can be summarized in accumulating distinctive criteria and presenting a multidimensional criterion of financial reporting transparency by emphasizing the role of integrated reporting and combinational utilization of Delphi-Fuzzy and TOPSIS hierarchical methods to design a model for financial statement transparency. The other factor is the significant role of disclosure, as a major criterion of each transparency model in the process of resource efficiency allocation and also corporate leadership. Moreover, since the capital market is one of the pillars of financial market and plays a significant role in presenting financial and capital facilities to economic growth and in most of the countries the function of the financial supply of credits is required by the business firms, more transparency in information related to capital market can lead to the effectiveness of the capital market in economic growth and development and finally, designing the model of financial statement transparency can be important for determining legislative strategies and also enable the investors to make sound investment decisions. The second innovation of this paper is the use of hierarchical TOPSIS method for the research method and design which is not utilized in the previous studies, hence, the main question of the study is that "whether financial reporting integration can lead to transparency increase in financial statements or not and what is the appropriate model for financial statement transparency?".

2. Conceptual framework and literature review

Information disclosure is the main framework in transparency (Barrosan et al., 1977). Transparency is a contributing factor to the trust-making, such that the presence of transparency is vital for each economy and causes the optimum allocation of resources (Dipiazza & Eccles, 2002). Information asymmetry in the market finally leads to the decline of liquidity and an increase in transaction costs (Barth et al., 2010; Lang & M. Maffett, 2011). The traditional way of presenting financial statements cannot respond to the increasing development of information needs for the operation of business firms and all needs of users. Currently, financial reports are historical and no financial expertise is required for using them (Reimsbach et al., 2017). Low quality of integrated reporting contributes negatively to transparency (Pistoni et al., 2018). Integrated reporting combines most of the currently reported information separately within a coherent set, presents the relationship between them, and explains how they affect firm capability in creating and holding value in the short, medium, and long-term. This type of reporting points to firm performance both for financial and non-financial results (Hopwood et al., 2010).

The information set, including rules and regulations, supervisory bodies, analysts, etc., can influence information transparency. One of the main objectives of financial and accounting information disclosure is the decline of information asymmetry (Cahan et al., 2005). The disclosure of such items is indicative of an increase in transparency that finally leads to the decline of information asymmetry (Bushman, Piotroski, & Smith, 2004). Transparency as an inseparable part of the governance system of the firm that lowers the uncertainty about future decisions and improves the efficiency of financial markets (Organization for Economic Cooperation and Development, 2004).

According to the conducted studies, the stock value of firms with more transparency is more than those with lower transparency (Benjamin, Hermalin, Michael, Weisbach, 2007). The negative effect of information asymmetry on firm value encourages other sections of a firm to establish some mechanisms for the realization of contributing factors to information transparency and the decline of information asymmetry (LaFond, R. Watts, 2006). Transparency can be achieved by improving legal mechanisms or regulations related to more disclosure, designing security measures for limiting the moral risk through more disclosure and establishing legal and policymakers for solving inevitable problems of financial markets (Vishwanath & Kaufmann, 1999). The other aspect of transparency which is of great significance for the opinion leaders is the quality of financial reporting and corporate governance. Financial reporting quality and corporate governance cause the maintenance and enhancement of information system position and financial reporting in capital markets and the decline of agency costs

(Bushman & Smith, 2001). Enormous waves of recent frauds posed some critics on the lack of information transparency and financial reporting quality (Agrawal & Chadha, 2005). According to the previous studies, certain governance mechanisms, including ownership concentration (Ballesta & Meca, 2005), board independence (Perta, 2007), and audit quality (Agrawal & Chadha, 2005) that lead to transparency increase are emphasized. Along with the complication of business and economy, the scope of financial and non-financial information users has increased, such that we cannot enhance the understanding of users about information without increasing transparency (McClintic, 2001). Such complication has led to several numbers of financial frauds by auditors and accountants in presenting transparent reports (Byrnes, 2002). Accounting and financial literature show that accounting policies are under the influence of dominant culture on society and economy (Doupink & Salter, 1995). Culture is the cumulative planning of mind that isolates the members of a human group from the other group (Hofstede, 2007). Accounting is under the influence of cultural, legal, political, and economic settings of different countries that environmental factors and more specifically culture affected the human factor of accounting and accounting policy via norms and dominant values (Doupkin & Salter, 1995). Among the dominant cultural aspects of accounting, we can refer to the culture of secrecy in society. Whenever more information is disclosed in the financial statement of firms in society, the amount of secrecy is lower in that society (Gray & Vint, 1995). The culture of secrecy determines the accounting policies on disclosure of commercial firms in that culture (Zarzeski, 1996).

On the other hand, historical developments and social, economic, and environmental conditions contribute to performance and expectations from accounting. Hence, different objectives defined for accounting in different periods (Napier, 1995). In the first step, presenting financial information can be with the aim of usefulness for decision-making or aiding the evaluation and consultation with the management. Thus, two approaches of “decision-making-based” and “responsibility-based” are developed for providing and presenting financial information. Several scholars have assessed these two aspects, some of whom have focused on aiding the decision-making process (Miihkinen, 2013) and some others on evaluating the previous performance and management stewardship (Kothari, 2010). According to the theoretical framework of the International Accounting Standards Board, qualitative features are divided into two broad groups of fundamental and promotive. The first group is about features related to information content that include relatedness and honest presentation within the current framework. The promotive features are related to presenting information and cause the effectiveness of information. These features include information comparability, timeliness, effectiveness, and understandability. The feature of reliability is, to a great extent, similar to the feature of honest presentation but the presence of different meanings for the expression “reliable” and unclarity of the exact meaning are the main reason for its replacement with the feature of an honest presentation. The honest presentation includes three features of completeness, clear of mistakes, and unbiasedness (International Accounting Standards Board, 2011). Moreover, admitting international standards of accounting has a significant effect on transparency and quality of accounting information. Previous studies have been concerned about the effect of the usefulness of international accounting standards on the quality of information setting and information transparency (Hail & Leuz, 2009) and the use of such standards is considered as an index for more clarity of financial reporting at the firm level (Daske et al., 2009). Admitting international accounting standards in firms with the required motivation for increasing transparency and legal sanction has positive effects on the capital market (Daske et al., 2013). Auditing is one of the contributing factors to information transparency. Financial reporting audit presents extensive interests in the processes of analysis and commercial reporting. Such interests can be enhanced via high-quality auditing to lead to the decline of agency problems, trust-making, more accurate analysis of data, creating a transparent setting, and increasing the efficiency of internal audit tests (Bizarro, 2011). The change of independent auditor does not affect the information transparency of firms. Besides, audit quality contributes to information transparency (Bolue et al., 2010). The previous studies emphasize the effect of internal controls and internal audit on transparency (Blue Ribbon Commission, 1999; Sarbanes-Oxley: Ramsay Report, 2002). Such an emphasis is, to some extent, due to some frauds, including adjusted profit and loss statements (Larcker, 2004). Further, there is a direct relationship between corporate governance weakness and low quality of financial reporting, earnings manipulation, fraud in financial statements, and weak internal controls (Dechow et al., 1995; Beasley, 1996; McMullen, 1996).

One of the determining factors in information transparency is the presence of financial analysts in the capital markets. There are different interpretations of investors and analysts about information transparency. Hence, the existing conflict derives from a mutual interpretation of investors that affect the information transparency and also honest presentation of information contributes to the transparency (Frijns et al., 2018; M. Lang & Maffett, 2010). The relationship between analysts and transparency is not clear. Should the analysts be in search of a share with few public information about that, more coverage of analysts is indicative of more information asymmetry. On the other hand, due to a lack of access to appropriate and sufficient information for evaluating the investments, the analysts may not be willing to pursue those firms with few and low-quality information (Lang et al., 2011).

Given the theoretical principles and the previous studies, the primary extracted concepts are depicted in Table 1.

Table 1

Contributing factor to transparency	Scholar name
Accounting information disclosure	Lang, Maffett,(2011); Acharya, Pedersen (2005).
Admitting international standards	Lang, Maffett (2010).
Avoiding uncertainty in the firm	Doupink and Salter (1995). Hofstede, Hofstede (2007).
Conflict of interests between firm managers and shareholders	Bhattacharya, Daouk, Welker, (2003), OECD Principles of Corporate Governance (2004). Zhai, Wang. (2016).
Corporate governance quality	Nairb, Muttakina, Khana, Nava Subramaniama, Somanathb (2019), Byard, Li,& Weintrop (2006), Ramsay, (2001). McMullen,(1996). Klein, (2002).
Culture of humanism	Doupink and Salter (1995). Hofstede, Hofstede (2007).
Culture of responsiveness in society	Lys, Naughton, and Wang. (2015). Gray, and Vint (1995).
Disclosing information related to payments and advantages of board members	Zhai, Wang (2016). Petra (2007).
Disclosing nonfinancial activities within separated reports	Campbell, Chen, Dhaliwal, Lu, and Steele. (2014).
Disclosure of capital cost	Bhattacharya, Daouk, Welker, (2003), Jinbu Zhai, Yutao Wang. (2016). Lang, Lins, Maffett, (2010), Acharya, Pedersen, (2005). OECD Principles of Corporate Governance (2004).
Disclosure of firm performance	Minnis, Michael and Sutherland, Andrew, (2017), Hopwood, Unerman, J. and Fries. (2010).
Ethical principles and honesty of the firm staff	Allison McClintic Marion. Gale Cengage, (2001), Byrnes (2002).
Financial reporting synchronization	Haijing. (2011), International Accounting Standards Board (2010),
Firm liquidity	LaFond, Watts, (2006). Lang, Maffett, (2011).
Firm size	Zhai, Wang. (2016). Petra,(2007). Nairb, Muttakina, Khana, Subramaniama, Somanathb (2019).
Firm value	Ohlson, (2005), LaFond, Watts,(2006).
Healthy competitive space	Cheng, Man and Yi. (2013). Grullon, Michaely, (2012).
Independent audit quality	Bizarro (2011). Bolue, Maham,Goodarzi.(2010).
Individualism against collectivism	Doupink and Salter (1995). Hofstede, (2007)
An initial acquaintance of beneficiaries with financial statement concepts	International Accounting Standards Board (2010), Gray, and Vint (1995).
Legal institutions and policy-makers to resolve financial market problems	Vishwanath, Kaufmann(1999).
Legal mechanisms related to disclosure	Vishwanath, Kaufmann(1999).
Local audit quality	Jinbu Zhai, Yutao Wang. (2016). Bizarro. (2011). Dechow, Sloan, R.G., & Sweeney. (1995). Beasley, (1996). McMullen. (1996).

Contributing factor to transparency	Scholar name
Political economy	Lys, Naughton, and Wang (2015).
Power distance infirm	Doupink and Salter (1995). Hofstede, Hofstede (2007).
Predictability of liquidity	Lang, Maffett(2011), Acharya, Pedersen, (2005). Qin, (2008). Brunnermeier, Pedersen. (2009). Lang, Lins, Maffett, (2010). Pangano, Paolo, (2012). Fetch, Roland, Philipp, (2014), Gerace, Qigui, , Gary, Willa, Z. (2015).
Presenting information related to different firm risks	Lang, Maffett(2010). Acharya, Pedersen, (2005). Pistoni, Songini. and Bavagnoli. (2018). Brunnermeier, Pedersen. (2009).
Presenting related information	International Accounting Standards Board (2010),
Presenting reliable information	International Accounting Standards Board (2010), Benjamin. Hermalin, ichael. Weisbach. (2007).
Records of board members	Benjamin. Hermalin, ichael. Weisbach. (2007).Petra, (2007).
Security measures to limit the ethical risk through more disclosure	Vishwanath, Kaufmann. (1999).
The short-term inclination toward a long-term inclination	Hofstede, Hofstede (2007) Gray and H. Vint (1995).
Social responsibility reporting	Blue Ribbon Committee (1999). Cui, Jo, Na (2018)
Staff efficiency	Solomon, Solomon, Norton, and Joseph. (2000).Zhai, Wang. (2016).
Tax reporting	Scholes. Wilson, and Wolfson, (1990), Lisowsky. (2009), Manzon, Gil , and George . Plesko, (2002), Shaviro(2008),
The presence of analysts in the market	Frijns, Huynh, Tourani-Rad., Westerholm, P., (2018), Nairb, Muttakina, Khana, Subramaniama, Somanathb (2019), Lang, Lins, Maffett, (2010), Lang, Maffett(2011), Bolue, Maham, Goodarzi,(2010). Healy, Palepu, and Ruback, (1992).
The presence of appropriate and sufficient internal controls	Dechow., Sloan & Sweeney. (1995). Beasley. (1996). McMullen, (1996).
The presence of political connections	Campbell, Chen, Dhaliwal, Lu and Steele. (2014).
The quality of financial reporting	Blue Ribbon Committee (1999). International Accounting Standards Board (2010), Healy, Palepu, and Ruback,(1992).
Timely presentation of information	International Accounting Standards Board (2010), Francis, Olsson, & Schipper. (2008).
Trustful presentation of information	Healy, Palepu, and Ruback, (1992). Francis, Olsson, & Schipper. (2008), Nairb, Muttakina, Khana, Subramaniama, Somanathb (2019), Frijns, Huynh, Tourani-Rad, Westerholm (2018),
Voluntarily disclosure of information, including social and environmental activity reporting	Cui,Na, (2018)), Ramsay, (2001). Blue Ribbon Committee (1999). Sarbanes, & Oxley. (2002). HAIL, and LEUZ(2009).

3. Research method

This paper is practical, in terms of objective and among the descriptive studies carried out using the survey method and exploratory design. The main objective of the study is to design a model for financial statement transparency. A questionnaire is designed with 42 questions. In this paper, the Hierarchical TOPSIS method is used for showing the relationship between indices. The statistical population of this paper, in the first step, includes all scientific and authentic local and international articles during 1990-2019 in the realm of financial statement transparency which are carried out using the unprobeable sampling method. In the second step, the opinions of 41 scholars are used that include financial and non-financial informants, including financial managers, investors, independent auditors, senior managers, and expert academicians in this field. In this paper, library and survey methods are used for collecting data and information and the Delphi-Fuzzy method, which is used for synthesizing the opinions of scholars and screening indices is employed for screening the questionnaires to determine the main indices of financial statement transparency. In this method, the opinions of scholars are collected using triangular-fuzzy figures as follows:

Equation (1) $$\hat{W}_k = (a_k, b_k, c_k)$$

Where

Wk: fuzzy number

K: index

(a_k): minimum evaluation

(b_k): average evaluation

(C_k): maximum evaluation

4. The findings

4.1. Descriptive statistics

Table 1 illustrates the information about the descriptive statistics of participants. As can be seen, the number of total participants is 41, among which 23 people were male and 18 people were female, which is depicted in Table 2.

Table 2. Information of descriptive statistics of participants

Gender	Age/education	PhD	PhD student	Bachelor's degree	Master's degree	Total	Percentage from total
Female	Between 25-30			1	3	4	9.8%
	Between 30-35	1	3	1	2	7	17.1%
	Between 35-40	2	1		2	5	12.2%
	Between 45-50				1	1	2.4%
	Between 50-55				1	1	2.4%
	Total female	3	4	2	9	18	43.9%
Male	Between 25-30			2	1	3	7.3%
	Between 30-35	2			3	5	12.2%
	Between 35-40	4		1	1	6	14.6%
	Between 45-50	6			1	7	17.1%
	Between 50-55		1		1	2	4.9%
	Total male	12	1	3	7	23	56.1%
Total		15	5	5	16	41	100.0%
Percentage from total		36.6%	12.2%	12.2%	39.0%	100.0%	

4.2. The results obtained from Delphi-Fuzzy method

In the first step, the contributing factors to financial statement transparency were extracted from the literature of the study and screened using the Delphi-Fuzzy method and the answers of participants were collected, as depicted in Table 3. The method of the centre of gravity ($s_k = \frac{a_k+b_k+c_k}{3}$) is used for evaluating the answers of participants. Should $s_k \geq \lambda$ is the desired accepted index, $s_k < \lambda$ would be the desired unacceptable index. In this paper, indices with the scores lower than 0.65 are omitted and finally, the inserted indices in Table 4 were considered as entered indices for designing the model.

Table 3. Triangular-fuzzy numbers equal to 5-degreeLikert spectrum

Totally agree	Agree	No opinion	Disagree	Totally disagree
(0.75, 1, 1)	(0.5, 0.75, 1)	(0.25, 0.5, 0.75)	(0, 0.25, 0.5)	(0, 0, 0.25)

Table 4. Obtained information from the implementation of Delphi-Fuzzy method

Index No.	Question	Fuzzy removal	(acceptance/rejection)
1	Disclosing firm value	0.762195	Acceptance
2	Disclosing annual financial performance via profit and loss	0.760163	Acceptance
3	Disclosing capital cost of the firm	0.739837	Acceptance
4	The presence of appropriate human connections in organizations	0.672764	Acceptance
5	Regulating ethical principles among senior managers of the organization	0.75	Acceptance
6	Disclosing the records of board members	0.699187	Acceptance
7	Through the synchronization of financial reporting, information related to the board	0.719512	Acceptance
8	An initial acquaintance of beneficiaries with financial statement concepts	0.721545	Acceptance
9	Presenting reliable information	0.79065	Acceptance
10	Related information	0.833333	Acceptance

Index No.	Question	Fuzzy removal	(acceptance/rejection)
11	Timely information	0.831301	Acceptance
12	Information disclosure	0.678862	Acceptance
13	Disclosing information related to payment and advantages of board members and firm CEO	0.644309	Rejection
14	Disclosing nonfinancial activities in separate reports	0.715447	Acceptance
15	Disclosing corporate governance mechanisms	0.778455	Acceptance
16	The presence of legal mechanisms related to disclosure	0.768293	Acceptance
17	Security measures for limiting ethical risk via more disclosure	0.75813	Acceptance
18	The presence of legal institutions and law-makers for resolving financial market problems	0.703252	Acceptance
19	The presence of healthy competitive space	0.727642	Acceptance
20	Independent audit quality	0.817073	Acceptance
21	Internal audit quality	0.823171	Acceptance
22	Disclosing information related to tax prices and firm performance	0.735772	Acceptance
23	Presenting information related to different firm risk	0.75	Acceptance
24	Financial reporting synchronization	0.73374	Acceptance
25	Staff efficiency	0.693089	Acceptance
26	The integrity of the firm staff	0.747967	Acceptance
27	The presence of appropriate and sufficient internal controls	0.821138	Acceptance
28	Admitting international standards	0.821138	Acceptance
29	The presence of analysts in the capital market	0.686992	Acceptance
30	Predictability of stock price liquidity	0.654472	Acceptance
31	Corporate governance quality	0.794715	Acceptance
32	The quality of financial reporting quality	0.825203	Acceptance
33	Trustful presentation of information	0.804878	Acceptance
34	Financial reporting integrity	0.810976	Acceptance
35	Power distance in firms	0.672764	Acceptance
36	Humanism culture	0.54065	Rejection
37	Individualism against collectivism	0.70122	Acceptance
38	Short-term inclination against the long-term inclination	0.707317	Acceptance
39	Avoiding uncertainty infirm	0.731707	Acceptance
40	The presence of political connection infirm	0.684959	Acceptance
41	The presence of economic and currency fluctuations	0.676829	Acceptance
42	Increase in economic sanctions	0.607724	Rejection

4.3. Ranking factors via Hierarchical TOPSIS

After screening the contributing factors to financial statement transparency using the Delphi-Fuzzy method, the constituent elements of the model will be recognized in the structural process by using the hierarchical TOPSIS method. The reason for that is the combination of obtained results from the Delphi-Fuzzy method with the hierarchical TOPSIS method to increase the credibility power of the model. In case those factors that are confirmed in the Delphi-Fuzzy method be also approved in the hierarchical TOPSIS method, they will be entered the model, otherwise, they will be omitted.

In this paper, the ISM method is used for showing the relationship between indices in a hierarchical manner. Structural modelling is an appropriate technical interpretation for analyzing the impact of an element on the other. Such a methodology assesses the sequence and direction of complicated relations among the elements of a system. Interpretive structural modelling is applied in different works of literature, a summary of which is illustrated in the Chart (Agrawal et al., 2007). In the following, we describe the implementation procedures of the ISM.

Step 1: realizing the most important variables is the first step in the process of presenting an interpretive-structural model, determining, and detecting the constituent elements of the model.

Step 2: achieving the structural matrix of the internal relationship between variables (SSIM). The matrix has different dimensions with the variables shown respectively at the first line and column, then the relationship between variables are shown with some symbols (O, X, A, V), each of which has a different meaning as follows:

V: line (i) factor can paper the way for reaching the factor of column (j);

A: column (j) factor can paper the way for reaching the factor of the line (i);

X: there is a mutual relationship between the factor of the line (i) and that of column (j). In other words, both factors can pave the way for reaching one another.

O: there is no relationship between these two elements (i.j).

Step 3: achieving the access matrix by converting the obtained symbols from the SSIM matrix to 0 and 1 according to the following rules. The regulations for converting symbols to figures 0 and 1 are as follows:

1) In case home (j.i) has taken V symbol in the SSIM index, its related home in the access matrix is 1 and its symmetrical home, namely (i.j) is 0.
2) In case home (j.i) has taken A symbol in the SSIM index, its related home in the access matrix is 0 and it is symmetrical home, namely (i.j) is 1.
3) In case home (j.i) has taken X symbol in the SSIM index, its related home in the access matrix is 1 and its symmetrical home, namely (i.j) is 1.
4) In case home (j.i) has taken O symbol in the SSIM index, its related home in the access matrix is 0 and it is symmetrical home, namely (i.j) is 0.

And finally, the obtained results from the analysis of the hierarchical TOPSIS model are shown in Tables 5 and 6.

Table 5. Structural matrix

۴۱	۴۰	۳۹	۳۸	۳۷	۳۵	۳۴	۳۳	۳۲	۳۱	۳۰	۲۹	۲۸	۲۷	۲۶	۲۵	۲۴	۲۳	۲۲	۲۱	۲۰	۱۹	۱۸	۱۷	۱۶	۱۵	۱۴	۱۲	۱۱	۱۰	۹	۸	۷	۶	۵	۴	۳	۲	۱	عوامل
V	X	V	V	V	V	O	X	V	A	V	V	V	X	V	V	V	X	V	O	X	V	A	V	V	V	X	V	V	X	V	O	O	V	V	O	V	V		۱
V	A	X	X	A	A	A	A	A	A	A	A	A	A	A	V	A	X	X	A	O	A	A	A	A	A	V	A	X	X	A	O	V	V	V	X	V		X	۲
A	A	V	V	V	X	A	A	O	A	A	A	V	A	X	A	A	O	A	A	A	V	A	A	A	V	V	A	X	A	A	O	V	A	X	X		O	A	۳
O	A	A	A	V	A	O	O	A	O	A	A	A	O	A	O	A	A	A	V	A	A	O	O	A	O	A	A	O	O	A	O	V	A	V		V	X	V	۴
O	V	V	V	O	V	V	V	O	V	V	V	O	V	V	V	V	O	V	V	V	O	V	V	V	V	O	V	O	V	V	V	A	A		A	A	V	V	۵
X	V	V	V	X	O	X	V	A	V	V	V	X	V	V	V	X	V	O	X	V	A	V	V	V	X	V	V	X	V	O	X	V		A	A	V	V	V	۶
A	X	X	A	O	A	A	A	A	A	A	A	A	A	V	A	X	X	A	O	A	A	A	A	A	V	V	X	X	A	O	A		O	O	A	O	A	A	۷
X	V	A	V	V	X	V	V	V	X	V	O	X	V	A	V	V	V	X	V	V	V	X	V	O	X	V	V	V	V	X		O	V	V	V	V	O	V	۸
A	A	A	A	A	A	X	X	A	O	A	A	A	A	A	A	A	A	A	A	V	A	X	X	A	O	A	A	A	A		V	A	X	X	A	O	A	A	۹
X	A	A	O	A	A	V	V	V	A	X	A	A	O	A	A	A	V	A	X	A	A	O	A	A	A	V	A	A		V	V	A	X	A	A	O	A	A	۱۰
A	A	O	O	A	A	A	A	V	A	A	O	O	A	O	A	A	A	O	A	O	A	A	A	V	A	A	O		O	A	A	A	O	O	A	O	A	A	۱۱
O	V	V	V	V	V	V	V	O	V	V	V	V	O	V	V	V	O	V	V	V	V	O	V	V	V	O		V	V	O	V	V	O	V	V	V	O	V	۱۲
A	A	A	A	A	A	X	X	A	O	A	A	A	A	A	A	A	A	A	A	V	A	X	X	A	O		A	A	A	V	V	A	X	X	A	O	A	A	۱۴
X	A	A	O	A	A	V	V	V	A	X	A	A	O	A	A	A	V	A	X	A	A	O	A	A		V	A	A	V	V	V	A	X	A	A	O	A	A	۱۵
A	A	O	O	A	A	A	A	V	A	A	O	O	A	O	A	A	A	O	A	O	A	A	A		A	A	O	A	O	A	A	A	O	O	A	O	A	A	۱۶
O	V	V	V	V	V	V	V	O	V	V	V	V	O	V	V	V	O	V	V	V	V	O		V	V	O	V	V	V	O	V	V	O	V	V	V	O	V	۱۷
V	V	X	V	V	X	V	O	X	V	A	V	V	V	X	V	V	V	X	V	O	X		A	V	V	V	V	V	V	X	V	O	V	V	O	V	V	V	۱۸
A	V	A	X	X	O	A	A	A	A	A	A	A	A	A	A	V	A	X	X	A		A	A	A	A	A	V	A	X	X	A	V	V	V	X	V	O	X	۱۹
A	A	A	V	V	X	V	V	V	X	V	O	X	V	A	V	V	V	X	V		V	X	V	O	X	V	V	V	V	X	V	V	A	X	X	A	O	A	۲۰
A	O	A	A	A	A	X	X	A	O	A	A	A	A	A	A	A	A	A		V	A	X	X	A	O	A	A	A	A	V	V	V	A	V	V	V	X	V	۲۱
V	O	V	O	A	A	V	V	V	A	X	A	A	O	A	A	A	V		X	A	A	O	A	A	A	V	A	A	V	V	V	A	A	A	A	A	V	V	۲۲
X	V	V	O	A	A	A	A	V	A	A	O	O	A	O	A	A		O	A	O	A	A	A	V	A	A	O	A	O	A	A	V	A	A	A	V	V	V	۲۳
A	X	X	V	V	V	V	V	O	V	V	V	V	O	V	V		O	V	V	V	V	O	V	V	V	O	V	V	V	O	V	A	O	O	A	O	A	A	۲۴

۴۱	۴۰	۳۹	۳۸	۳۷	۳۵	۳۴	۳۳	۳۲	۳۱	۳۰	۲۹	۲۸	۲۷	۲۶	۲۵	۲۴	۲۳	۲۲	۲۱	۲۰	۱۹	۱۸	۱۷	۱۶	۱۵	۱۴	۱۲	۱۱	۱۰	۹	۸	۷	۶	۵	۴	۳	۲	۱	عوامل
A	V	V	V	V	V	V	V	X	V	O	X	V	A	V		V	X	V	V	V	X	V	O	X	V	A	V	V	X	V	V	O	V	V	V	V	O	V	۲۵
A	A	A	A	V	X	X	A	O	A	A	A	A	A		A	A	A	A	V	A	X	X	A	O	A	A	A	A	V	V	A	X	X	A	O	A	A	V	۲۶
V	V	V	V	O	V	A	V	V	V	X	V	V		X	V	O	X	V	A	V	V	V	X	V	V	V	V	O	X	V	A	V	V	V	X	V	V	V	۲۷
V	V	O	A	O	A	A	A	A	V	A	X		A	O	A	A	A	A	A	A	A	A	A	A	V	A	X	A	O	A	A	A	A	A	V	V	A	X	۲۸
V	O	X	V	A	A	A	O	A	A	A		V	V	A	X	A	A	O	A	A	A	V	A	X	A	A	A	A	A	V	A	A	A	V	V	V	A	X	۲۹
A	A	A	V	V	A	O	O	A	O		A	A	V	A	A	O	O	A	O	A	A	A	O	A	O	A	A	V	A	A	O	O	A	O	A	A	A	O	۳۰
X	A	A	V	V	V	V	V	V		V	V	V	O	V	V	V	V	O	V	V	V	O	V	V	V	V	V	V	V	O	V	V	V	V	O	V	V	O	۳۱
A	O	O	V	O	V	A	V		V	X	V	V	V	X	V	O	X	V	A	V	V	V	X	V	V	V	V	O	X	V	A	V	V	V	X	V	V	V	۳۲
V	V	V	A	O	A	A		A	V	A	X	X	A	O	A	A	A	A	A	A	A	A	A	A	V	A	X	A	O	A	A	A	A	A	V	V	A	X	۳۳
O	X	V	V	A	A		O	A	A	A	V	V	V	A	X	A	A	O	A	A	A	V	A	X	A	A	A	A	A	V	A	A	A	V	V	V	A	X	۳۴
A	A	A	V	V		O	O	A	O	A	A	A	V	A	A	O	O	A	O	A	A	A	O	A	O	A	A	V	A	A	O	O	A	O	A	A	A	O	۳۵
A	X	X	A		V	X	V	V	V	X	V	O	X	V	A	V	V	V	X	V	V	V	X	V	O	X	A	V	V	V	X	V	V	V	X	V	O	X	۳۷
A	V	V		A	V	A	X	X	A	O	A	A	A	A	A	A	A	A	A	A	V	A	X	X	A	O	A	A	A	A	V	V	A	X	X	A	O	A	۳۸
A	A		A	O	A	A	V	V	V	A	X	A	A	O	A	A	A	V	A	X	A	A	O	A	A	A	A	A	A	V	V	V	A	X	A	A	O	A	۳۹
V		V	O	O	O	A	A	A	V	A	A	O	O	A	O	A	A	A	O	A	O	A	A	A	V	A	O	O	A	O	A	A	A	O	O	A	O	A	۴۰
	V	V	V	V	O	V	V	V	O	V	V	V	V	O	V	V	V	O	V	V	V	V	O	V	V	V	V	V	V	V	O	V	V	O	V	V	V	O	۴۱

Table 6. Final Access Matrix

۴۱	۴۰	۳۹	۳۸	۳۷	۳۵	۳۴	۳۳	۳۲	۳۱	۳۰	۲۹	۲۸	۲۷	۲۶	۲۵	۲۴	۲۳	۲۲	۲۱	۲۰	۱۹	۱۸	۱۷	۱۶	۱۵	۱۴	۱۲	۱۱	۱۰	۹	۸	۷	۶	۵	۴	۳	۲	۱	عوامل
1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1		۱
1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	0	1	1	0	0	1	1	1	1	1		0	۲
0	0	1	1	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	1	1		1	1	۳
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1		0	0	0	۴
0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	0	1	1	1	1	0	1	0	1	1	1	0	0		1	1	0	0	۵
1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1		1	1	0	0	0	۶
0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0		1	1	1	1	1	1	۷
1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1		1	0	0	0	0	1	0	۸
0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0		0	1	0	0	1	1	1	1	۹
1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0		0	0	1	0	1	1	1	1	1	۱۰
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0		1	1	1	1	1	1	1	1	1	1	۱۱
0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	0		0	0	1	0	0	1	0	0	0	1	0	۱۲
0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0		1	1	1	0	0	1	0	0	1	1	1	1	۱۴
1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0		0	1	1	0	0	0	1	0	1	1	1	1	1	۱۵
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	1	1	1	1	1	1	1	1	1	1	1	1	1	۱۶
0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1	1	1	1	0		0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	۱۷
1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1		1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	۱۸
0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0		1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	۱۹
0	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1		0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	۲۰
0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0		0	1	0	0	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	۲۱
1	0	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	1		0	1	1	1	1	1	1	0	1	1	0	0	0	1	1	1	1	1	0	0	۲۲
1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0		1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	0	0	۲۳
0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1		1	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	1	1	1	1	1	1	۲۴
0	1	1	1	1	1	1	1	1	1	0	1	1	0	1		0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	۲۵
0	0	0	0	1	1	1	0	0	0	0	0	0	0		1	1	1	1	0	1	0	0	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	0	۲۶
1	1	1	1	0	1	0	1	1	1	1	1	1		0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	۲۷
1	1	0	0	0	0	0	0	0	1	0	1		1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	1	0	۲۸
1	0	1	1	0	0	0	0	0	0	0		0	0	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0	0	0	0	1	0	۲۹

۴۱	۴۰	۳۹	۳۸	۳۷	۳۵	۳۴	۳۳	۳۲	۳۱	۳۰	۲۹	۲۸	۲۷	۲۶	۲۵	۲۴	۲۳	۲۲	۲۱	۲۰	۱۹	۱۸	۱۷	۱۶	۱۵	۱۴	۱۲	۱۱	۱۰	۹	۸	۷	۶	۵	۴	۳	۲	۱	عوامل
0	0	0	1	1	0	0	0	0	0		1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	۳۰
1	0	0	1	1	1	1	1	1		0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	۳۱
0	0	0	1	0	1	0	1		0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	۳۲
1	1	1	0	0	0	0		1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	1	0	۳۳
0	1	1	1	0	0		1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0	0	0	1	0	۳۴
0	0	0	1	1		1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	۳۵
0	1	1	0		0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	۳۷
0	1	1		1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	0	0	1	0	0	1	1	1	۳۸
0	0		1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	۳۹
1		0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	۴۰
	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	۴۱

5. Conclusion

The main objective of financial reporting is to help users in making wise decisions. In case the quality and transparency of reported information are low, dependence on such information may lead to false decisions (Beaver, 1989). In the literature of financial reporting, concentration is more on historical information, the main structure of which is profit and loss statement, and the financial status statement of the firm (Minnis et al., 2017). Financial transparency brings about the decline of information asymmetry (Chih et al., 2008). The quality and transparency can be analyzed in two ways. First, evaluating the usefulness, which means information is useful for those investors who are in search of valuated decisions that reflect the application of information pricing. The second method is contract creditability, which means information is useful for those contracts that reflect the governance application of information. Pricing application can be recognized by the impact on stock prices. The stock price of a firm shows, to some extent, special information about that. More transparent and high-quality accounting information makes the growth of opportunities possible (Zhai & Wang, 2016). Financial reporting transparency and information symmetry lead to more adjustment between managers and investors concerning investment decisions. In contrast, the lower the quality of financial reporting, and the higher the information asymmetry, the higher is the capital cost. Further, information asymmetry due to low financial reporting quality increases the chance of false selection (Minnis & Sutherland, 2017).

Moreover, information disclosure relative to social responsibility can enhance transparency. Hence, we can expect business firms to present information about social responsibility following the moral standards of stakeholders to present more transparency in financial reports (Prior, Surroca, & Tribo, 2008). Transparency in financial reports would lead to the growth of public trust and lack of that causes pessimism and false valuation (Bushman, Piotroski, and Smith, 2004). Regarding the previous studies, firstly 42 indices were extracted that include legal mechanisms related to disclosure, security measures for limiting the ethical risk via more disclosure, legal entities, and policy-makers for solving the problems of financial markets, tax reporting, the presence of analysts in market, liquidity predictability, corporate governance quality, the quality of financial reporting, honest presentation of information, social responsibility reporting, firm value, firm performance disclosure, capital cost disclosure, ethical principles, and manipulation of firm staffs, board members' records, financial reporting synchronization, primary familiarity of stakeholders with financial statement concepts, presenting reliable information, presenting related information, timely presentation of information, voluntarily disclosure of information, including social and environmental activity reporting, disclosing information related to salary and benefits of board members, disclosing nonfinancial activities in separate reports, healthy competitive space, independent audit quality, local audit quality, presenting information related to different firm risks, personnel efficiency, presence of sufficient internal controls, admitting international standards, power distance in firm, muscularity culture, individualism against collectivism, short-term bias against long-term bias, avoiding lack of confidence in firm, the presence of political relations, firm liquidity, culture of responsiveness in society, conflict of interests between firm managers and shareholders, disclosing accounting information, firm size and political economy. In the following, these factors were assessed using the opinions of scholars and finally, 39 factors were admitted and 3 of them were omitted and the final model was designed following the 39 factors using the Hierarchical TOPSIS model. Since factor no. 16 (financial reporting synchronization) is in the first zone of the model with the guiding power and dependency power, financial reporting synchronization factors have guiding and dependency power in the transparency model showing that the factor works as a guiding and dependent factor in financial statement transparency. Thus, we can claim that financial reporting synchronization leads to an increase in transparency, so we recommend the managers and compilers of regulations in the capital markets to establish an appropriate setting for the synchronization of financial reporting to increase transparency and lower the information asymmetry.

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