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Research Paper

Indicators for Adopting Management Accounting Innovations in Times of Economic Crisis

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Abstract **Given the existing economic situation, the role of management accounting in Iranian economic enterprises has been quite evident in the last two decades. Considering the economic crises, it is necessary to examine the indicators of adoption of management accounting innovations in times of economic crisis. Therefore, the present study aimed to identify the indicators of adoption of management accounting innovations in times of economic crisis and to present a model for its structural equations. The research was conducted in two parts: qualitative and quantitative. In the qualitative section, data analysis was performed by Delphi method and using interviews with 10 experts, including managers and deputies of the management accounting department of accepted companies and university professors. The analysis was conducted three parts: open coding, axial coding and selective coding and finally Delphi method. Based on the results obtained in the qualitative section, 103 sub-components and 6 main components were identified. The main components are: 1) economic crises; 2) economic indicators; 3) organizational culture; 4) information and communication technology; 5) Management indicators and 6) Crisis control indicators. In the quantitative section, using the indicators identified in the qualitative section, a questionnaire was designed and provided to a statistical sample including 180 people, managers and deputies of the management accounting department. Finally, the questionnaires were analyzed by**

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PLS structural equation modelling. The results showed that economic indicators ,organizational culture, information and communication technology , and crisis control indicators as indicators of adoption of management accounting innovations in times of crisis.

Keywords *Innovation, Management Accounting, Adoption of Management Accounting Innovations, Economic Crisis*

Introduction

Today, management accounting has entered a new phase with the beginning of the new millennium. The speed of information transfer and communication between people through the Internet has launched a new reference that is referred to as the third generation Internet (Jinseok et al., 2013). Management accounting is a value-added process and continuous improvement of the planning, design, measurement and application of financial and non-financial information systems that guide the actions of managers and encourage behavior and support and create the cultural and ethical values necessary to achieve goals. It is operational, tactical and strategic (Liu and Ching, 2006). The role of management accounting in Iran economic enterprises has been quite evident in the last two decades. By privatization of enterprises, changes in patterns of competition, production, corporate structure, technology development, and the rise of global trade, the importance of management accounting in enterprises is well evident. Recent empirical research in Western countries shows that management accounting must adapt to changing managers' needs in order to keep pace with increasing globalization. Management accounting systems help managers to identify the weaknesses and shortcomings of the company and provide solutions to overcome the unsuccessful performance of the organization. Also, it can be effective in increasing the efficiency of economic resources and their optimal allocation by improving the performance of the organization. Management

accounting changes usually involve the introduction of new accounting information and leadership styles of managers that can affect the usefulness of new accounting information (Jansen, 2011). The economic crisis also affects management accounting and the use of that organization's practices (Pavalatos and Kostakis, 2015). Although there have been many successes in the field of management accounting innovations over the past few decades, research into the adoption criteria for management accounting innovations should also be considered. Adoption of management accounting innovation is related to the analysis of the company which must be consistent with the organizational culture, values, beliefs, as well as the company's vision. Therefore, management accounting innovations must be consistent with the values and organizational culture in the organization in order to be accepted. If management accounting innovations are not in line with organizational culture and values in the organization, it may not be appropriate for the organization. On the other hand, the adoption of management accounting innovations is of particular importance in times of economic crisis. Because if the management accounting indicators do not correspond to the organizational culture, it may not be accepted by the organization and cannot help to get out of the economic crisis in times of crisis (Ax and Greve, 2017). The purpose of this study is to cover the literature gap related to the adoption of management accounting innovations in times of economic crisis. This research expands on previous research in a number of ways. Firstly, examinining the impact of the economic crisis on the adoption of management accounting innovations in order to finally arrive at a structure around the research topic for the first time. Previous research has examined the importance and extent of using innovative and traditional management accounting activities in different time periods (ie before and during the economic crisis) and identified the differences between them. Secondly, this study uses more powerful statistical tests such as statistical techniques such as structural equations compared to previous

studies. In addition, it expands the limited knowledge about the impact of the economic crisis on management accounting by providing insights into the adoption of management accounting innovations in times of economic crisis.

Literature Review

Abdul Khalid (2000) and Kaplan (1984) argued that there is no common definition of change in management accounting perspective. However, change is not limited to methods, but includes daily repetitions, activities, attitudes, roles and responsibilities of members of the organization. In the same vein, Kaplan (1984) argues that change in management accounting is a cause-and-effect relationship, that is, when the business environment changes, it changes the management accounting system in organizations that operate in this environment. Innes and Mitchell (1990) categorized the factors changing management accounting into three main groups. Facilitators: Factors that seem significant to change but are not appropriate for themselves, including accounting staff resources, degree of independence, accounting requirements, accountant authority, and accounting resources. Stimuli: Factors that affect the change in the general method, including competitive market, organizational structure, production technology, product cost structure and short product life cycle. Organizational factors: Factors that are directly related to the time of change, including poor financial performance, loss of market share, organizational change, new accountants and the launch of a competitive product. The advent of management accounting during the Industrial Revolution has reached the nineteenth century (Drury, 2012). In the mid-nineteenth century, the railroad was introduced as a major driving force in the evolution of management accounting systems. At that time, management accounting based on product cost calculations was used to assist financial accounting in preparing external reports. As a result, new concepts in management accounting such as the cost per ton per mile, the cost per

passenger per mile and the ratio of operating costs to revenue were introduced (Waweru, 2010). Since the twentieth century, the role of cost accounting has shifted from savings calculations to product costs to assist managers in their responsibilities. Vatter wrote the first textbook on management accounting in 1950, titled "management accounting." Vatter stated that the role of management accounting was to serve the manager rather than reporting to the owners (Kelly & Pratt, 1994). In the mid-1980s, the accounting literature of traditional management accounting firms was criticized (Drury et al., 1993; Johnson & Kaplan, 1987; Kaplan, 1984). Kaplan (1984) was the first scientist to write on the subject. Johnson and Kaplan published their book, Lost Communication: The Rise and Fall of Management Accounting in 1987. They found that the lack of management accounting innovations over the past sixty years and its inadequacy to provide contemporary solutions in line with changes in the competitive environment reduced its relevance. The economic crisis emerged in 2008 has been a significant threat to companies (Waymire and Basu, 2011). According to research by James et al. (2011), the economic crisis leads to problems with cash flows, reduces available resources and demand, and also causes political turmoil. In addition, it increases uncertainty in companies (Pearson and Claire, 1998) and complicates the decision-making process and the practice of management control (Mangena et al., 2012). Examining some studies, it can be stated that the economic crisis affects management accounting operations (Arnold, 2009; Van der Stead, 2011). Although research has yielded mixed results (Hapwood, 2009; Abernethy and Mundy, 2014; Van der Stede, 2011), related research in management accounting has provided little or no strategy for how companies can manage management crises. The new economic environment that is now emerging calls for new management tools to achieve better crisis management (Arnold, 2009). The existing literature shows that replacing new management accounting practices and creating management accounting innovations to

meet the information needs of organizations in the current organizational environment is relatively slow (Ax and Bjørnenak, 2011). Discussion of innovation in the implementation of organizational processes and management accounting system is one of the important topics for all organizations. Therefore, the factors that facilitate the adoption of management accounting innovations should be considered so that the organization can move towards higher productivity by applying them. Also, in the conditions of economic crisis that organizations in our country are facing a lot, management accounting innovations should be used to deal with these crises and the conditions should be adjusted in such a way that the most possible adoption of management accounting innovations to be established in organizations (caron-Fasan et al., 2020). In previous research, the effect of using information technology on ISC organizational agility was evaluated as high (Hamidreza navaie et al.,2015). Firth (1996) examined the impact of foreign joint ventures on the dissemination of Western management accounting practices among Chinese companies. The results show that local companies with a joint venture of a foreign partner achieved a higher level of use of Western management accounting methods than firms that did not cooperate with a foreign partner. Wu (2003) conducted a study to examine the adoption of Western management accounting practices among Chinese companies and to discover its benefits, especially in state-owned enterprises and foreign joint ventures based in China. He found that management accounting practices in Chinese companies have developed in recent years compared to previous local research, although the adoption and use of management accounting practices is still lower than in Western countries. Brown et al. (2004) consider four factors (support for top management, internal support, size and use of consultants) and three technological factors (higher level of overhead, product complexity and product diversity and comparative advantage) to examine the role of these factors in decision

making to adopt the management accounting innovations in Australian companies. This study showed that all four organizational factors and two of the three technological factors (product complexity and diversity and comparative advantage) had a positive impact on the process of adoption of management accounting innovations. In addition, three of the seven factors (higher levels of superior managerial support and internal support and larger organizational size) provide a detailed explanation of the differences between firms that do not actively consider management accounting innovations and firms that do not. Have evaluated, presented. In this context, Wu et al. (2007) examined the development of Western management accounting practices in China's emerging market economy based on sample data including 64 joint ventures (JVs) and 115 state-owned enterprises (SOEs), and Were collected using questionnaire forms. They concluded that the type of ownership of the organization, joint venture (JV) or state-owned enterprises (SOE) is the main factor influencing the level of adoption of management accounting practices. Another important finding was that budgeting for cost control, profit and sales budgeting, and costing seemed to be more beneficial in state-owned enterprises than in joint ventures. Ali (2010) studied costing tools and management accounting practices in Istanbul-based manufacturing companies. The research sample included 61 small and medium enterprises that collected information using a questionnaire. He concluded that job costing is the dominant method for calculating product costing, and that the three most important management accounting practices in Turkish firms were budgeting, planning, control, and cost-volume-profit analysis. In addition, traditional management accounting practices remained important among Turkish firms, where MAIs such as strategic planning and transfer pricing were less important. Nuraddeen Abubakar Nuhu et al. (2017) examined the "adoption and success of modern management accounting methods in the public sector." The results of the study showed that both interactive and diagnostic

approaches of management control systems have a positive and significant relationship with the adoption of modern management accounting methods. Also, while the success rate of modern management accounting methods was moderate, it was found that the adoption of these methods has increased their success. In Iran, Shayegh and Khaghani (2009) examined the impact of management accounting innovations in times of economic crisis. Findings indicate that the severity of the economic crisis has a positive effect on the use of management accounting innovations. Asgharpour et al. (2009) examined the evaluation of management accounting innovations during the economic crisis and its consequences on the value creation of manufacturing companies listed on the Tehran Stock Exchange. To analyze the research findings, data of 132 companies from industries listed on the stock exchange in a period of 3 years between 2016 to 2018 (based on the type of panel data, the number of observations was 396 years / company). Findings indicate that there is a positive and significant relationship between management accounting innovation and value creation. Al-Lahiari and Ramezani (2011) examined the factors affecting the process of management accounting change. The main factors are: lack of accounting staff, lack of competition resources, management stability, management problems, lack of accounting power, ensuring compliance with legal requirements and lack Independence from the parent company. They concluded that the lack of accounting staff based on poor training and failure to develop their technical knowledge and lack of independence from the parent company led to bad decisions. In addition, the lack of calculation resources delayed the change in management accounting in Iran. Kawsari and Darush (2017) In a study examined investigating the Impact of Organizational Culture on Innovation with Regard to the Mediating Role of Knowledge Sharing the results of examining the components of organizational culture demonstrated that adhocracy and clan cultures have positive effects on other variables while hierarchy and market cultures

negatively affect the dependent variables. Karim Nakhaei et al. (2019)Argued that applying management accounting concepts,methods and innovations assist firms and organizations in achieving organizational goals, improving operations,and increasing the efficiency of the managerial decisions. Since organizational culture is a prerequisite foraccounting profession, adopting and implementing management accounting innovations are a function of organizational culture.

Methodology

The present study is a combination of qualitative and quantitative research and is applied in terms of purpose and descriptive-exploratory in terms of data collection with inductive approach. The statistical population in the quality department, experts include managers and deputies of the management accounting department of companies listed on the Tehran Stock Exchange and university professors. The sampling method is judgmental and the sample size continued until theoretical saturation. This section was conducted through semi-structured interviews with experts. After conducting the interview, we reached a theoretical saturation with 10 interviews. Analysis of information by three basic steps of qualitative methods include; Open coding, axial coding and selective coding were performed and then the validity of the extracted codes was checked by Delphi method. Among the statistical sample in the qualitative section, 7 men, 3 women; 5 university professors and 5 administrators or deputies; And all of them have a history of more than 5 years. In the quantitative part, a questionnaire was designed by the indicators identified in the qualitative part and provided to the statistical sample. The statistical population consisted of a small number of managers and deputies of the management accounting department, who were selected as a statistical sample by Cochran's formula of 300 people. Finally, the questionnaires were analyzed by PLS structural equation method and Smart PLS software.

Findings

In this study, first the content of all interviews was implemented and then their open coding was done by key point coding method. In this way, the data collected in the interviews were written in a Word file and then open source was created by analyzing the existing data. Open coding itself consists of three stages: open coding of the first stage, open coding of the second stage and open coding of the third stage. In the first step of open coding, the codes are identified. In open coding, the second step is to explain each code. In the third stage open coding, the second stage codes that are close to each other are merged to form a code with a short title (Markey et al., 2020). Thus, a total of 111 codes were extracted from the third stage open coding. Table (1) shows the number of codes extracted from each interview.

Table 1.
Number of Open Code Extracted from each Interview in the Third Stage

Number of Extracted Open Code	Interview Number
9	1
10	2
9	3
11	4
10	5
10	6
12	7
10	8
21	9
9	10
111	total

Axial coding is the second stage of analysis in qualitative methods. The purpose of this step is to establish the relationship between the classes produced in the open coding step (Creswell, 1998). This is based on the paradigm model and helps the theorist to simplify the theory-making process.

In axial coding, the code generated in the previous step is interconnected by creating communication networks between these codes. This process is obtained by analyzing the data obtained from open coding. Therefore, the purpose of axial coding is to sort the relationship between each concept (Sun, 2011). When making connections in the network, it is necessary to examine how these categories relate to each other. The axial coding results are presented in Table (2). Based on the obtained results, 6 main components including economic crises, economic indicators, organizational culture, information and communication technology, management indicators, crisis control indicators as indicators of adoption of management accounting innovations in The time of economic crisis was identified. To ensure that the categories and components identified from the interviews are real, and to reach a consensus on the main and sub-components identified and review the validity of the model, in order to design the final model and qualitative validation of the model, Delphi technique is used. The following are the steps and results of the Delphi technique. After the categories and components related to the qualitative section were identified, the Delphi questionnaire was designed to obtain the opinion of experts on the extent to which they agree with the identified categories. The Delphi questionnaire was then provided to the experts. The range of answers to the questions and the score are as shown in Table (2).

Table 2.
The Range of Answers to the Questions and the Corresponding Score

Score	Verbal Variables
5	Very high
4	High
3	Medium
2	low
1	Very low

In this section, the survey is conducted in several stages to achieve the consensus of experts on categories and components. The identified components in the qualitative phase were presented to 10 experts in the form of a questionnaire. Then the average of the answers was calculated using Excel software. The purpose of the Delphi method is to reach the most secure group agreement of experts on a specific topic, which is done by using questionnaires and consulting experts, often, according to the feedback obtained from them. This process continues until the mean of the numbers is sufficiently stable. The value of disagreement for Delphi means in this study is considered to be 1 (the lowest number in the response spectrum) (Cheng and Lin, 2002). If the disagreement is greater than this number, the corresponding component will be removed. In the first stage of Delphi, the identified categories were presented to the experts in the form of a Delphi questionnaire. In the second stage of Delphi, the Delphi questionnaire was given to the experts again and the average of the answers as well as the difference between the mean and the previous stage were calculated. The average of the answers provided by the experts for some sub-components (8 sub-components) is less than 3, which indicates that these components have not been evaluated as appropriate for the experts. Therefore, first the components whose average in the first stage was less than 3 were removed. Then the second questionnaire was designed and along with the previous opinions of each expert and the extent of their differences with the views of other experts, was again presented to the group of experts. The mean value of the answers in the second Delphi stage for all components is higher than 3. Also, the mean difference for all components that entered the second stage of Delphi is less than 1. Therefore, all components that entered the second Delphi stage (103 sub-components) are approved. Selective coding is the process of integrating and improving categories. The point to be considered at this stage of the research is that if the purpose of the research is to theorize, the findings

should be presented in the form of related concepts and not just a list of topics. It is important to note that there is always more than one way to show relationships. In order to achieve the desired integration, it is necessary for the researcher to set the main line of the subject and describe the main line of the story with commitment. In selective coding, the researcher discovers a principle and regularly associates a main category with other categories (Zhang and ma, 2009). The main category should have the following characteristics: First, it should be obtained by codes that are more centralized in the axial coding stage; The second should show the highest frequency in the coding process. Third, all communication with categories should be done spontaneously (He and Shi, 2009). According to the results obtained from the Delphi method, the main indicators identified for the adoption of management accounting innovations in times of economic crisis are in Figure (1). These indicators make up a total of 103 subcomponents.

Figure 1.
The Main Indicators Identified

In this section, a questionnaire was designed using the indicators identified in the qualitative section and provided to the statistical sample. First,

the validity of the questionnaire was examined by CVR index. The CVR value was 0.56, which indicates acceptable validity. Before modeling the structural equations of PLS, the measurement model was evaluated to evaluate the quality of the fit. The results for all 6 models are described in Table (4). Cronbach's alpha and rho_A criteria indicate the reliability of the questionnaire. Also, considering that the CR level is higher than 0.7 and AVE is higher than 0.5, so there is convergent validity.

Table 4.
Review of the Measurement Model

AVE	CR	rho_A	Cronbach's Alpha	Hidden Variable	Model
0.570	0.868	0.907	0.837	Economic crises	First
0.598	0.859	0.921	0.854	Economic indicators	Second
0.555	0.789	0.920	0.785	Organizational Culture	Third
0.589	0.798	0.931	0.758	Information and Communications Technology	Forth
0.570	0.821	0.925	0.798	Information and Communications Technology	Fifth
0.546	0751	0.969	0.801	Crisis control indicators	sixth

Next, the indicators of adopting management accounting innovations in times of economic crisis are modeled by modeling structural equations with a partial least squares approach. Table (5) shows the modeling results. Also, the graphical results of structural equation modeling in all 6 models are shown in the appendix in Figures (2) to (7). As can be seen, the economic crisis index and the management index are not significant at the 5% probability level, and therefore these indicators are excluded from the analysis. Other indicators are significant at the 5% probability level. The results of factor loads show that

information and communication technology has the highest coefficient among other identified indicators.

Table 5.
Results of PLS Structural Equation Modeling

Result	Statistics T	Factor Load	Indicator
Insignificant	1.098	0.538	Economic crises
Significant	2.620	0.670	Economic indicators
Significant	2.301	0.752	Organizational Culture
Significant	44.705	0.856	Information and Communications Technology
Insignificant	0.937	0.525	Management indicators
Significant	2.329	0.648	Crisis control indicators

Conclusions

Management accounting innovations are also very important for organizations. In this regard, it is necessary to create the necessary grounds for adoption of this innovation in the organization firstly. Therefore, the present study aimed to identify the indicators of adoption of management accounting innovations in times of economic crisis by qualitative and quantitative research methods. According to the results, it is clear that information and communication technology is of the highest importance for the adoption of management accounting innovations in times of crisis. In recent decades, information and communication technology (ICT) has entered into various aspects of human life, including economics on a large scale. This phenomenon has affected the various economic relations and dimensions to such an extent that it has even changed the structure of national and global economies; As it is referred to as the ICT revolution (Asungo and Odhiambo, 2019). Information and communication technology is important in a country's economic prosperity, because it helps to strengthen Iran production capacity

in various economic sectors. Information and communication technology is one of the most important factors for the adoption of management accounting innovations in crisis situations, which helps organizations and facilitates the process of adoption of these innovations in the organization. Given the importance of information and communication technology to adopt management accounting innovations, it is suggested that organizations pay special attention to the implementation of information and communication technology in the organization and also create knowledge of its use in the organization. Knowledge of the use of information and communication technology is created by education, employing experienced people in this field, studying new technologies by members of the organization, spending on new technology, hiring experienced and trained workforce in this field and so on. The results of the present study are consistent with the study of Brown et al. (2004) in terms of the importance of information and communication technology. Due to the importance of organizational culture, organizations should implement organizational culture and also pay attention to community culture in the meantime. Because the culture of an organization is in fact the culture of the society in which the organization is located, and in order to adopt any innovation and technology, its culture must first be implemented in the society. Therefore, any organization to adopt management accounting innovations in times of crisis, needs to have its culture in society. In terms of the importance of organizational culture, the results of the present study are consistent with the results of the study of X and Greve (2017). Organizations should use economic indicators in the form of cost-benefit analysis in the organization so that they can be properly aware of their profits and costs in times of crisis. If the cost-benefit analysis is not done properly in the company, many costs, which may be heavy costs, will be lost in the company and many losses will be incurred by the organization. In terms of economic indicators, the results of the present study are consistent with the results of Arnold (2009).

Through these indicators, crisis control will be more desirable when the company is facing economic crises. Therefore, in general, it is necessary for organizations to consider adoption of management accounting innovation to produce new goods in order to increase their profitability by producing new goods.

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