



Identifying The Effective Factors of Management Accounting Techniques on the tendency To Earnings Management in Financial Crisis Conditions

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ABSTRACT

Improper supervision in companies can have significant effects on employee fraud. identifying effective factors of management accounting techniques can play a crucial role in controlling organizational performance. therefore, the aim of the present study is to identify the effective factors of management accounting techniques on the tendency to earnings management in financial crisis conditions in companies listed on the tehran stock exchange. the statistical population of this study includes financial managers of all companies listed on the tehran stock exchange in 2023, from which 251 individuals were selected as the sample using the cochran test. in this research, a questionnaire and the delphi method were used to collect data. after analyzing the data and testing the research hypotheses using the correlation test and Pearson Method, the results of the research hypotheses indicate that there is a negative and significant relationship between the value chain analysis technique, balanced scorecard technique, organizational culture theory, business process reengineering, artificial intelligence, customer relationship management, and a positive and significant relationship between activity-based costing technique, continuous improvement technique on the tendency to earnings management in financial crisis conditions.

Keywords:

management accounting techniques, the tendency to earnings management, financial crisis

1. Introduction

Earnings management is one of the most challenging topics in accounting and financial sciences and stems from the studies of Schipper (1989) and Healy & Wahlen (1999). Healy and Wahlen (1999) state that earnings management occurs when managers use their personal judgment in financial reporting (Mansour Zarei et al. 2020). When it is expected that earnings fall within the upper and lower bounds of a reward, managers will choose to increase earnings. Conversely, when earnings are expected to be above the upper bound or below the lower bound, managers will shift earnings to these periods to enhance future earnings (Khoddadi et al. 2020). In other words, one method that obscures bankruptcy risk evaluation is the tendency to earnings management, which can diminish the quality of earnings information presented in financial statements. Low-quality information in financial statements negatively impacts the company's financial performance (Agustia et al. 2020). On the other hand, management accounting provides tools for cost management, and various studies have shown that using these tools reduces costs, which in turn affects the organization's profitability (Mohammadi Ramazani et al. 2023). Thus, management accounting techniques can provide more useful information in improving production processes, eliminating unnecessary activities, identifying non-value-added costs, and evaluating organizational performance (Masoud Taheri et al. 1393). In recent years, inflation and exchange rates in Iran have increased. Therefore, bankruptcy prediction may be useful for evaluating company performance, especially for investors (Oskouei, Sureshjani 2021). The collaboration of management accounting for the development of business strategies is reflected in strategic management accounting, aiming to overcome competition with rival companies in a way that can maintain and develop business processes (Yaghoubi, Raeeszadeh 1400).

The significance of this research lies in demonstrating the factors influencing MAT¹'s impact on the tendency to earnings management in financial crisis conditions. These effects are stable and specified under normal conditions. In our studies, we seek to determine whether a crisis changes the impact of MAT variables on the tendency to earnings management, which may be either stimulative or deterrent. One way

to prevent earnings management by managers in crisis conditions is to identify the effective managerial and informational factors on it. Initially, by providing necessary warnings, companies can be made aware of managers' tendencies to earnings management, prompting them to take appropriate actions. Secondly, examining the effective factors of MAT individually.

Previous studies on earnings management have mostly focused on the opportunistic motives of business unit managers' tendencies to earnings management. Additionally, some studies have examined the impact of internal organizational factors such as financial report manipulation, auditing, governance and controls, capital market incentives, and regulatory determinants on the tendency to earnings management (Habib et al. 2022). However, the specific impact of modern management techniques in crisis conditions on the tendency to earnings management has not yet been studied. Furthermore, past studies have seldom examined modern management accounting techniques. Past research has mostly considered factors such as age, gender, and educational background of individuals, overlooking the impact of organizational and managerial factors.

The present research is innovative in several aspects. This study, considering control factors such as company size (small, medium, large), ownership structure (government, private, family), Level of Corporate Governance (strong, weak), organizational culture (conservative, risk-taking), and managers' expertise and experience (high, medium, low), examines the impact of stimulating environmental conditions on the tendency to earnings management. Additionally, the impact of MAT, a management accounting component, on a financial accounting component is assessed, categorizing this research as managerial accounting. Furthermore, a behavioral and motivational factor of managers on a financial variable is evaluated. The present studies specifically examine earnings management behavior during financial crises, a topic that has been less explored in traditional studies. Financial crises can create strong and compelling incentives for manipulating financial statements, and this research focuses particularly on these conditions. Another innovation aspect of this research is the use of modern management accounting techniques such as organizational culture theory, process reengineering, artificial intelligence, and customer relationship management, and examining

¹ management accounting techniques

their impact on the tendency to earnings management. The present studies, in determining the tendency to earnings management, examine a wide range of MAT and provide a more comprehensive view of the role of management accounting. The findings from this research indicate that some MATs can reduce the tendency to earnings management during financial crises, while others may increase this propensity. These insights are valuable for managers, auditors, and other stakeholders of companies as they help in understanding how to use MATs to enhance the quality of financial reporting.

Therefore, the main goal of this research is to identify the effective factors of MAT on the tendency to earnings management in financial crisis conditions. The main research question is whether there is a significant relationship between MAT and the tendency to earnings management in financial crisis conditions.

2. Theoretical Foundations and Research Background

Earnings management is defined as an false statement of a business's performance by individuals within the organization (Nguyen et al., 2024). Healy and Wahlen (1999) believe that earnings management occurs when managers use their personal judgment in financial reporting and manipulate the structure of transactions to alter financial reporting. This is either done with the intent to mislead some shareholders about the company's economic performance or to influence the outcomes of contracts that depend on achieving certain profit levels (Hashmi Behrman et al., 2024). In economic recession conditions, companies today face a more complex economic environment than before and are therefore at greater risk of financial crises (Zhao et al., 2023). The term financial crisis refers to a situation where a significant percentage of the value of certain assets is unexpectedly lost (Karshenas, Memshali, 2018). When companies engage in earnings management with weaker governance mechanisms, their financial performance declines (Chen, Hung, 2021). There is a close relationship between financial crisis risk and earnings management. Ting et al. (2009) argue that earnings management behavior increases risk, thus heightening the likelihood of a financial crisis (Luu Thu, 2023).

Most of the information used in financial markets is processed and reported by the accounting system. For accurate future information prediction, one cannot solely rely on accounting data; other factors such as the country's economic conditions, whether in recession or inflation, must also be considered (Ebrahimi et al., 2024). MAT are influential in providing information to assist management in properly executing core operations such as planning, control, execution, estimation, and decision-making (Adelegan, 2000). MAT adapts to organizational change which are often driven by three major forces: technological change, globalization, and customer needs (Eman et al., 2024). Using MAT helps managers make better decisions, enhance management efficiency, and act as a barrier to earnings manipulation (Mohammadi Ramazani et al., 2023). In implementing MAT, the most important task of a manager is to determine and strengthen a sustainable competitive position so that the company can ensure its continuous success by leveraging its competitive advantage. (Seyed Majaveri, 2023) In other words, MAT aligns all the company's activities with the business strategy, thereby increasing the organization's competitiveness. (Mohammadi et al., 2019) Below, we examine the effective components of MAT.

2-1- Activity-Based Costing²

In the late 1960s and early 1970s, some accounting authors, including 'Solomons', highlighted the relationship between activity and cost (Seyedmojavari, 2023). In this system, costs are initially assigned to activities, and then based on the extent to which products use these activities, the activity costs are allocated to the products (Imani-Berendag, Zowari-Rezaei, 2009). During ABC analysis, organizations gain a deeper understanding of business processes, cost behaviors, and cost structures. Detailed examination of activities and activity costs helps organizations identify non-value-added activities, creating opportunities for cost reduction and cost management by eliminating some or all of them for more efficient use of capacity and time (Vetchagool et al., 2020). However, maintaining activities operational for an extended period does not guarantee profitability (Making, 2020). ABC information can aid managers in

² ABC

manipulating profits by managing costs (Kirzhetska et al., 2023).

2-2- Value Chain Analysis

Michael Porter's value chain model, introduced in 1985, was a suitable tool for evaluating and determining business areas (Rezaei et al., 2015). Value chain analysis is described as an accounting process for allocating costs to the activities necessary for designing, producing, marketing, distributing, and servicing a product (Almatarneh et al., 2022). The goals of the value chain are to support competitive advantages, provide appropriate services at the right time and price, maintain high quality, and reduce costs through effective management and improved relationships among chain members (Al-Zaqeba et al., 2022).

2-3- Continuous Improvement

Continuous improvement refers to the process of making continuous changes within an organization, focusing on enhancing the effectiveness or efficiency of its activities to achieve its policies and major objectives (Mohammadi et al., 2022). Kaizen is based on the idea that creating improvements in organizations does not require sudden changes, but rather, any type of improvement or modification, as long as it is continuous, is acceptable (Seyedmojaveri, 2023). To achieve gradual and continuous improvement in organizations from a Kaizen perspective, three fundamental actions must be taken: eliminating non-value-added activities, discovering better work methods, and adding those activities that are essential for completing and improving the quality of services (Mura) to the organization's activities (Dehiri, Rafati, 2022).

2-4- Balanced Score-cards³

Kaplan and Norton (1996) stated that the Balanced Scorecard helps auditing firms identify their key success factors and manage them within an integrated and balanced framework (Mehrabanpour et al., 2021). BSC translates the company's main objectives and strategies into goals and metrics organized into four perspectives: financial, customer, internal business processes, and learning and growth (Divsalar et al.,

2023). The SWOT matrix should be considered one of the most important tools supporting BSC, used for systematic analysis of the internal and external environments. Strengths and weaknesses are assessed from the internal environment, while opportunities and threats are identified from the external environment (Khan-Mohammadi, Safari, 2022).

2-5- Organizational Culture Theory

Organizational culture, in general, is the perception individuals have of their organization, which exists neither in the organization nor in the individual (Sina, 2020). Organizational culture drives managers to use innovative methods to manage the organization and advance its goals, ensuring it can survive in a competitive market (Malek Hosseini et al., 2021). Schein (2010) defines three levels of organizational culture: "artifacts" (including behaviors, dress, symbols), "values and norms," and "beliefs and assumptions" (Isensee et al., 2020). Managers in companies with stronger organizational cultures tend to prefer Real Earnings Management (REM) over Accrual Earnings Management (AEM) (Grabiński, Wójtowicz, 2022). Companies with a strong organizational culture structure increase profit quality and company value while controlling real earnings management (Shahzad et al., 2023).

2-6- Business Process Re-engineering⁴

Business Process Re-engineering (BPR) is a systematic and methodical improvement approach that critically examines, revises, and redesigns mission delivery processes (Njuguna, Wanjohi, 2021). BPR is considered one of the modern methods used to reduce production costs, as it reduces the costs of non-value-added activities and processes through redesign (ALHAWAMDEH, 2021). The goal of BPR towards customers is to provide better service and increase their satisfaction (Han, 2023). The ultimate goal is to achieve efficiency and effectiveness by fundamentally rethinking the existing process (Pasaribu et al., 2021).

2-7- Artificial Intelligence⁵

The search for tools capable of analyzing financial resources and extracting useful knowledge from raw

³ BSC

⁴ BPR

⁵ AI

data in unstructured and qualitative reports has led to the development of AI (Zeyouidar, 2022). AI plays a significant role in executing audit procedures and facilitating decision-making by accountants through the use of advanced technology (Mana, 2023). With the development of AI technologies, higher-level strategic decisions are made based on AI-based solutions (Vărzaru, 2022). Various studies argue that AI-based methods can help identify and predict earnings management in companies (Kang, Park, 2021). AI can identify and correct inaccuracies in financial reports, detect irregularities in financial statements, and reduce the incidence of earnings management (Kadhim, Al Ani, 2023).

2-8- Customer Relationship Management⁶

The term CRM emerged in the 1990s as a business strategy aimed at selecting and managing the most valuable customer relationships (Masoud, 2016). CRM is a system that places the customer at the center of business processes and is considered a symbol of customer loyalty as an integral part of a successful business plan (Ferrer-Estévez, Chalmeta, 2023). CRM can enhance company performance by increasing sales, reducing costs, and improving efficiency (Kolsky, 2022). This system increases customer satisfaction and profitability by retaining current customers and fostering their loyalty (Khoshkar et al., 2022).

2-9- Research Background

Mojaveri (2023) in his research on the role of MAT in organizational governance found that strategic use of MAT has a positive impact on achieving short-term, long-term, and strategic goals of companies listed on the stock exchange. By employing these techniques, these companies can effectively reach their defined objectives. Mohammadi et al. (2022), through their library research, demonstrated that familiarity with concepts related to Kaizen processes and efficient methods for continuous improvement, aligned with organizational needs, leads to success. Bahmani and colleagues (2021) examined the relationship between earnings smoothing and the risk of stock price decline to investigate the implications of earnings smoothing on shareholders' wealth risk. Their research indicated a higher level of earnings smoothing correlates with

greater stock price decline risk. Riyahi Nezhad and Tavangar (2021) explored the impact of organizational culture characteristics on the relationship between earnings management and financial report readability in companies listed on the Tehran Stock Exchange from 2011 to 2018. Their findings suggested that countries with higher individualism tend to have lower levels of earnings management. Asnaashari (2020) in a study highlighted the beneficial impact of machine learning technologies and blockchain on company activities. For example, companies using invoice systems for their customers can control the number of services provided, evaluate them, and shape them, thereby achieving success in the commercial market. Qousi and Akbarpour (2019) investigated the negative impact of financial crises on financial performance and stock returns of companies. Nayini et al. (2016) studied the effect of CRM on organizational performance. Their research showed that the CRM variable has a significant impact on organizational performance with a beta coefficient of 0.89. Additionally, components such as information technology, knowledge management application, customer response, beneficial interaction, CRM process, CRM organization, and customer orientation significantly affect organizational performance. El-Rajoub and colleagues (2023) demonstrated that the ABC system plays a role in allocating indirect costs correctly to products, preventing the loss of part of these costs. Jin et al. (2023) showed that the use of AI leads to the elimination of repetitive and time consuming activities, freeing up time and resources for more profitable activities. Shahool Hamed and colleagues (2022) showed in their studies that BPR dimensions, such as senior management commitment, organizational readiness for change, IT capabilities, and people management, have a positive and significant impact on organizational performance. Lee et al. (2020) showed that companies facing financial difficulties tend to engage in more accrual earnings management and less real earnings management. Huang Li (2020) named BSC as a benchmark to prevent earnings management. Finally, Latif Ibrahim (2013) mentioned target costing as a method for cost reduction in companies.

⁶ CRM

2-10- Research Hypotheses

Based on the theoretical foundations and background of the research, the hypotheses are formulated as follows:

- 1) There is a significant relationship between value chain analysis technique and the tendency to earnings management in financial crisis conditions
- 2) There is a significant relationship between activity-based costing technique and the tendency to earnings management in financial crisis conditions
- 3) There is a significant relationship between continuous improvement technique and the tendency to earnings management in financial crisis conditions
- 4) There is a significant relationship between balanced scored-card performance evaluation technique and the tendency to earnings management in financial crisis conditions
- 5) There is a significant relationship between organizational culture theory and the tendency to earnings management in financial crisis conditions
- 6) There is a significant relationship between business process reengineering and the tendency to earnings management in financial crisis conditions
- 7) There is a significant relationship between artificial intelligence and the tendency to earnings management in financial crisis conditions
- 8) There is a significant relationship between customer relationship management and the tendency to earnings management in financial crisis conditions

3- Research Methodology

The present study is classified based on its objective as applied research and its approach as post-event. This research is considered exploratory using a questionnaire and a survey method. The Delphi method has been employed in this research. In order to ensure greater accuracy and significance of the topic, the researcher selected 5 members of the university faculty and 15 financial managers from all companies listed on the Tehran Stock Exchange in 2023 as Delphi panelists. The statistical population includes all financial managers of companies listed on the Tehran

Stock Exchange in 2023, totaling 719 individuals. The sample size, calculated using Cochran's formula, is 251 individuals.

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left[\frac{z^2 pq}{d^2} - 1 \right]}$$

Cochran's Formula:

In this formula, **N** represents the population size. The statistic **p** is the percentage of the trait distribution in the population, meaning the proportion of individuals possessing the studied trait. The statistic **q** represents the percentage of individuals lacking the studied trait. If the values of **p** and **q** are not specified, use their maximum value, which is **5.0**. In the current research, both library and field methods were used to collect data, and a questionnaire tool was employed to gather responses. The questionnaire included questions measured on nominal and ordinal scales. For data analysis and testing research hypotheses, correlation analysis using Pearson's method was utilized. The questionnaire design was conducted using a Likert 5-point scale.

The results obtained from this stage of the Delphi technique are reported in Table 1.

After identifying the key components and indicators needed from the experts' perspective in the initial Delphi survey, the secondary Delphi survey aims to examine the proposed indicators for each of the influential factors of MAT on the tendency to earnings management in financial crisis conditions. Based on the feedback and viewpoints of the responding experts, the necessary components for each indicator will also be designed and explained. Table 2 summarizes the results of the experts' opinions after aggregation and statistical processing.

Completely disagree	Disagree	No opinion	Agree	Completely agree
1	2	3	4	5

The results in this table indicate that all proposed indicators received an average score higher than 3 from the panel members' perspectives. Therefore, all proposed indicators are confirmed and will be used in this stage of the Delphi technique.

Table 1 - Frequency distribution of experts' perspectives on the effectiveness indicators of MAT on the tendency to earnings management in financial crisis conditions

Components	Completely appropriate	Somewhat appropriate	Somewhat inappropriate	Inappropriate	To some extent Inappropriate
Value Chain Analysis	12	3	0	0	0
Activity-Based Costing	10	2	2	1	0
Continuous Improvement	8	4	3	0	0
Balanced Score-cards	5	5	3	1	1
Organizational Culture Theory	14	1	0	0	0
Business Process Re-engineering	6	5	3	1	0
Artificial Intelligence	6	3	3	2	1
The tendency To Earnings Management In Financial Crisis Conditions	10	3	0	2	0
Customer Relationship Management	9	5	1	0	0

Table 2 - Results from the perspectives and opinions of expert groups regarding the influential indicators on Management Accounting Techniques On The tendency To Earnings Management In Financial Crisis Conditions

Components	Mean	Standard deviation	Result
Value Chain Analysis	4.66	5.196	positive
Activity-Based Costing	4.38	4	positive
Continuous Improvement	3.46	3.316	positive
Balanced Score-cards	3.52	2	positive
Organizational Culture Theory	4.26	6.164	positive
Business Process Re-engineering	3.12	2.549	positive
Artificial Intelligence	3.01	1.870	positive
The tendency To Earnings Management In Financial Crisis Conditions	3.55	3.937	positive
Customer Relationship Management	3.13	2.738	positive

3-1- Introduction and evaluation of research variables

- **Independent variable:** In this study, the independent variable is Management Accounting Techniques (MAT). To measure MAT, we utilize the standardized questionnaire on strategic management accounting techniques by Khaksari (2015) and the profitability questionnaire by Seiler et al. (2013). Data analysis is performed using the Kolmogorov-Smirnov method and structural equation modeling for each factor.
- **Dependent variable:** The dependent variable in this research is The tendency To Earnings Management, To measure this, we use the earnings management inclination questionnaire by Belskey and colleagues (2008).
- **Mediating variable:** The mediating variable in this study is the financial crisis. To examine this, we use the following criteria. A company is

considered in crisis if it meets any of the following six financial indicators:

- 1) The company has incurred losses for two consecutive years. Major operational losses are indicators of doubts about the company's going concern assumption.
- 2) The annual cash dividend has decreased by more than 40% compared to the previous year. Failure to pay dividends or significant delays in payment are signs of doubts about the company's going concern assumption.
- 3) During the years under study, the company has lost half of its capital due to incurred losses (Article 141 of the Commercial Code).
- 4) The company's earnings before interest, taxes, and depreciation for two consecutive years are less than 80% of the interest expense.
- 5) There is a negative stock return with a decline of more than 30%, along with negative sales

growth. Negative sales growth combined with a stock return decline of more than 30% signals hidden operational issues in daily business activities.

- 6) For two consecutive years, the book value per share is less than its nominal value. A book value less than the nominal value indicates accumulated losses in the company.

Control Variables: The control variables used in this research are as follows:

- **Company size (small, medium, large):** Company size is a key variable in managing and controlling the company and indicates how management decisions and risk-taking are implemented. Companies are classified into large and small-to-medium enterprises (SMEs). Only legal entities, institutions, economic entities, and funds can trade in the SME market. Large companies enjoy economic benefits (Mansh & Zardini, 2020). Auditors face the complexity of transactions when auditing large companies compared to smaller ones; hence, there is a higher likelihood of significant distortions (Shamshad, 2023).
- **Ownership structure (government, private, family):** Increased oversight by institutional ownership is expected to negatively correlate with discretionary accruals (Zadeh et al., 2015). Given the substantial share volume of investors compared to other shareholders, they are exposed to higher risk, leading to greater motivation to control the manager (Mashayekhi et al., 2023). government ownership is based on the ownership of state shareholders, while private ownership includes non-state legal entities and individuals (Elahbakhshi et al., 2019).
- **Level of Corporate Governance (strong, weak):** Strong corporate governance is an effective

mechanism in reducing earnings management (Mohammadi et al., 2020). Corporate governance mechanisms reduce agency problems in companies (Seyfi & Mirani, 2023). Strong corporate governance leads to company growth and shareholder equity. This reduction in costs and increase in company growth prevents companies from engaging in concealment (Namazian et al., 2022).

- **Organizational culture (conservative, risk-taking)** Having a risk-taking and strong corporate culture can enhance transparency regarding company goals and practices. When companies face unexpected events, such clarity about goals and actions can reduce uncertainties (Afzali, 2023).
- **Managerial expertise and experience (high, medium, low):** Managers with high abilities and exceptional skills can better predict future losses and improve company performance (Khajavi et al., 2022). CEO experience will be measured by the number of years the CEO has held the position in the company (Ghazribeygi & Bouzandani, 2022).

4- Research Findings

4-1- Descriptive Statistics

In descriptive analysis, the researcher describes the collected data using tables and descriptive statistical indicators such as central the tendency and dispersion measures. This significantly aids in clarifying and explaining the data. In Table 3, for data transparency, descriptive statistical tables such as absolute frequency and charts have been used. The descriptive findings of this research include statistical indicators such as mean, standard deviation, variance, maximum, and minimum values.

Table 3 - Descriptive Statistics of Data Based on Research Variables

Variables	Mean	standard deviation	Variance	Minimum	Maximum
Value Chain Analysis	3.290	1.148	1.319	1	5
Activity-Based Costing	3.00	1.145	1.313	1	5
Continuous Improvement	3.25	1.018	1.038	1	5
Balanced Score-cards	3.50	1.058	1.121	1	5
Organizational Culture Theory	3.40	1.222	1.495	1	5
Business Process Re-engineering	3.44	1.131	1.279	1	5
Artificial Intelligence	3.36	1.123	1.263	1	5
The tendency To Earnings Management In Financial Crisis Conditions	2.63	1.211	1.468	1	5
Customer Relationship Management	2.55	1.266	1.604	1	5

4-2- Reliability of research variables

In this study, Cronbach's alpha, one of the most important and common methods, is used. This method is employed to calculate the internal consistency of a measurement tool that measures various attributes. The Cronbach's alpha coefficient ranges between 0 and 1, representing the correlation coefficient of the data at different times; a value of 1 indicates maximum correlation, and a value of 0 indicates minimum correlation.

Cronbach's alpha is calculated using the following formula:

$$r_{\alpha} = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum S_j^2}{S^2} \right)$$

- r_{α} is the reliability coefficient of the entire test,

- k is the number of questions (sections) of the test,
- S_j^2 is the variance of the scores of each question (section),
- S^2 is the variance of the total scores of all questions (the entire test).

A tool with a Cronbach's alpha above the minimum level of 0.70, as suggested by Nunnally (1987), is considered to have appropriate reliability. In this research, using SPSS software and the Cronbach's alpha method, the reliability of the questionnaire was estimated to be 0.857. This estimate, being higher than the minimum value of 0.70, indicates that the questionnaires used have high reliability.

Table 4 - Reliability coefficients of research variables

Variables	Cronbach's Alpha
Value Chain Analysis	0.854
Activity-Based Costing	0.888
Continuous Improvement	0.901
Balanced Score-cards	0.777
Organizational Culture Theory	0.911
Business Process Re-engineering	0.837
Artificial Intelligence	0.888
The tendency To Earnings Management In Financial Crisis Conditions	0.906
Customer Relationship Management	0.927

To explain and interpret the research variables, a single-sample t-test was used with a test value equal to 3 (Test Value = 3) and a 95% confidence interval (5% error margin). In this test, if the P-Value is greater than 0.05, the variable under review does not have a significant difference with the test value (i.e., 3), indicating that the factor under review exists at an average level in the statistical population. Conversely,

if the P-Value is less than 0.05, the variable under review has a significant difference with the test value (i.e., 3). In this case, if the mean of the factor under review is higher than 3, the factor exists strongly in the statistical population. If the mean of the factor under review is lower than 3, the factor exists weakly in the statistical population.

Table 5 - T-Test results for research variables

variables	P-Value Sig.(2-tailed)	Mean	Standard Deviation	t-test
Value Chain Analysis	0.000	3.290	1.148	2.525
Activity-Based Costing	0.000	3.00	1.145	3.017
Continuous Improvement	0.000	3.25	1.018	2.454
Balanced Score-cards	0.001	3.50	1.058	4.722
Organizational Culture Theory	0.000	3.40	1.222	3.271
Business Process Re-engineering	0.002	3.44	1.131	3.890

variables	P-Value Sig.(2-tailed)	Mean	Standard Deviation	t-test
Artificial Intelligence	0.000	3.36	1.123	3.203
The tendency To Earnings Management In Financial Crisis Conditions	0.000	2.63	1.211	3.054
Customer Relationship Management	0.000	2.55	1.266	3.554

Table 6 - Single sample T-Test results for research variables

Factor	P-Value Sig.(2-tailed)	Mean	Standard Deviation	t-test
Company size	0.002	3.180	0.952	2.889
Ownership structure	0.000	3.425	0.990	4.289
Level of Corporate Governance	0.003	3.350	1.376	2.542
Organizational culture	0.001	2.780	1.005	2.187
Managerial expertise and experience	0.002	2.863	0.832	2.641

4-3- Results of Hypotheses

Hypothesis 1: There is a significant relationship between value chain analysis technique and the tendency to earnings management in financial crisis conditions.

According to the results in table number 7, the findings show that the coefficient of significance between value chain analysis technique and the tendency to earnings management in financial crisis conditions is -0.412, so a negative and significant relationship is observed at the 99% confidence level.

Hypothesis 2: There is a significant relationship between activity-based costing technique and the tendency to earnings management in financial crisis conditions

According to the results in table number 8, the findings show that the coefficient of significance between ABC variables and the tendency to earnings management in the financial crisis is 0.509, so a significant and positive relationship is observed at the 99% confidence level.

Hypothesis 3: There is a significant relationship between continuous improvement technique and the tendency to earnings management in financial crisis conditions

According to the results in Table No. 9, it is found that the coefficient of significance between variables of continuous improvement techniques and the tendency to earnings management in financial crisis conditions is 0.313. Therefore, at a 99% confidence level, a significant relationship is observed.

Hypothesis 4: There is a significant relationship between balanced scored-card performance evaluation

technique and the tendency to earnings management in financial crisis conditions

According to the results in table number 10, the findings show that the coefficient of significance between BSC variables and the tendency to earnings management in financial crisis conditions is -0.445, so a negative and significant relationship is observed at the 99% confidence level.

Hypothesis 5: There is a significant relationship between organizational culture theory and the tendency to earnings management in financial crisis conditions

According to the results in Table No. 11, the findings show that the coefficient of significance between the variables of organizational culture theory and the tendency to earnings management in financial crisis conditions is -0.367, so a significant negative relationship is observed at the 99% confidence level.

Hypothesis 6: There is a significant relationship between business process reengineering and the tendency to earnings management in financial crisis conditions

According to the results in Table No. 12, the findings show that the coefficient of significance between BPR variables and the tendency to earnings management in financial crisis conditions is -0.385, so a negative and significant relationship is observed at the 99% confidence level.

Hypothesis 7: There is a significant relationship between artificial intelligence and the tendency to earnings management in financial crisis conditions.

According to the results in Table No. 13, the findings show that the coefficient of significance between AI

variables and the tendency to earnings management in financial crisis conditions is -0.433, so a negative and significant relationship is observed at the 99% confidence level.

Hypothesis 8: There is a significant relationship between customer relationship management and the tendency to earnings management in financial crisis conditions.

According to the results in Table No. 14, the findings show that the coefficient of significance between CRM variables and the tendency to earnings management in the financial crisis is -0.628, so a negative and significant relationship is observed at the 99% confidence level.

Table 7 - The results of the correlation test of the first hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	value chain analysis technique	the tendency to earnings management in financial crisis conditions	0.01	0.000	-0.412	Confirmed

Table 8 The results of the correlation test of the second hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	activity-based costing technique	the tendency to earnings management in financial crisis conditions	0.01	0.000	0.509	Confirmed

Table 9 - The results of the correlation test of the third hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	continuous improvement technique	the tendency to earnings management in financial crisis conditions	0.01	0.002	0.313	Confirmed

Table 10 - The results of the correlation test of the Fourth hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	balanced scored-card	the tendency to earnings management in financial crisis conditions	0.01	0.000	-0.445	Confirmed

Table 11 - The results of the correlation test of the Fifth hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	organizational culture theory	the tendency to earnings management in financial crisis conditions	0.01	0.000	-0.367	Confirmed

Table 12 - The results of the correlation test of the Sixth hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	business process reengineering	the tendency to earnings management in financial crisis conditions	0.01	0.000	-0.385	Confirmed

Table 13 - The results of the correlation test of the seventh hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	artificial intelligence	the tendency to earnings management in financial crisis conditions	0.01	0.000	-0.433	Confirmed

Table 14 - The results of the correlation test of the Eighth hypothesis

Row	Independent variable	Dependent variable	Error level	Significance level	Correlation coefficient	Conclusion
1	customer relationship management	the tendency to earnings management in financial crisis conditions	0.01	0.000	-0.628	Confirmed

5-Discussion and Conclusions

One of the ways to prevent earnings management by company managers during a financial crisis is to identify effective managerial and informational factors influencing it. Firstly, providing necessary warnings can alert companies to managers' inclination towards earnings management, allowing them to take appropriate actions. Secondly, the effective factors of MAT should be examined individually. This study investigated the criteria for identifying the effective factors of MAT systems on the tendency to earnings management in the financial crisis. For this purpose, the Delphi method was used, and in the findings section, each step of the Delphi method was analyzed. According to the results of the hypothesis tests, the significance level of the techniques such as value chain analysis, ABC, continuous improvement, BSC, organizational culture theory, BPR, AI, and CRM is less than 5 percent. Therefore, at a 95% confidence level, there is a significant relationship between the independent variables of the study and the tendency to earnings management, indicating that these techniques affect the tendency to earnings management. Accordingly, there is a significant negative relationship between value chain analysis, BSC, organizational culture theory, BPR, AI, and CRM techniques and the tendency to earnings management in crisis conditions. Conversely, there is a significant positive relationship between ABC and continuous improvement techniques and the tendency to earnings management in the financial crisis. The hypotheses of the study are analyzed as follows:

The results of the first hypothesis test indicate that the value chain analysis technique has a significant

negative effect on the tendency to earnings management. This conclusion suggests that the stronger the value chain governing the organization, the less fraudulent behavior will occur. These results align with Ayubi (2023), who found that the value chain acts as a deterrent against managerial deviations. Furthermore, value chain analysis can help managers identify key cost points in the company's value chain, aiding in cost reduction and profitability improvement efforts.

The results of the second hypothesis test show that the ABC technique has a significant positive effect on the tendency to earnings management. This relationship indicates that the more managers use the ABC system, the higher the likelihood of earning manipulation. These findings align with Jetzka (2023), who identified a positive relationship between ABC and the tendency to earnings management due to delays in cost recognition or increased production costs by managers. Overhead cost allocation to activities can provide an opportunity for manipulation. Additionally, ABC systems can provide more precise information on product and service costs, enabling managers to manipulate profits by managing costs.

The results of the third hypothesis test indicate that the continuous improvement technique has a significant positive effect on the tendency to earnings management. This relationship shows that systems with continuous and incremental improvement capabilities provide a foundation for earnings management. These findings align with Kaperli (2022), who identified continuous improvement as a driving factor for earnings management. Continuous

improvement can help managers manipulate earnings in business processes. Due to the focus on short-term results and rapid reporting, data may be subject to earnings management, leading to unrealistic outcomes.

The results of the fourth hypothesis test indicate that the BSC technique has a significant negative effect on the tendency to earnings management. The findings align with Yang Li (2020) and Huang (2020), who identified BSC as a factor controlling earnings manipulation through performance monitoring. BSC provides a comprehensive framework for performance measurement, helping managers evaluate the company's overall performance and preventing earnings management to conceal fundamental company issues (Hwang, Lee 2020).

The results of the fifth hypothesis test show that organizational culture has a significant negative effect on the tendency to earnings management. This finding indicates that a richer organizational culture reduces fraudulent behavior within the organization. The results align with Riyahi Nejad (2021), who introduced organizational culture theory as a factor for controlling earnings management through transparency in reporting, and Castro and Escamilla (2008), who demonstrated that many cultural societies, such as individualistic societies, are less prone to manipulation. Countries with high individualism tend to have lower levels of earnings management.

The results of the sixth hypothesis test show that BPR has a significant negative effect on the tendency to earnings management. This relationship indicates that the stronger the control tools used by managers, the less likely earnings management will occur. These findings align with Harika (2021), Ringim (2012), and Khuzaimah (2011), who identified BPR as a controlling factor for earnings management by reducing costs and eliminating redundant processes. Management commitment is a factor leading to a lack of the tendency to earnings management. There is a significant positive relationship between management commitment and organizational growth strength, where management commitment is a BPR index, reducing the tendency to earnings management. (Khuzaimah 2011).

The results of the seventh hypothesis test indicate that AI has a significant negative effect on the tendency to earnings management. This relationship shows that using up-to-date systems increases awareness and reduces earnings management. These

findings align with Jin (2023) and Khadim (2023), who introduced AI as a factor for eliminating repetitive and time-consuming activities. AI corrects errors in financial reports, freeing up time and resources for more profitable activities.

The results of the eighth hypothesis test show that CRM has a significant negative effect on the tendency to earnings management. This relationship indicates that customer loyalty is a profitable factor for the organization and ultimately a barrier to earnings management. These findings align with Khoshkar (2022) and Kolesky (2022), who identified CRM as a factor that increases customer satisfaction, retaining existing customers and enhancing their loyalty, thus increasing profitability and reducing earnings management. CRM can help improve company performance by increasing sales, reducing costs, and improving efficiency, leading to organizational improvement.

The results obtained from this study contradict the findings of several researchers. Vetchagul (2020) identified a negative relationship between the ABC system and the tendency to earnings management due to the elimination of non-value-added activities. Taheri (2014) considered the ABC system as a factor for improving the production process, eliminating redundant activities, identifying non-value-added costs, and performance measurement. Mohammadi (2022) considered continuous improvement as a factor for quality enhancement, simplifying the production line, improving design quality, and ultimately controlling earnings management. Kai et al. (2019) showed that companies managed by religious CEOs are drivers of earnings management. These findings contradict the results obtained by the present study.

Based on the results obtained and hypothesis testing, it is suggested that managers' performance be monitored to avoid earnings management. Additionally, since one of the factors for earnings management in continuous improvement activities is the pursuit of short-term profits, attention should be paid to the time dimensions of activities to achieve profits, such as rewards and short-term benefits. Furthermore, techniques such as BSC, which evaluate all financial, growth, learning, and customer performance aspects, should be given more attention for performance monitoring and evaluation. It is recommended to use up-to-date systems and specialized financial and executive staff to increase

organizational efficiency. Additionally, identifying crisis factors can alert organizational members to unexpected risks and prepare them to face such situations. Providing practical and applicable solutions for managers to improve earnings management processes during financial crises and holding training courses for employees on optimizing MAT use in facing financial crises can help organizations achieve greater efficiency in earnings management during financial crises.

Every research has its limitations, which are undeniable. There were also limitations in the stages of this research. The statistical population of this study includes financial managers of all companies listed on the Tehran Stock Exchange over a one-year period. Due to time constraints, it was not possible to access all financial managers. The data for this study were collected through questionnaires, which may be subject to human error. Additionally, some variables, such as ABC, have a dual impact on the tendency to earnings management. By delaying cost recognition by managers, they can provide a foundation for management manipulation and prevent earnings management by providing transparent information. This study only examined the effective factors of MAT on the tendency to earnings management and did not investigate other influential factors on this subject.

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