

Evaluation of the performance of listed companies in Tehran Stock Exchange on the implementation of accrual accounting system using consolidated approaches of ANP and TOPSIS

Hajar falah¹ & Hamid Reza Shammakhi²

Abstract:

Accounting and reporting system is a main instrument to transfer information on companies' accountability task. To play a vital and on-time role, accountability, evaluating the performance of managers and organizations, utilizing accrual accounting system in registering financial events and public/private units are too effective. Hence, studying affecting factors on executing accrual accounting system is an undeniable necessity. The purpose of this study is Evaluation of the performance of listed companies in Tehran stock exchange on the implementation of accrual accounting system with considering the complex factors and with Efficient Approach. The sample of this study is top financial managers and accounting experts of listed companies in Tehran stock exchange in 2008- 2013. We use ANP and TOPSIS approaches for evaluating the performance of the listed companies in Tehran stock exchange on the implementation of accrual accounting system..To analyze the opinions of elites, networked hierarchical analysis method is used in SUPER DECISION software package and TOPSIS approach is used for formulation in EXCEL software package. The results showed that management Support is the most effective factor in implementation of accrual accounting system. After

¹Department of Accounting, College of Humanities, Science and Research Branch, Islamic Azad University, saveh, Iran.

²Department of Accounting, College of Accounting and Management, Science and Research Branch, Islamic Azad University, Islamshahr, Iran. Email address: m.fallah1585@gmail.com

that, the theoretical framework, law and regulations, the culture of accountability and human resources are the next important factors.

Keyword: *Accrual accounting, ANP, TOPSIS, Tehran stock exchange*

1. Introduction

Accounting and reporting system is a main instrument to transfer information on companies' accountability task. A type of accounting is accrual accounting. In accrual accounting, incomes are identified and registered in books when they are achieved or realized. In this type of accounting, the time of income acquisition or realization is when the income is determined definitely or in terms of continuing the services. Therefore, the time of receiving the sums is not considered in this method; rather, it is the time of income acquisition or realization which matters in income recognition and registration. Likewise, in this system, the time of identifying and registering the costs is the time of creating or realizing the costs and when goods are delivered or a service is provided, final price of delivered goods or provided services, payable debts are generated (Kordestani & Iranshahi, 2009). Many governments have considered the process of changing cash accounting to accrual as part of public sector new management agenda and have considered accrual accounting as a guideline to achieve a public sector through "quasi – commercial" and "performance based" approach. The opponents of such theory argue that accrual accounting provide more suitable information for managerial decisions and would finally lead into a more efficient and effective public sector. The process of shifting from cash to accrual accounting started by British central government's agencies in early 1990s and it was established within ten years. At that time, there were clear marks that similar changes will be occurred in other countries like Ireland. However, at the time of entering this changing performance, affecting factors on accrual basic establishment such as practicality, lack of public propensity, ideological and political pressures and cultural differences prevented executing accrual accounting system (Babajani, 2009).

Different studies indicate that using accrual accounting is more favorable than traditional cash accounting since in accrual accounting, expenditures are compared with performance goals rather than budgets already agreed. Therefore, one can claim that the focal point for which reforms in public sector accounting is the shift from cash to accrual accounting. That is, changing from an accounting system which provides less fruitful information to another system which purveys more useful information. Recent system has two functions: providing cohesive and reliable information on public assets and paving the way for better and more effective

financial supervision on government's operations. On the other hand, although many authors have discussed and studied possible outcomes of using accrual accounting in public sectors and its role in organizational and social transformations, it seems that the number of studies on accrual accounting is too limited and there are various other aspects which demand more researches. In addition to above points, devising and executing operational budgeting in public agencies requires accrual accounting in order to determine real costs of plans and activities. In operational budgeting, in addition to separating the credits, all tasks, plans, activities, schemes, the volume of operations and the costs of public operation and relevant organs are computed by final price accounting methods which increase the needs to accrual accounting (Kordestani & Iranshahi, 2009). Hence, its study is too vital in Iran. In conducted studies, the performance of companies in executing accrual accounting is not evaluated. Therefore, the aim of present paper is to assess the performance of listed firms in Tehran Stock Exchange (TSE) on executing accrual accounting through integrating two decision making techniques.

2. Theoretical Foundations

Accounting is double size of the old civilization. The accounting records have been discovered in the world, ceramic plate of the Sumerian civilization of Babylon and Dating back to 3600 BC, and the wages of workers. Evidence shows that the civilizations of Egypt, Rome and Greece also established an accounting controls and an account has been set-up and spending. Accounting and types

2.1 Cash accounting

The cash method is the simplest of all methods of accounting. Under the cash method, income is recognized when money is received and is available for use by the optometrist, without restrictions. Under this method, expenses are generally recognized when paid. (Harper& Hicks,2006)

2.2 Accrual accounting

The accrual method of accounting is more complex but more accurately measures earnings when compared with the cash basis. Under the accrual method, revenue is recognized when earned, regardless of when money is received. Revenue is considered earned when the entity has the right to receive the income and the amount of revenue can be reasonably determined.

Without regard for when expenses are paid, under the accrual method, an expense is recognized when the optometrist becomes liable for the expense and the service or property is used or provided. The accrual method of accounting involves the use of general ledger accounts such as accounts receivable for recognized— but not yet received—income and accounts payable for unpaid expenses..(Harper& Hicks,2006)

2.2.1 History of accrual accounting

Accrual based accounting and financial reporting in the public sector is not, despite appearances to the contrary, an entirely new phenomenon. By way of example, it has been noted that in Australia, the Postmaster-General's department commenced preparing commercial accounts (including a full profit and loss statement and balance sheet) in 1913, and continued to use this form of reporting through time (Standish, 1968; Carlin,2005).The shift towards a comprehensive accrual oriented public sector accounting and financial reporting structure began to take place in the late 1980s, most notably in Australia and New Zealand. The latter jurisdiction became the first sovereign nation to fully implement accrual accounting at both a national and agency level. By the early 1980s, many New Zealand GTEs had adopted accrual accounting and financial reporting (IFAC, 1996; Carlin,2005). Australia has also been noted as an early adopter of accrual accounting techniques within its public sector (Funnel and Cooper, 1998; Carlin,2005). In the United Kingdom, matters also moved quickly. In 1992, the first widespread application of accrual accounting methodologies in the UK public sector⁴ came with the creation of NHS Trusts (Broadbent, 1992; Carlin, 2005). The response to accrual accounting and reporting in the public sectors of Canada and the United States was far more subdued. Though the issue had been contemplated in Canada since the 1960s (Glassco, 1962; Carlin,2005).full accrual reporting for budget funded agencies has been adopted in the Netherlands (OECD, 1997; Carlin,2005), Finland, Japan, Portugal, Sweden and Switzerland (OECD, 2002; Carlin,2005).

2.2.2 Benefits of accrual accounting (Almasi & Gholampour, 2009):

- ✓ Rapid access to thorough, complete and precise information of organization's status quo
- ✓ The possibility to determine expenditure based on correct information form resources and requirements
- ✓ Clarifying not received incomes in each financial period and the possibility of planning to receive them

- ✓ Priority of accrual accounting technique to cash accounting
- ✓ More desired information trustworthiness
- ✓ Better and more comprehensible efficiency and quality
- ✓ Reflecting more relevant and suitable information for temporal decision makings
- ✓ Prepared financial statements can be compared better and their information is too transparent that make decision making for all authorities especially financial and accounting incumbents clearer
- ✓ More efficiency of accounting elements in prepared financial statements
- ✓ The ability to compare prepared financial statements better

In 1993, Bartt conducted a research on management in accrual accounting ambience. It is asserted in this research that there are seven outcomes on using accrual accounting: first, a more comprehensive of government's plan expenditure which would lead into the second outcome namely emphasis on cost control and effectiveness calibration. Accrual figures have an important impact on pricing methods for user's account. The fourth outcome is the need to show more productivity in bargaining negotiations. The fifth one is to create more accountability for used resources and investments by public sector while the sixth outcome is to create accountability for downward debt policies which point out the importance of inter-class capital calibration. Finally, measuring financial impact by government policies for initial estimations with increasingly interests for its nominal aspect, that is, budget.

In 2007, Babajani conducted a study on the necessity of using accrual accounting in public sector especially in Iranian public sector. In present study, it was initially attempted to expound the aims of financial reporting in public sector and to mention the role of accounting basics in realizing such aims, to evaluate the special status of accruals and the reasons and advantages of its application in financial accounting and reporting in public sector and to express current barriers and necessary conditions in using it. Finally, the evaluation of authors on the status of using accrual basics in accounting and financial reporting in Iranian Public sector is provided and necessary guidelines to transfer from cash to accrual basics are expounded in a proposed framework based on an incremental change approach.

Rafei (2008) conducted a study on the application of full accrual basics in governmental accounting. It is said in this article that an approach toward using full accruals in accounting is recently established in public sector of such countries as UK, New Zealand and Australia and in our country, some governmental organizations have moves toward using full accruals in accounting. Hence, it seems necessary that in Iran, an analytical study on

advantages and disadvantages of this approach is necessary like other countries that have selected this approach since used basis in governmental accounting can impact on financial information and decision makings based on such information and selecting it as a basis for predicting and budgeting would cause major changes in resource allocation. In conducted study, such items as clarifying radical concepts, advantages/disadvantages of this approach, how to execute this approach in different countries are addressed while assessing the performance of companies in executing accrual accounting system is not considered.

3. Hypothesis

- 3.1 Among affecting factors on executing accrual accounting system, accountability culture has the highest rank.
- 3.2 Among affecting factors on executing accrual accounting system, theoretical framework has the lowest rank.

4. Methodology

In present study, the performance of listed companies in TSE in terms of executing accounting accrual was assessed by a systematic and comprehensive model as below:

Step one: defining the aim of decision making

Step two: networking

In present study, conceptual model was extracted from statistics steps (figure 1) by which all components and subcomponents were confirmed.

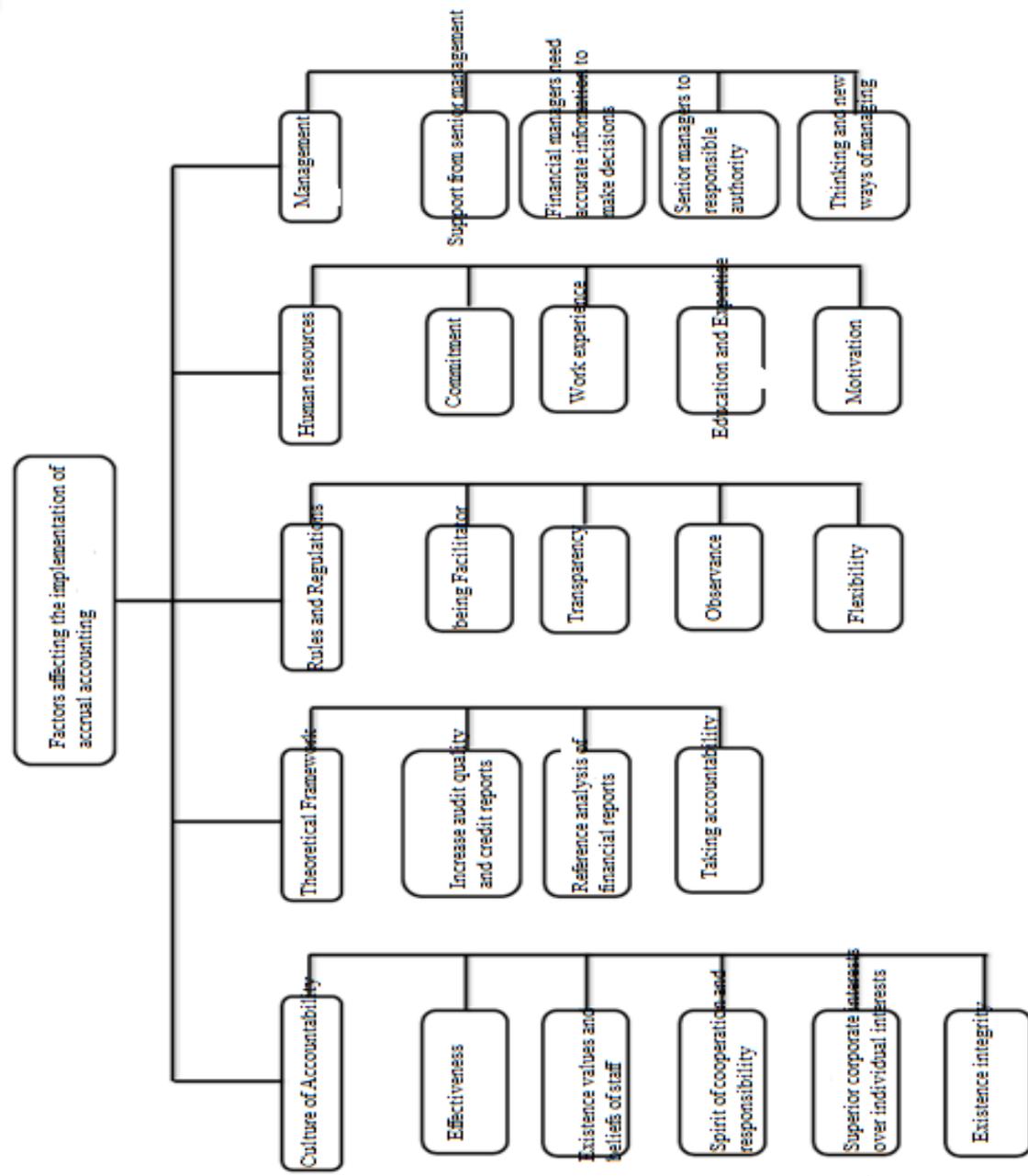


Figure 1 Conceptual Model

Step three: acquiring the weight of affecting factors on executing accounting accrual by networking analysis process

Step four: devising decision making matrix by final weight of factors

Step five: ranking by TOPSIS process

To analyze the opinions of elites, networked hierarchical analysis method is used in SUPER DECISION software package and TOPSIS is used in formulation in EXCEL software package.

4.1 sample size and Data collection

Research population consists of top financial manager and accounting experts in listed companies in Tehran Stock Exchange (TSE) between 2008 – 2013, these companies were attended in TSE for seven consecutive years and their fiscal year ends in 20 March. By judgment objective method, 120 elites were selected. Affecting factors on executing accounting system was extracted from research literature and after confirmation, elites were provided with statistical steps in the format of a questionnaire. Final model was inferred by analyzing data and statistical steps.

4.2 Validity and reliability of the questionnaire

The validity of the questionnaire in this study, was approved by all experts. (see table 1)

Table 1 Reliability and validity of questionnaires used in the study

Content and face validity	Stability	Questionnaire
Was approved by all experts	0.86	Inventory phase model
Was approved by all experts	0.83	Inventory phase TOPSIS

4.3 TOPSIS technique

This technique was provided by Hwang Yoon (1981). On this basis, any MADM –type problems can be evaluated by m option and n indicator which can be considered as a geometric system which includes m point in n space (Hwang Yoon, 1995), TOPSIS technique is based on this concept so that selected option has the shortest distance from ideal solution (the best possible mood) and the highest distance from the negative ideal solution (the worst possible mood). It is assumed that the utility of each indicator is smoothly increased (or decreased). That is, more r_{ij} would yield to more utility and vice versa. The steps of computations are as below:

First: normalization

In this step, decision making matrix is converted in to un-scaled matrix by Euclidian norm called N_d .

$$N_d = [n_{ij}]n_{ij} = \frac{r_{ij}}{(\sum_{i=1}^n r_{ij}^2)^{\frac{1}{2}}} \quad (2)$$

Second: drawing weighted un-scaled matrix

In this step, by using w diameter matrix (the weight of indicators) and below equation, weighted un-scaled matrix can be achieved.

$$V = N_d * W_{n*n} \quad (3)$$

Three: determining ideal and negative ideal solutions

$$\begin{aligned} \text{ideal positive solution} &= \{V_1^+, V_2^+, \dots, V_n^+\} \\ &= \{(\max_i V_{ij} \mid j \in J_1), (\min_i V_{ij} \mid j \in J_2), i = 1, 2, \dots, m\} \end{aligned}$$

$$\text{ideal negative solution} = A_j^- = \{V_1^-, V_2^-, \dots, V_n^-\} \quad (4)$$

$$= \{(\min_i V_{ij} \mid j \in J_1), (\max_i V_{ij} \mid j \in J_2), i = 1, 2, \dots, m\}$$

So that:

$$J_1 = \{1, 2, \dots, n \mid \text{The positive aspects of each indicator to}\}$$

$$J_2 = \{1, 2, \dots, n \mid \text{The}$$

Four: computing the distance by Euclidian norm

The distance of *i*th option from positive ideal solution

$$d_i^+ = \left\{ \sum_{j=1}^n (V_{ij} - V_j^+)^2 \right\}^{\frac{1}{2}} \quad i = 1, 2, \dots, n \quad (5)$$

The distance of *i*th option from negative ideal solution

$$d_i^- = \left\{ \sum_{j=1}^n (V_{ij} - V_j^-)^2 \right\}^{\frac{1}{2}} \quad i = 1, 2, \dots, n \quad (6)$$

Fifth: computing relative closeness of *A_i* to ideal solution

$$CL_i = \frac{d_i^-}{(d_i^- + d_i^+)} \quad i = 1, 2, \dots, n \quad (7)$$

4.4 ANP Technique

ANP approach comprises four steps (Satty, 1996; Chung et al. 2005; Yüksel and Dağdeviren, 2007; Gerner, 2012):

Step 1: Model construction and problem structuring: The problem should be stated clearly and decomposed into a rational system like a network

Step 2: Pairwise comparisons and priority vectors: In ANP, like AHP, pairs of decision elements at each cluster are compared with respect to their importance towards their control criteria. In addition, interdependencies among criteria of a cluster must also be examined pairwise; the influence of each element on other elements can be represented by an eigenvector. The relative importance values are determined with Saaty's scale.

Step 3: Super matrix formation: The super matrix concept is similar to the Markov chain process. To obtain global priorities in a system with interdependent influences, the local priority vectors are entered in the appropriate columns of a matrix. As a result, a super matrix is actually a partitioned matrix, where each matrix segment represents a relationship between two clusters in a system.

Step 4: Synthesis of the criteria and alternatives' priorities and selection of the best alternatives: The priority weights of the criteria and alternatives can be found in the normalized super matrix

5. Data Analysis

Initially, networked analytical analysis method is used as below to compute the weights of main criterias and sub criterias

5.1- Computing paired comparisons matrix

To show the steps of computation, we drew two consolidated tables for two from five major components extracted from the opinions of 120 respondents for each one paired comparisons matrix boxes are achieved from geometric average of 120 respondents' opinions. Geometric average of different opinions causes that the rate of incompatibility of each consolidated matrix becomes smaller than the rate of incompatibility of each paired comparison table. Consolidated tables on paired comparisons and incompatibility rates are achieved for each criterion.

Table 2 outlines the consolidated matrix of paired comparisons of sub-regulation that its incompatibility rate is 0.02.

Table 2 Consolidated matrix of paired comparisons of sub-regulation

Law and legislations	Being facilitator	Observance	Transparency
Flexibility	↑ 1.366	↑ 1.277	↑ 1.718
Being facilitator		1.069	↑ 1.256
Observance			↑ 1.344

↑
The figures with () symbol indicate that the relevant criterion in the column prefers to the criterion in the row while figures without any symbol indicate that the criterion in row prefers to column.

Table 3 outlines the consolidated matrix of paired comparisons of sub-regulation that its incompatibility rate is 0.01.

Management	Support of superior managers	Way of thinking	Requirements of manager
Submission	↑ 2.866	↑ 1.708	↑ 1.109
Support of superior managers		1.678	2.583
Way of thinking			1.5393

Table 3 Consolidated matrix paired comparisons subgroup management

5.2- Computing final weights of main criteria's and sub criteria's

One can achieve the final weight of each component by multiplying the weight of major aspects in the weight of factors.

Table 4 final weighting criteria

The final weight of sub-criteria	Sub- Criteria	Weight of sub-criteria	Main Dimensions Weight	Main Dimensions
0.050	submission	0.149	0.337	Management
0.144	Support of superior management	0.428		
0.085	Way of thinking	0.255		
0.055	Requirements of manager	0.166	0.112	Human resources
0.027	Manager	0.242		
0.021	Experience	0.191		
0.038	Education	0.347		
0.024	Commitment	0.218		
0.082	Increase of the quality	0.311		
0.113	Taking responsibility	0.428	0.266	Framework
0.069	Reference analysis	0.260		
0.037	Flexibility	0.186		
0.051	being Facilitator	0.254		
0.047	Observance	0.238		
0.064	Transparency	0.320		
0.012	Effectiveness	0.154	0.201	Law and legislations
0.018	Superiority of human resources	0.234		
0.022	Spirit of cooperation	0.277		
0.009	Existence of value	0.121		
0.017	Having cohesion	0.212		
1				
			1	Total

Concerning achieved weights in past step, here main aspects of conceptual model and data from questionnaire are rated by TOPSIS technique and shown in below table.

Table 5: computing distances and relative closeness to ideal solution of rating main criteria

Major factor	d+	d-	Ci
Management	0/0212	0/1127	0/8418
Theoretical framework	0/0608	0/0841	0/5801
Laws and regulations	0/0652	0/0657	0/5017
Accountability culture	0/089	0/0763	0/4617
Human resources	0/1175	0/017	0/1265

6. Findings

As seen in the table, the highest weight relates to managers' supports on executing accrual accounting system. Based on conducted analyses in past chapter, the rates of affecting indices on accrual accounting are outlined in table 6.

Table 6 rating factors on accrual accounting

Rank	Effective implementation of accrual accounting standards
1	Management
2	Theoretical Framework
3	Law and Regulations
4	Culture of Accountability
5	Human resources

Accordingly, management is most effective and the least impact on the implementation of accrual accounting to human resources.

6.1 Examining the first hypothesis

Hypothesis 1: among affecting factors on executing accrual accounting system, accountability culture has the highest rank. Concerning above results, management acquired the top rank.

6.2 Examining the second hypothesis

Hypothesis 2: among affecting factors on executing accrual accounting system, theoretical framework has the lowest rank. Concerning above results, Human resources acquired the lowest rank.

7. Conclusion

Today, evaluating the performance of companies especially listed ones in Tehran Stock Exchange in executing accrual accounting system is necessary and challenging. In conducted studies, the performance of companies is not evaluated on executing accrual accounting system. Therefore, an integrated approach on TOPSIS and ANP is used to evaluate the performance of listed companies in Tehran Stock Exchange in executing accrual accounting system. In 2012, Vakilifard and Nazari identified such factors as management, professional manpower, laws and regulations, theoretical framework, and culture of accountability impact on utilizing accrual accounting in public sector. Considering research findings, one can say that according to tests, the impact by studied factors on executing accrual accounting system in high and among these factors, management and theoretical framework have the highest and lowest impact on accrual accounting system. The findings of present study indicate that among affecting factors on executing accrual accounting system, management has the highest role which is consistent with the results of mentioned study.

In another study, Kazamei and Karbasi Yazdi (2012) investigated the challenges of reporting system based on accrual accounting (by emphasis on accountability) in Iranian public sector. This study aimed at studying the challenges of establishing reporting system based on accrual accounting system (by emphasis on accountability) in Iranian public sector by which five factors were studied: the lack of theoretical framework, laws and regulations in financial system, public accounting standards and methods, lack of full execution of operational budgeting and lack of executing performance auditing. Lack of executing performance auditing has the first rank followed by lack of theoretical framework, lack of full execution of

operational budgeting and public accounting laws, regulations and standards. In present study, theoretical framework in terms of elites was identified as the second affecting factor on executing accrual accounting system which is consistent with the results of mentioned study.

8. Recommendations and Suggestions

According to priorities in present research, it is clear that managerial attitude has the highest impact on organization. Therefore, it is the most important factor in executing accrual accounting system. Thus, a key point is to pay attention to management in executing this system. Rating other main factors would identify the importance of each item for managers and respecting these items can pave the way for executing accrual accounting system.

In past research, we addressed such items as clarifying radical concepts, how to execute, and advantages/disadvantages of this approach in different countries while assessing the performance of companies in executing accrual accounting system is less considered. Therefore, there are gaps in these studies. In this vein, future studies can use fuzzy decision making processes to determine the priorities and to compute weights by using fuzzy processes and model assessment in other organization, etc.

References

- Almasi, Hassan & Gholampour, Seyed Mohammad (2009), the role of computing rules and regulations and accrual accounting system in promoting accountability capability, *Business Management*, vol. 2, 25 – 44
- Babajani, Jafar (2006), *Auditing and public financial controls*, 2nd edition, Tehran, Alameh Tabatabaei University
- Broadbent, J. (1992), Change in Organisations: A Case Study of the Use of Accounting Information in the NHS', *British Accounting Review*, Vol. 24, No. 4, pp. 343–67.
- Carlin, Tyronem. (2005) *Financial Accountability & Management*, 21(3), August 2005, 0267-4424
- Chan, L.J. (2003). *Government Accounting: An Assessment of Theory, Purposes and Standards*. *Public Money & Management*, Vol.20, Issue.1, pp.19 -26.

- Chung, S., Lee, A. H. I. and Pearn, W. L. (2005), Analytic network process (ANP) approach for product mix planning in semiconductor fabricator, *Int. J. Production Economics*, Vol. 96, pp. 15-36.
- Danayifard, Hassan; Alvani, Mahdi & Azar, Adel (2009), "the methodology of quantitative research in management: a thorough approach," 2nd edition, Tehran, Safar – Eshraghi Publications
- Funnell, W. and K. Cooper (1998), *Public Sector Accounting and Accountability in Australia* (UNSW Press, Sydney).
- Glassco (1962), *Report of Royal Commission on Government Organisations (Canada)*, 5 Volumes (Government Printer, Ottawa).
- Gorener, Ali (2012) *International Journal of Business and Social Science*, Vol. 3 No. 11;
- Harper, Jennifer; Hicks, Kenneth E. (2006) *Optometry - Journal of the American Optometric Association*, Volume 77, Issue 9, September 2006, Pages 465
- Hwang, C., & Yoon, K. (1981) *Multiple Attribute decision making: A state of the art survey*. Springer-Verlog.
- Hwang, C., & Yoon, K. (1995) *Multiple Attribute Decision Making: An introduction*. London, Sage publications
- International Federation of Accountants (IFAC) (1996), 'Perspectives on Accrual Accounting', IFAC Occasional Paper 3 (IFAC, New York).
- Kazemi, Mohammad and Husseini Karbasi Yazdi (2012), "the challenges of establishing reporting system based on accrual accounting system (by emphasis on accountability) in Iranian public sector", *Auditing Knowledge Quarterly*, vol. 10
- Kurdestani, Gholam Reza & Iranshahi, Ali Akbar (2009), studying affecting factors on utilizing accrual accounting system in public sector," *auditing knowledge*, vol. 26: 46 – 58
- Nezlobin (2012). *Accrual Accounting, Informational Sufficiency and Equity Valuation*. *Journal of Accounting Research*, 50(1), 233-273.
- OECD (1997), *Accrual Accounting in the United Kingdom and The Netherlands* (OECD, Paris).
- OECD (2002), *Accrual Accounting and Budgeting – Key Issues and Recent Developments* (OECD, Paris).
- Paper Barrett, P. (1993) *Accrual Accounting Environment*.. "Managing in an RIPA Presented to Conference (Canberra, 26 February).
- Rafei, Afsaneh (2008), "applying the basics of accrual accounting system in public sector", *Auditing*, vol. 40

Saaty, T. L. and Vargas, L. G. (1996), *Decision Making with The Analytic Network Process*, Springer, USA

Saber, Mahdi (2011), “studying the capacity of laws and regulations in executing accrual accounting system in Iranian Public sector,” the first national seminar on new approaches on public accounting, Mazandaran

Standish, P. (1968), *Financial Accounting and Reporting in the Australian Post Office*, in W. Jay and R. Mathews (eds.), *Government Accounting in Australia* (Cheshire, Melbourne), pp. 110–28.

Vakilifard, Hamid Reza & Nazari, Farzad (2012), “affecting factors on executing accrual accounting system in affiliated institutes by Ministry of Health, Treatment and Medical Education,” *Health Auditing Quarterly*, vol. 1, 111 – 125

Yuksel, İ. and Dagdeviren, M. (2007), Using the analytic network process (ANP) in a SWOT analysis-A case study for a textile firm, *Information Sciences*, Vol. 177, No. 16, pp. 3364-3382.