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Determining Effective Factors on Adopting and Not Adopting Methods of Environmental Management Accounting

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Abstract

This research was performed in order to achieve three goals by EMA base including: 1 - Developing theoretical literature of management accounting in Iran by adding EMA to its frame. 2 -Recognizing current accounting methods for environmental costs management in Iran. 3 -Determining effective factors on adopting methods of environmental management accounting. The results of achieving the first goal of research, in addition to theoretical development of country management accounting, a Persian rich and useful resource was provided in EMA field. In order to achieve the second goal of research, some interviews were performed by 45 financial managers or senior accountants employing in production companies the members of Tehran stock market. And in order to achieve the third goal and using the results and data obtained from interviews, 6 hypotheses were presented following by approving the effect of a factor. To test hypotheses, some questionnaires were transported for financial managers and directors of management accounting units of mentioned companies. Then data resulted from returning questionnaires were coded and analyzed by one sample T statistical test. Finally, according to results some suggestions were presented to speakers in order to use methods of environmental management accounting. Apart from theoretical development of this area of research, results and findings resulted from research approved challenges, times of using and operational cases of EMA in our industry. These methods can and must be used by companies about quality of reporting environmental aspects. This provides advantages not only for the same part but also for all environments in which we live.

Keywords: Environmental Management Accounting (EMA), Tolerating Change of Traditional Methods, Efficiency or Considerations of Costs, External Pressure.

Introduction

At present, accounting faces challenges regarding environmental reporting, a challenge not only by playing traditional role in record and report of financial information, but also by playing role in the field of environmental function management of environmental accounting helping to face this challenge is an area of accounting which provides information about

company environmental operation and reports it to internal and external beneficiaries (Bennette & James, 2000; Deegan, 2003). Environmental management accounting (EMA) is a subset of environmental accounting which is presented as developing traditional management accounting and is the aim of this research. In order to performing this research EMA is defined as:

Providing, analyzing and using monetary (financial) and non-monetary (physical) information related to environment in order to improve financial and environmental operation of company (Bartolomeo and others, Bennette and James, 1997).

Several limitations are observed in the methods of traditional management accounting by purpose of improving environmental operation in environmental costs management (for example environmental costs accumulate in overcharge accounts) (Burritte, 2004; Deegan, 2003; United Nations Division For Sustainable Development (UNSD), 2001). In addition it is generally accepted that most of management accounting systems performing in companies, failed to show all combinations (forms) of environmental costs in organizational operations (Deegan, 2003; Epstein, 1996; UNSD, 2001).

Such limitations in management accounting methods or systems mean that many chances are lost to decrease environmental costs and to improve environmental operation. For example, United Nations Division for Sustainable Development points that:

The role of EMA is known for all in developing management accounting operation in order to manage environmental operation. This role changed the attention of traditional management accounting from "providing financial information" to "reducing resources consumption and more efficient use of natural resources" (International Federation Of Accountants, 2005). The ability of EMA performance is clear in managing environmental operation (Gray & Bebbington, 200). In fact EMA as a protective mechanism for environmental operation management is so popular in many countries either in the area of research or in the area of operation. But in our country, Iran, this area of accounting remains intact and virgin and neither its most primary meanings and definition aren't translated to Persian nor some researches are done in this area.

This deficiency of research is a reason to perform this research that tries to fill gaps and adding EMA to the frame of our country's accounting knowledge, we step to develop its operation.

Importance and Necessity of Performing Research

According to developing population and limiting available natural resources, today the problem of protecting environment is presented as one of the most important problems in men society. In recent years, because of over use of natural resources and producing and spreading polluted substances in environment, related scientists and authorities in this field pay more attention to environment and protecting it. Polluting weather, destroying forests and pastures extinction of animal resources and ... are some cases affected by activities of factories and production industrial centers. It is important to notice that protecting environment isn't limited to politic and geographical limits and needs all earth residents to try in addition to other related sciences (such as accounting).

It is generally agreed that managers of trade units are under an increasing pressure in which they should not only decrease their operational costs but also they should minimize environmental effect resulted from their operational activities. To decrease environmental effects of their operational activities there is no way for companies except that they consider information related to environmental costs in their accounts and decisions. Recent researches

showed that according to large size and importance of environmental costs, they are ignored by managers, because presented information by traditional accounting system is generally deficient in this field and environmental costs mainly accumulate and hide in overcharge accounts. Company senior manager should be informed about the effects and risks of environmental factors resulted from company activities. Most of environmental costs can be decreased or even omitted using better trade decisions, investing in technologies more proportionate to environment (green industries) and redesigning products and processes. Managing environmental costs in the best way can improve company environmental operation and associated with more advantages for society. In addition to improving environmental operation, environmental costs management effects directly and positively on financial operation. In one side, optimum and controlled consumption of natural resources, causes to improve environmental operation and move toward sustainable development, and in other side decreasing consumption costs of natural sources such as water, electricity, gas, fuel, different kinds of raw materials and... it causes to improve environmental operation. It is anticipated that regarding to approve and perform "Subsidies Purposivism Rule" in our country, managing these costs and accounting methods of suitable management in this way are more paid attention and audited. This rule makes government to approach gradually the costs of energy vectors, water, electricity and gas to an actual cost. Certainly performing this rule, firms and companies will be successful to control their consumption in these costs. Now environmental management accounting is emerged as an important instrument of decision process, emphasizing on environmental costs management and can decrease and control efficiently consuming natural resources and prevent wasting national capitals of country. This is the main purpose of this research because EMA methods won't be performed except that papers, researches and investigations are considered.

Reviewing History of the Research

Studying production companies of automobile industries, Esmaili (1376) shows that in many companies necessary information and reports aren't provided and presented to management. He introduces a complete and exact study and needed rooting from university experts and industry authorities as an improvement of this field.

Studying the quality and quantity of accounting information operation in water industry Sadat Ashkooi (1377) shows that in view point of %64 people in statistical society, providers of accounting information in water industry can't provide on time information. %76 people also believe that operation and function of accounting information in water industry aren't known.

Studying 70 examined companies of companies accepted in stock exchange Rasooli (1377) shows that management accounting information has qualitative properties (dependent, complete, correct and on time) and management uses accounting information while evaluating operation, recognizing deviations and their reasons and also studying efficiency and effectiveness.

Studying problems and difficulties of using management accounting information in fishery company Yazdani (1382) shows that manager of the company don't have enough time to use this information and in other side they aren't enough knowledgeable and informed about using the methods of management accounting.

Allameh (1383) in his M.A thesis as "Studying load of environmental accounting information in financial reports of governmental units" shows that accounting reports can increase the load of environmental information for users especially environment supporters

in order to help making decision and also achieving goals of environmental management systems and encourage governmental units to protect environment.

Talebnia and Rostami (1384) show that managers' main reasons for noting use of management accounting information are behavioral, cultural and technical factors respectively. In their opinions, managers can use effectively management accounting information when they know technical factors such as definitions and operations of management accounting and also try to minimize negative effect of behavioral and cultural factors of using this information.

Research Method and Hypotheses

Research Method

Several methods are used for the research.

Regarding that this research studies present position of Iran environmental management accounting and describes opinions and views of related society, so it can be a descriptive research. However the research method is a descriptive-measuring method. A combination of library and field methods is used to gather research information.

Research Hypotheses

Hypothesis 1: It seems that there is a meaningful relation between "low priority of environmental costs accounting" and adopting environmental management accounting (EMA) methods.

Hypothesis 2: It seems that there is a meaningful relation between "tolerating change of traditional methods" and adopting environmental management accounting (EMA) methods.

Hypothesis 3: It seems that there is a meaningful relation between "efficiency or considerations of costs and advantages" and adopting environmental management accounting (EMA) methods.

Hypothesis 4: It seems that there is a meaningful relation between "limitation of resources and expert forces" and adopting environmental management accounting (EMA) methods.

Hypothesis 5: It seems that there is a meaningful relation between "difficulty of gathering and allocating environmental costs" and adopting environmental management accounting (EMA) methods.

Hypothesis 6: It seems that there is a meaningful relation between "external pressure" and adopting environmental management accounting (EMA) methods.

Statistical Society and Sample

Statistical society of the research includes financial managers, senior accountants and authorities of production companies management accounting, remembers of Tehran stock exchange comprising 370 companies. Involving mentioned factors in process of inter organizational reporting and in other side responsibility for performing management accounting methods is a reason for this selection. As statistical society had large geographical size and capacity and we couldn't practically refer to them one by one and explore needed information, so we selected some of them as a sample and gathered results from studied society.

Data Analysis

As it was mentioned, research data was gathered by questionnaire. All questions were of closed ones and for specialty questions, answers were designed based on Likert 5 options of very much, much, average, low, very low. After gathering answers all options were coded by 1 to 5 weights. It is worth to mention that tests study options based on Likert measure and this measure wasn't determined by numbers not to effect on respondents. Returning questionnaires, regarding to kind of presenting question and its power to accept or reject hypothesis in some questions the weight of so low was numbered 1, low 2, average 3, much 4 and very much 5, and in other ones in contrary so low was 5, low4, average3, much2 and so much1. Tables' 1-6 show descriptive statistical information related to answers of all 30 questions and tables 2-6 show descriptive statistics of every independent variable. This information includes average, middle, mode, standards deviation, variance, tension coefficient, and skew coefficient, slope, minimum and maximum.

Table 1-6. Descriptive statistics of answers to questionnaire question

Property Question	Average	Middle	Mode	Standards deviation	Variance	Tension coefficient	Skew coefficient	Slope	Minimum	Maximum
A-1	54/4	0/5	5	713/0	509/0	105/0	242/1-	2	3	5
A-2	40/4	5/4	5	661/0	437/0	581/0-	665/0-	2	3	5
A-3	31/4	5/4	5	776/0	603/0	086/1-	602/0-	2	3	5
A-4	71/4	0/5	5	580/0	336/0	591/2	910/1-	2	3	5
A-5	78/4	0/5	5	552/0	304/0	729/4	419/2-	2	3	5
B-1	17/4	0/4	5	812/0	659/0	409/1-	324/0-	2	3	5
B-2	27/4	0/5	5	894/0	799/0	531/1-	555/0-	2	3	5
B-3	45/4	0/5	5	757/0	572/0	581/0-	957/0-	2	3	5
B-4	13/4	0/4	5	845/0	715/0	562/1-	248/0-	2	3	5
B-5	65/4	0/5	5	651/0	424/0	387/1	649/1-	2	3	5
C-1	9/3	0/4	5	940/0	883/0	007/1-	282/0-	3	2	5
C-2	1/4	0/4	5	962/0	926/0	345/1-	417/0-	3	2	5
C-3	31/4	5/4	5	776/0	603/0	086/1-	602/0-	2	3	5
C-4	81/3	0/4	3	883/0	780/0	200/1-	101/0	3	2	5
C-5	31/4	0/5	5	892/0	796/0	381/0-	932/0-	3	2	5
D-1	23/4	0/5	5	885/0	783/0	563/1-	481/0-	2	3	5
D-2	03/4	0/4	5	835/0	698/0	568/1-	061/0-	2	3	5
D-3	37/4	0/5	5	790/0	623/0	959/0-	773/0-	2	3	5
D-4	00/4	0/4	5	855/0	731/0	640/1-	000/0	2	3	5
D-5	51/4	0/5	5	758/0	575/0	228/0-	170/1-	2	3	5
E-1	65/4	0/5	5	651/0	424/0	387/1	649/1-	2	3	5
E-2	45/4	0/5	5	798/0	637/0	235/1	379/1-	3	2	5
E-3	54/4	0/5	5	616/0	380/0	012/0	010/1-	2	3	5
E-4	84/4	0/5	5	368/0	136/0	604/1	889/1-	1	4	5
E-5	84/4	0/5	5	514/0	265/0	433/8	135/3-	2	3	5
F-1	29/4	0/4	5	771/0	594/0	109/1-	548/0-	2	3	5
F-2	41/4	0/5	5	795/0	632/0	823/0-	894/0-	2	3	5

F-3	26/4	0/4	5	802/0	644/0	270/1-	498/0-	2	3	5
F-4	59/4	0/5	5	710/0	503/0	498/0	415/1-	2	3	5
F-5	71/4	0/5	5	580/0	336/0	591/2	910/1-	2	3	5

Table 2-6. Descriptive statistics of research independent variables

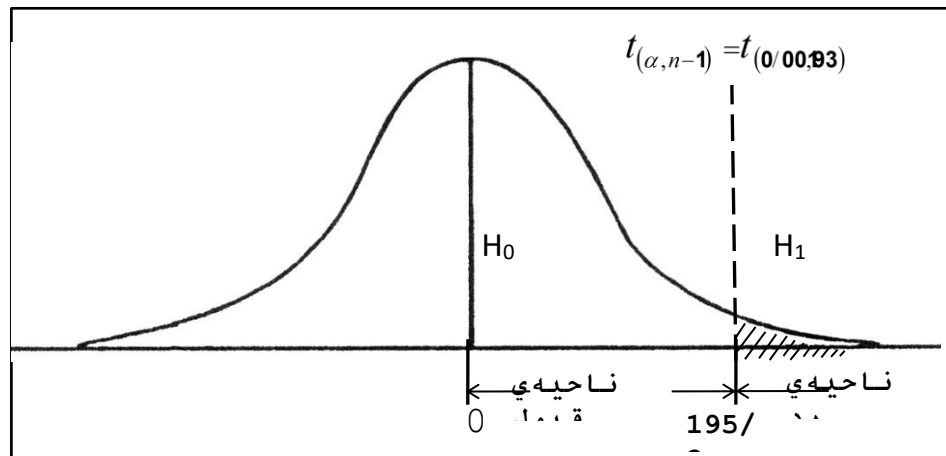
Property Question	Average	Midle	Mode	Standards deviation	Variance	Tension coefficient	Skew coefficient	Slope	Minimum	Maximum
Variable 1	549/4	8/4	5	6032/0	3638/0	835/0	652/1-	0/2	0/3	5
Variable 2	332/4	6/4	5	7446/0	5544/0	110/1-	684/0-	0/2	0/3	5
Variable 3	085/4	3/4	5	8432/0	7110/0	280/1-	397/0-	4/2	4/2	5
Variable 4	230/4	6/4	5	7798/0	6081/0	388/1-	494/0-	0/2	0/3	5
Variable 5	664/4	0/5	5	5410/0	2927/0	539/2	806/1-	0/2	0/3	5
Variable 6	451/4	6/4	5	6815/0	4644/0	457/0-	983/0-	0/2	0/3	5

Hypotheses Test and Results Description

First Secondary Hypothesis Test

It seems that there is a meaningful relation between “low priority of environmental costs accounting” and adopting environmental management accounting (EMA) methods. (Table3-7: First hypothesis test statistics (low priority of environmental costs accounting)).

Statistical indexes Independent variable	T statistics	Freedom degree df	Meaningfulness level sig	Sample average difference from claimed average	Confidence distance 9/99%	
					Minimum	Maximum
Low priority of environmental costs accounting	898/24	93	000/0	5489/1	3375/1	7603/1



Curve 1-7. Areas of accepting and rejecting hypothesis 1

As $24/898 > 3/195$ that is $t > t_{(\alpha, n-1)} = t_{(0/001, 93)}$

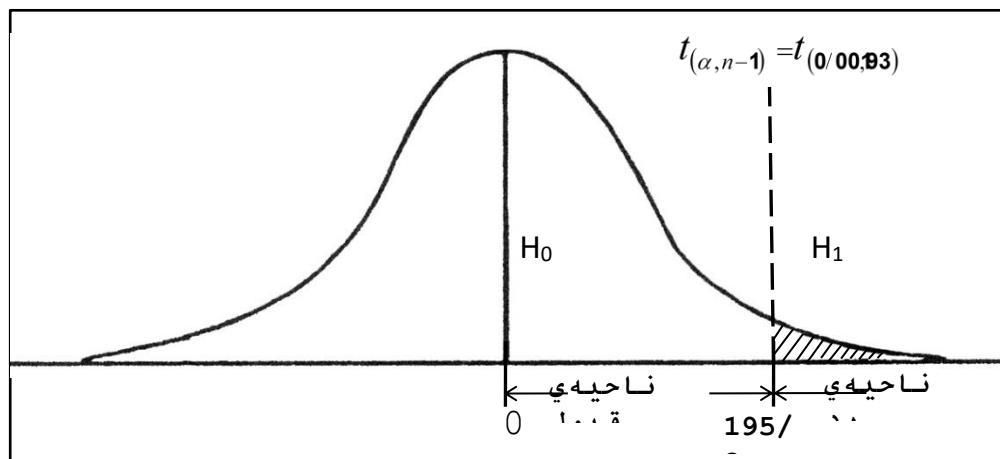
And in other words $t > \alpha$, so test statistics is in H1 area comparing critical amount and H0 hypothesis is rejected. It means that claim hypothesis or the same research hypothesis is accepted. In other side regarding that $0/001 > 0/000$ that is $\alpha > sig$, so by assuming one in thousand error it can be claimed that there is a meaningful relation between “low priority of environmental costs accounting” and adopting environmental management accounting (EMA) methods and this factor is effective on process of making decision about accepting or not accepting this methods.

Second Secondary Hypothesis Test

It seems that there is a meaningful relation between “tolerating change of traditional methods” and adopting environmental management accounting (EMA) methods.

Table 4-7. Second hypothesis test statistics (Tolerating change of traditional methods)

Statistical indexes Independent variable	T statistics	Freedom degree df	Meaningfulness level sig	Sample average difference from claimed average	Confidence distance 9/99%	
					Minimum	Maximum
Tolerating change of traditional methods	3428/17	93	000/0	3319/1	0709/1	5929/1



Curve 2-7. Areas of accepting and rejecting second hypothesis

As

$17/342 > 3/195$ that is $t > t_{(\alpha, n-1)} = t_{(0/001, 93)}$

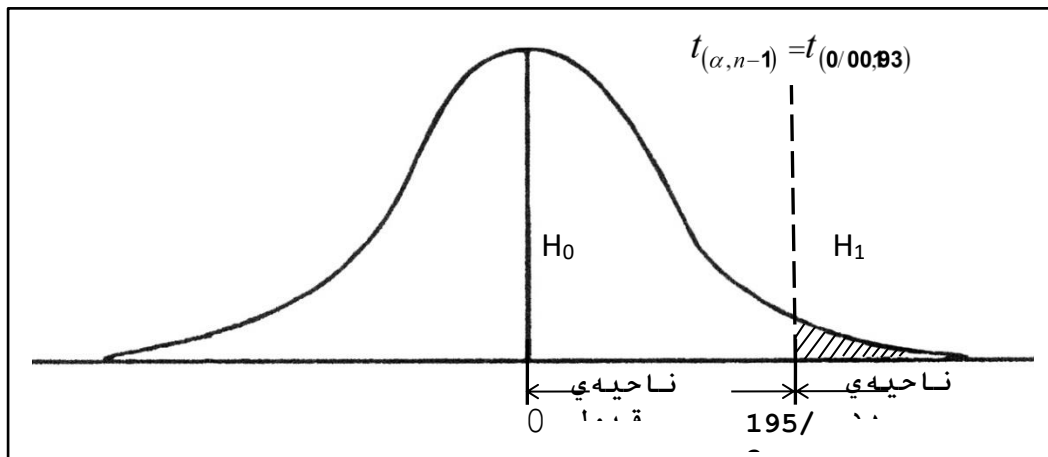
And in other words $t > \alpha$, so test statistics is in H1 area comparing critical amount and H0 hypothesis is rejected. It means that claim hypothesis or the same research hypothesis is accepted. In other side regarding that $0/001 > 0/000$ that is $\alpha > sig$, so by assuming one in thousand error it can be claimed that there is a meaningful relation between “tolerating change of traditional methods” and adopting environmental management accounting (EMA) methods and this factor is effective on process of making decision about accepting or not accepting this methods.

Third Secondary Hypothesis Test

It seems that there is a meaningful relation between “efficiency or considerations of costs and advantages” and adopting environmental management accounting (EMA) methods.

Table 5-7. Third hypothesis test statistics (efficiency or considerations of costs and advantages”

Statistical indexes Independent variable	T statistics	Freedom degree df	Meaningfulness level sig	Sample average difference from claimed average	Confidence distance 9/99%	
					Minimum	Maximum
Efficiency or considerations of costs and advantages	12/477	93	000/0	0851/1	7896/1	1/3806



Curve 3-7. Areas of accepting and rejecting second hypothesis

As $12/477 > 3/195$ That is $t > t_{(\alpha, n-1)} = t_{(0/001, 93)}$

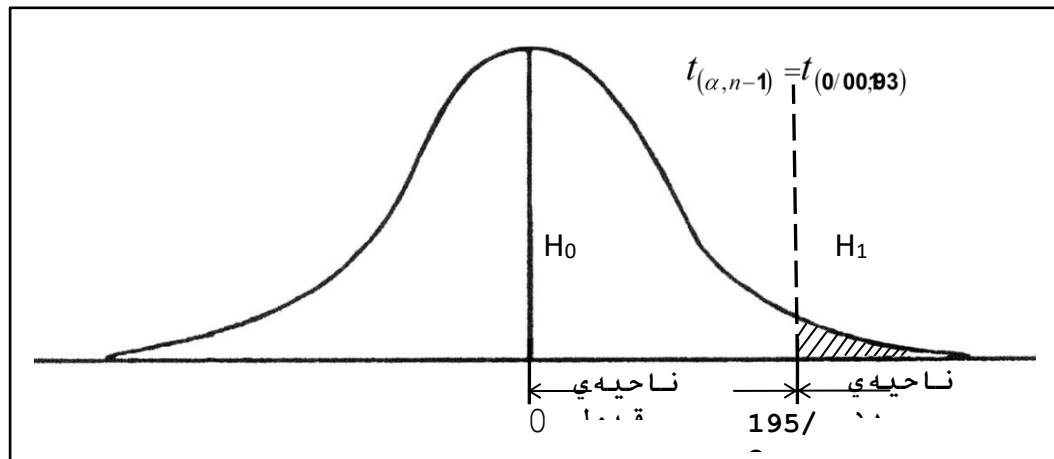
And in other words $t > \alpha$, so test statistics is in H1 area comparing critical amount and H0 hypothesis is rejected. It means that claim hypothesis or the same research hypothesis is accepted. In other side regarding that $0/001 > 0/000$ that is $\alpha > sig$, so by assuming one in thousand error it can be claimed that there is a meaningful relation between “efficiency or considerations of costs and advantages” and adopting environmental management accounting (EMA) methods and this factor is effective on process of making decision about accepting or not accepting this methods.

Fourth Secondary Hypothesis Test

It seems that there is a meaningful relation between “limitations of resources and expert forces” and adopting environmental management accounting (EMA) methods.

Table 6-7. Fourth hypothesis test statistics (limitations of resources and expert forces”

Statistical indexes Independent variable	T statistics	Freedom degree df	Meaningfulness level sig	Sample average difference from claimed average	Confidence distance 9/99%	
					Minimum	Maximum
Limitations of resources and expert force	15/290	93	000/0	2298/1	0/9565	1/5031



Curve 4-7. Areas of accepting and rejecting second hypothesis

As $15/290 > 3/195$ That is $t > t_{(\alpha, n-1)} = t_{(0/001, 93)}$

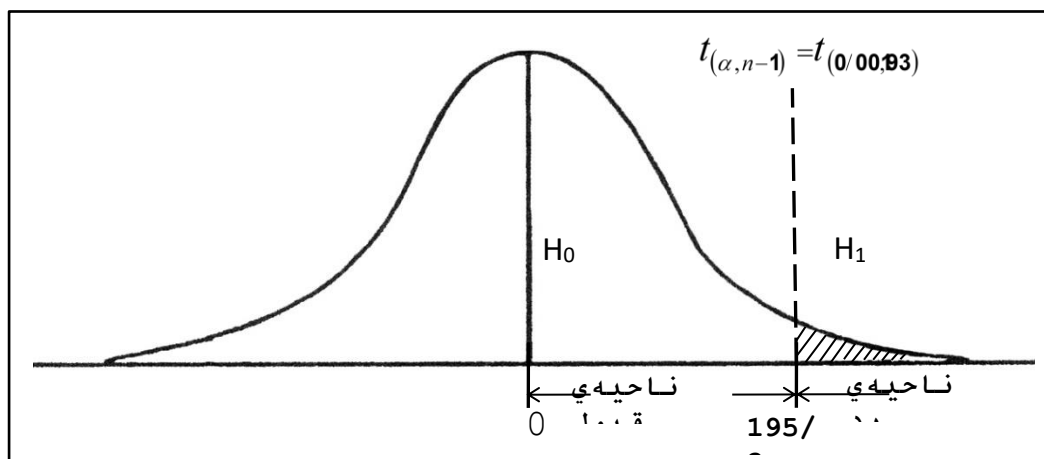
And in other words $t > \alpha$, so test statistics is in H1 area comparing critical amount and H0 hypothesis is rejected. It means that claim hypothesis or the same research hypothesis is accepted. In other side regarding that $0/001 > 0/000$ that is $\alpha > sig$, so by assuming one in thousand error it can be claimed that there is a meaningful relation between “limitations of resources and expert forces” and adopting environmental management accounting (EMA) methods and this factor is effective on process of making decision about accepting or not accepting this methods.

Fifth Secondary Hypothesis Test

It seems that there is a meaningful relation between “difficulty of gathering and allocating environmental costs” and adopting environmental management accounting (EMA) methods.

Table 5-7. Fifth hypothesis test statistics (difficulty of gathering and allocating environmental costs” and adopting

Statistical indexes Independent variable	T statistic	Freedom degree df	Meaningfulness level sig	Sample average difference from claimed average	Confidence distance 9/99%	
					Minimum	Maximum
Difficulty of gathering and allocating environmental costs	29/819	93	000/0	6638/1	4742/1	1/8534



Curve 5-7. Areas of accepting and rejecting second hypothesis

As $29/819 > 3/195$ That is $t > t_{(\alpha, n-1)} = t_{(0/001, 93)}$

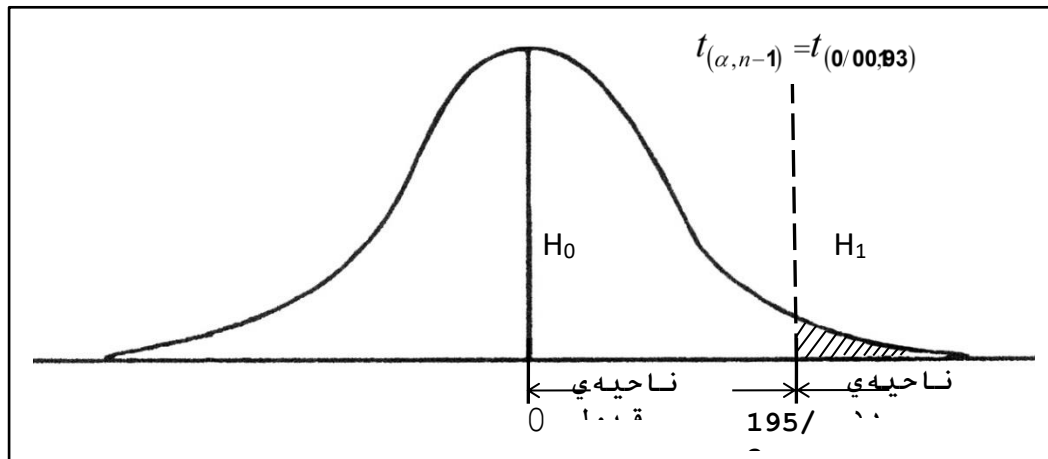
And in other words $t > \alpha$, so test statistics is in H1 area comparing critical amount and H0 hypothesis is rejected. It means that claim hypothesis or the same research hypothesis is accepted. In other side regarding that $0/001 > 0/000$ that is $\alpha > sig$, so by assuming one in thousand error it can be claimed that there is a meaningful relation between “difficulty of gathering and allocating environmental costs” and adopting environmental management accounting (EMA) methods and this factor is effective on process of making decision about accepting or not accepting this methods.

Sixth Secondary Hypothesis Test

It seems that there is a meaningful relation between “external pressure” and adopting environmental management accounting (EMA) methods.

Table 8-7. Sixth hypothesis test statistics (external pressure)

Statistical indexes Independent variable	t statistics	Freedom degree df	Meaningfulness level sig	Sample average difference from claimed average	Confidence distance 9/99%	
					Minimum	Maximum
External pressure	29/819	93	000/0	6638/1	4742/1	1/8534



Curve 6-7. Areas of accepting and rejecting second hypothesis

As $20643 > 3/195$ That is $t > t_{(\alpha, n-1)} = t_{(0/001, 93)}$

And in other words $t > \alpha$, so test statistics is in H1 area comparing critical amount and H0 hypothesis is rejected. It means that claim hypothesis or the same research hypothesis is accepted. In other side regarding that $0/001 > 0/000$ that is $\alpha > sig$, so by assuming one in thousand error it can be claimed that there is a meaningful relation between “external pressure” and adopting environmental management accounting (EMA) methods and this factor is effective on process of making decision about accepting or not accepting this methods.

Summarized Statistical Results of Research Variables and Grading based on Their Effects Rate

Table (9-7) presents statistical results from research variables test not in order of hypotheses number but in order of the most effecting. The measure of this grading is difference of "variable average from claimed average". In this regard, in view points of financial managers, senior accountants and authorities production companies management accounting unit, members of Tehran exchange stock, variables of “difficulty of gathering and allocating environmental costs” and “efficiency or considerations of costs and advantages” have the most and the least effecting power on process of making decision about adopting or non adopting methods of environmental management accounting.

Table 9-7. A summary of statistical results and variable grading

Hypothesis	Independent variable	statistics t	df	sig	Sample average difference from claimed average
Fifth	Difficulty of gathering and allocating environmental costs	819/29	93	000/0	6638/1
First	Low priority of environmental management accounting	898/24	93	000/0	5489/1
Sixth	External pressure	643/20	93	000/0	4511/1
Second	Tolerating change of traditional methods	342/17	93	000/0	3319/1
Fourth	Limitation of resources and expert forces	290/15	93	000/0	2298/1
Third	Efficiency or considerations of costs and advantages	477/12	93	000/0	0851/1

Conclusions

All scientific researches are performed based on a certain goal and regarding every related goal and based on analyzing gathered data, researcher proceeds to conclude, create and announce a hypothesis. In this research also we try generally to achieve three goals in order to solve problem and answer some marked questions.

Research Recommendations

Recommendation of Research

a) Renovating companies accounting systems in order to make a relationship between information about monetary and physical environmental costs. It is easily possible by creating and defining an additional field of non monetary kind in accounting system. So Rial and quantitative information related to consuming natural resources is also easily controllable.

b) defining and using budget systems based on responsibility and/or at least main environmental costs are determined and announced in budget stage separately and clearly.

c) Using methods of environmental evaluation such as evaluation based on activity that can reflect actual consumption in the best way by allocating environmental costs to responsible centers using measured bases. But it is suggested to perform this method gradually along with limited selection of environmental costs.

d) Recommendations for executive managers:

-Considering and entering main environmental costs in projects evaluation process

-Improving and reforming the methods of recognizing and managing main environmental costs

-Finding chances and innovations to decrease consuming natural resources and minimize wastes

-Using more information and specialty of accountants in the field of promoting environmental responding

-Evaluating environmental operation of key personnel regarding determined functional measures and creating motivation in them in order to improve their functions by encouraging incentives

e) Following establishment of Iran Management accounting association or every other systems propagating new methods of management accounting.

f) Holding the course of management accounting in B.A degree and improving educational systems of this course in M.A and Ph.D degrees by increasing class hours, employing experienced professors, updating the articles of this course in order to include new methods of management accounting and coordinating educational subjects and society needs more and more.

g) Translating and writing suitable and useful books and article in the field of management accounting especially methods of environmental management accounting.

h) Holding congresses and seminars by aim of introducing and explaining EMA methods for Managers, university personnel and related structures.

Recommendations for Future Researches

a) Environmental management accounting methods can be used in several production and service organizations, public and private systems, in small and big measures. The area of this research includes production companies; members of Tehran stock market that the results obtained from it can't be transportable to all country economic units. So, it is suggested to perform this research in other companies especially service or official units.

b) In this research the factor of "external pressure" was determined as a factor effecting on adopting EMA methods. Logic measure of the research, opinions and viewpoints of some production companies personnel. But to understand this subject that why this pressure isn't available, it is suggested to gather and analyze stockholders, government, structures and several companies' views about the answer of this question.

c) It is suggested to research methods of encouraging and formal obligating of accountants in order to participate in environmental operation management.

d) It is suggested to study the environmental methods and innovations of organizations in the field of accounting in Iran and through the world in order to decrease consuming natural resources and improve environmental operation.

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