Considering the role of Marketing Information System on Elevation of Efficiency

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ABSTRACT

This paper considers the role of marketing information system on the elevation of efficiency of market for food producer companies (food sauce and dressing), their head-offices are located in Tehran. All superior directors, middle directors and sales experts of these companies are sample community of this research and 74 companies are defined by Cochran formula as the statistical sample. The research is done by measurement type of descriptive method. The information gathering tool of the questionnaire ascertained that the questionnaire should be distributed among addressees after assessment of permanency values. Answers were analyzed by means of SPSS 18 software and Liserel software after gathering questionnaires. The results of theory tests indicate that there is a meaningful and direct relation between four aspects of marketing information system and elevation of efficiency of market in food producing companies that their head-offices are located in Tehran. The result of regression analysis shows that marketing information system has a direct and meaningful relation with all variant aspect of market. From impression viewpoint, marketing information system has the most effect on satisfaction of customers with line coefficient 0.48. Variants of cost reduction with (0.442), sales increase with (0.40) and market share with (0.389) are affected by information system of market respectively.
KEY WORDS: Marketing information system, Market efficiency, Customer satisfaction, Market share, Sales and Reduction of Costs

INTRODUCTION

The first description of marketing information systems is revealed by Good and Cox in HBR Magazine in 1967 in which marketing information systems are mentioned as a collection of trends and methods to gather information regularly and to analyze information to use in marketing decisions. This description is beyond preparation systems that control stores and orders. They introduced two main systems including: supportive systems and operational systems. The concept of marketing information system was the first part in which the management information system pointed as a basic requirement for information system[11]. Philip Cutler discussed about marketing nervous center in 1996 and explained that a company can use computers separately for its marketing purposes. Cutler also believes that a marketing information system includes people, equipments and methods to gather, classify, analyze, assess and distribute correct information for decision makers of market. The duty of marketing information system is to assess, develop and distribute information.[5] Cutler developed his idea in 1997 and explained that this system begins from marketing managers and ends to them too. The system contacts with these managers to provide their information requirements, then this information will be processed by internal resources of the company, marketing informative activities and marketing research process. Prepared information can be used after analysis, and at last the system returns processed and prepared information to these managers in an appropriate time to assist them to program, execute and control information marketing.[6] Kimball described the system as following: marketing information system is a continues, formal, flexible and comprehensive system which is represented to provide an organized information flow to aid marketing decisions. [7]

To understand success factors and measurement criteria, you need to have a right perception about the targets of your company. A new established company that intends to import its products to the market has certainly different targets in comparison with a big company that tries to make close relation with its customers. But all entities who intend to select appropriate criteria to assess efficiency of market should regard the factors which include positive effects of following three concepts: attraction of customers, saving customers and income. According to mentioned matters, in-time decision making and using opportunities by managers are important subjects to have a successful business. The competition of most of the companies in the market is to take a stable

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and permanent situation. The target of this competition can be described as distinction and going forward; so increasing efficiency of marketing and decreasing costs are two important factors to achieve more points in the competition. Efficiency of marketing will be fulfilled at the time that a comprehensive and strong information system is accessible to take advantage appropriately. On the other hand, execution of a customer-based strategy requires performance and use of information systems among various fields of time including marketing. For this reason, this research shows that considering the role of marketing information system on elevation of efficiency is necessary and important.

According to above-mentioned subjects, following is the most important subject that this research tries to discuss:

How much is management information system effective on strengthening aspects of efficiency of market in under study companies?

General target of this research is to define the role of marketing information system to elevate efficiency of market in food producing companies that their head-offices are located in Tehran. Minor targets of this research are to define the role of marketing information system to increase the sale, to increase satisfaction of customer, to increase market share and to decrease costs.

Background of research (literature of research):
Marketing information system:

Marketing information system is a tool that is designed to support managers to make decision about marketing. Rapid development of markets requires rapid decision and reaction. An effective marketing information system saves the information about changes and situation of market and deletes additional environmental information. An appropriate marketing information system solves the problems of most of the managers who face due to a lot of incorrect information in an inappropriate place and time or when there is not enough correct information about a specific date and place. [2]

Moreover, marketing information systems help marketing managers make their decisions by means of any relation between productive units and sections. For example sales forces gather information about the perception of customer about a new product and marketing information systems distribute this information among product development groups. Marketing information systems raise the capability to reaction against active business environment. For example, companies can change the price of their products according to information gathered from their retail sellers to have a good reaction against their competitors. Marketing information system can also be used to arrange, save and manage data efficiently. For example, data may be classified according to the type of shops, customers or competitors who act in a specific market. Effective marketing information system improves services directly by making changes in products or increases indirectly the responses to requirements of customers. For example, new requirements of customers and their orders can be distinguished rapidly for performance by considering reports.

Marketing information system is a system that improves decisions of managers. In this direction, the significant role of computers and their secondary systems to import, process, output and artificial intelligence has increased more and more. More powerful users to use secondary systems will improve managing activities in the organization. Generally marketing information system improves efficiency of organization that is a competitive advantage. Marketing manager usually faces two main problems: sometimes required information is not accessible at all and sometimes information is too much. Some part of information is statistical that has no efficiency to make decision at present time but may be useful for future decisions. So it is better to pay more attention to gathering and saving information to make appropriate decision for present and future. Marketing information system includes organized stages during which the information will be gathered, classified, analyzed and arranged and may be used regularly inside and outside the company. Marketing information system can analyze statistics and offer new theories and calculate the trend of changes in order to define appropriate patterns to achieve desirable suggestions. It should be mentioned that marketing information system is not efficient lonely and marketing managers should define required information. As an important point, if achieved information is not efficient, meaningful and in-time, it will not be profitable for marketing decision making. For this reason, the researching companies try to gather new information to provide their much and little requirements in decision making. [3]

One of the basic steps to gather marketing information is to establish a marketing information management system in the organization. The target to create such this system is to reveal required information to managers to make better decisions. This information can be gathered from internal and external resources of the company. It is important to gather suitable and required information in an appropriate method and to represent it to managers in a way to help them make better decisions. As it is shown in the figure, internal data sources, marketing researches, marketing spying, and analyzing current data can be referred to prepare required information. Pay attention that

marketing information management system is not merely an information system based on information technology, but it is a comprehensive information system which can be established by means of information technology if required. Such these systems can affect the efficiency of company to a great extent and even distinct the company against its competitors as a strategic success factor.

Figure 1: marketing information system[3]
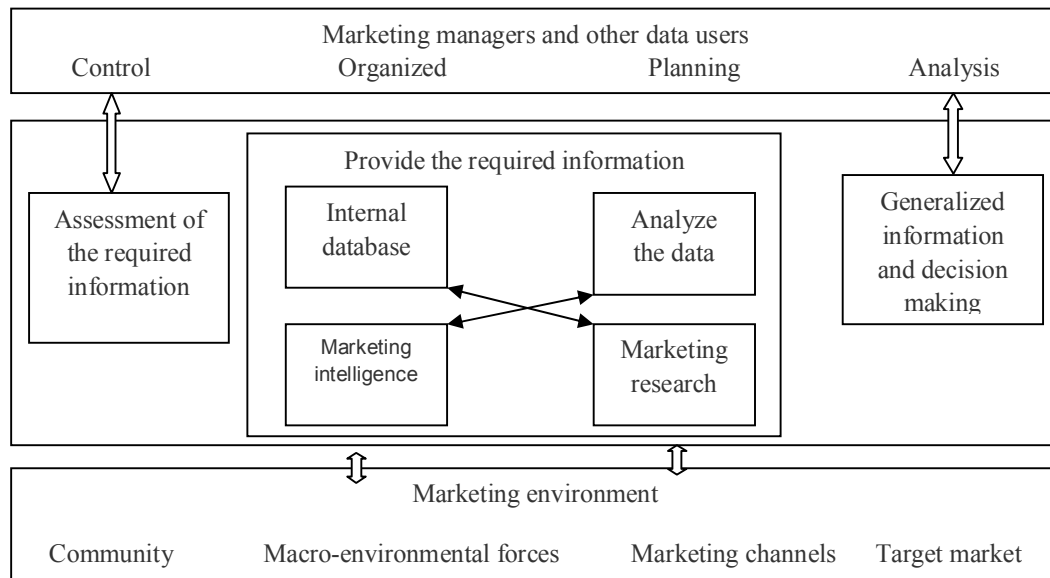
Market Efficiency:

Affecting market efficiency is one of the functions of this system. Efficiency or output is the ratio of real efficiency to standard efficiency (expected) or in other words, the ratio of done work to expected work. Based on physical rules, efficiency as the quotient of current capacity to nominal capacity never reached 1 and is always less than 1 in all machines (close and mechanical systems), but in human (open system) this quotient can be more than 1 because of motivation and leadership.[10]

Market Efficiency Dimensions:

According to a study under the title: "Strategic marketing and business performance: A study in three European engineering countries", the dimensions of market efficiency are mentioned as sale increase, customer satisfaction, market share increase and cost reduction. [12]

Market share:

Market share is some part of the entire market which belongs to our company and the company prepares, arranges and performs its marketing programs to meet its requirements. Market share is one of the most important criteria for quantitative assessment and measurement that shows the situation of an organization in comparison with its competitors and can be referred to assess the rate of success or fail of all organizations. [1]

Customer satisfaction:

Efficiency and advantage of organizational processes are an uprising argument. This question should be answered based on scientific studies that how to improve efficiency of organizational processes? Authorities believe that one of the methods to increase efficiency of an organization is to improve the quality of services in order to provide expectations and requirements of customers. "Useful for customer" is a common description of "quality". Deming, a pioneer leader of TQM movement, believes that quality is equal with satisfaction of customer. So satisfaction of customer can be mentioned as one of the criteria for organizational efficiency processes.

Cost:

Economical costs include definite costs and implicit costs. Definite costs include real costs of productive unit for any purchase and employ productive factors. Implicit costs depend on value of productive factors that are employed by productive unit in any productive activity. Value of these productive factors are assessed and calculated according to their best performance. Productive unit should pay for any price production factor equal with its the best performance. This method is known as "opportunity cost theory". [4]

Sale:

Total desire of each company is to increase its sale and profit. Programming to increase sale and to define a suitable strategy requires to know product life cycles. Most of the products pass various stages during their life cycle and have different growth rate in any stage. This process is called "product life cycle".

Review studies:

Lin Si & Hon Si (2009) suggests a marketing information system in his research during which target-based methods to classify customers and functions in an active way can be performed for further considerations. Due to various personal behavior of consumers, recognition requirements and personalities, more study about classification methods of customers may be attractive and useful. Because customers change during the time, using active data methods can be analyzed effectively and be arranged actively according to behavior of customer. The results of research of M. Zhiang Zhun (1999) showed that marketing managers believe that marketing strategic function is very important. Most of the strategic functions are performed actually in most of the companies. Yet, applied programs of marketing information system focus on current function of marketing instead of supporting strategic function. A marketing information system should focus on external environment consideration, strategic analysis and processes in order to reinforce marketing managers. Gonaris Panirigaris (2007) says: According to assessments, suggested criteria and methods for measurement are acceptable and valid criteria to assess efficiency the marketing information system. He also shows that marketing information system may have a share in efficiency of organization. Butry-A and Butry-E (1990) in their paper suggest three main ways to design a decision making support system and advantages and disadvantages of these ways including: descriptive method, positive tendency and phenomenology, organizational culture remarks, space and structure which are reflected in organizational development samples and writings. Nevertheless, researchers distinguish that there are two separated sub-systems in MIST both of which can be developed according to a different pattern. The last part of paper describes that how a decision making support system was designed in the UK for 800 producers and 20000 products to buy non-deteriorating foods. Sax Jarui and Talvin (1992) say that technical integration in marketing systems is necessary because most of the employees require sub-systems of marketing information system and this will bring better services and more advantages. The meaning of functional integration is very important and designers of marketing information system should be more and more informed of possibility of efficiency of MkIS by integrating marketing processes creatively. The pre-requirement of this situation is recognition and cooperation between designers of MkIS and marketing staff. Kulagit (1996) says: Marketing information system technology (MIST) is a method to create SCA by means of information technology during the functions of marketing. As MIST is capable to create SCA, it has not been exploited in banking industry in the UK and Ireland. According to the importance of this opportunity, this paper presents practical documents and proves to show that how retailer banks are able to use MIST successfully and take advantage. As the result, mentionable point is three types of relation of crossing methodology. Obvious relations in this paper are marketing chart, organizational structure and experience in the organization. Amaravad Vas Amadar (1999) analyses that which development in marketing and sale will be possible by execution of marketing information system to support marketing management process. He investigates accurately to define applied sub-systems for marketing information systems to improve efficiency of execution and control of marketing efforts. Mahmoodreza Elahi-Fard (1995): A marketing information system in Alborz Co. increases efficiency of the company. Designing a marketing information system provides the possibility to assess fields of competition among different commodities and also to anticipate behavior of customer. Reza Shafei (2000): In selected companies, a sale and marketing information system increases their selling rate. This research insists on the necessity of creation of a marketing awareness system and reaches this conclusion that creation of marketing and selling information systems will facilitate services, provide the possibility to anticipate behavior of customers, increase satisfaction of customers and provide the possibility to anticipate behavior of competitors. Ali Kanani (2005): In designing marketing information system, SSADM structural methodology with "up-to-down" approach is used. According to this under study methodology in analysis stage, the circumstances of system including all requirements are distinguished and an appropriate information system conceptual model is designed according to these circumstances. Mohammad Panahi Nikoo (2005): More interaction between managers and consumers and other members outside the organization to recognize environmental requirements, to consider market researches and to remove any gap between the perception level of parties, will define the importance of management information systems and will make significant the readiness of different parts of organization for any changes to have better reaction and in order to reach the target, that is rendering services. It is suggested that insurance companies enjoy the results of vast researches in the field of structural changes and coordination of structure with strategies in framework of management information systems. Siamak Charsoughi (2006): Organizing a marketing professional committee is

the most important policy which car manufacturing companies should take to install marketing information systems in order to investigate all sub-systems of marketing information system and to classify these systems and also to use the experiences of other car manufacturing companies which have installed marketing information system.

Research Questions:
Main question: Will marketing information system elevate the efficiency of market in food producing companies?
Secondary questions:
1- Will marketing information system increase the income of market in food producing companies?
2- Will marketing information system increase satisfaction of customers in food producing companies?
3- Will marketing information system increase market share for food producing companies?
4- Will marketing information system decrease costs in food producing companies?

Theoretical framework and research analytical model:
After considering various models of marketing information system and efficiency of market, dimensions of marketing information system, data analysis, information gathering, decision making, control [15] According to a study under the title: "Strategic marketing and business performance: A study in three European engineering countries", the dimensions of market efficiency are mentioned as sale increase, customer satisfaction, market share increase and cost reduction. [12]

Figure 2: Perpetual model of research
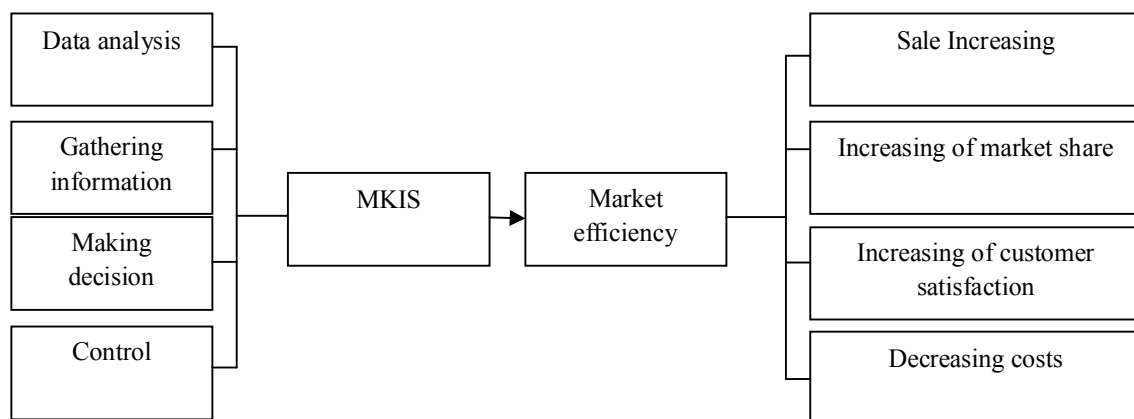
Study method and tools to gather information:
From the viewpoint of target, this study is a kind of applied studies and from methodology it is a kind of measurer descriptive researches in correlation branches. It is also a kind of correlation studies due to relation between variants and is a sectional study due to gathering information. Field and library studies are enjoyed to gather information in this research.

Permanency and admissibility of questionnaire:
To assess permanency and admissibility of questionnaire, at first step the questionnaire was distributed among 30 persons, and then the answers were used to assess permanency and admissibility of questionnaire.
Permanency:
Cronbach's alpha method and spss 18 software were used to measure permanency of questionnaire. Cronbach's alpha correlation index is an amount between zero and one. If the amount of Cronbach's alpha is more than 0.7, the questionnaire is permanent and if this amount is near to 1, the questionnaire has higher permanency.
According to the results, it is distinguished that Cronbach's alpha index for this questionnaire of marketing information system is 0.94 (data gathering 0.847, data analysis 0.803, making decision 0.764 and control 0.814) that shows this questionnaire has a high level of permanency. Alpha index is 0.898 for the questionnaire of market efficiency (cost reduction 0.855, sale increase 0.855, market share 0.901 and customer satisfaction 0.878) that shows questionnaire of market efficiency has enough permanency.

Admissibility:

To consider admissibility, at first each questionnaire was approved by experts and then the exploration and confirmation factor analysis method and KMO criterion were used. Calculated factor loads for questionnaire of marketing information system for all aspects are more than 0.5. All of these factors show that management information system questionnaire has a high level of admissibility.

KMO index is calculated 0.865 which shows that correlations are suitable for factor analysis. About the market efficiency questionnaire, calculated agent loads is 0.849 for dimensions that refers to high admissibility of questionnaire.

Statistic community:

The community of recent research includes all staff working in marketing and sale sections of food industries (including supreme manager, middle manager, sale expert) in 2011, the head-offices of which are located in Tehran. According to information achieved from Ministry of Industries and Mines about "the list of active manufacturers of industrial products with production license of Ministry of Industries and Mines", 92 companies are among statistic community of this research.

Statistic sample and sample volume:

Selection of a sample is very important and basically greater samples are closer to the characteristics of community, so generalizing the results is more logistic. A good sample is the one which is economical and refers to the entire society. Following formula is used to assess sample volume in this research:

Formul 1) Statistic sample and sample volume

$$n = \frac{\delta^2 N \ Z^2_{\frac{\alpha}{2}}}{\varepsilon^2(N-1) + \delta^2 \ Z^2_{\frac{\alpha}{2}}}$$

$$n = \frac{92 \times 1.96^2 \times 0.5 \times 0.5}{0.085^2(92-1) + 1.96^2 \times 0.25} \approx 74$$

74 companies are included in the research based on this formula. While testing the questionnaire for some of the companies, it is seen that 3 questionnaires can be collected from each company averagely. It can be said that statistic community has about 210 members and as the result and according to sampling formula, 210 people among all marketing and sale staff make statistic sample of the research

METHOD OF STATISTICAL ANALYSIS:

Model of structural equations is used in this research, that means causation relations of marketing information system and efficiency of market will be assessed through standard coefficient, and the meaningful number will be calculated by means of Lisrel 5 software according to which the decision to accept or reject the theories will be made. Totally, the first and second grade agent analysis (measurement models) and also direction analysis (structural equation model) are used. At first, first and second grade agent analysis was used for market efficiency concept and first and second grade agent analysis was used for marketing information system concept to assess admissibility of questions, then through the route analysis the causation relation between marketing information system and market efficiency was assessed. Lisrel software has three advantages: 1- confirmation agent analysis 2- route analysis 3- proportion. This research enjoys all these three advantages.

Population Description:

Among 210 interviewees, 131 people (62.4%) are men and 79 people (37.6%) are women. 52 people (24.8%) have 30 years old and younger, 81 people (38.6%) are in 31-40 years of age, 55 people (26.2%) are in 41-50 years of age and 22 people (10.5%) have 51 years old and older. 24 people (11.4%) have high school diploma and lower, 95 people (45.2%) have BSc degree and 91 people (43.3%) have MSc degree and higher. 20 people (9.5%) have less than 5 years working experience, 51 people (24.3%) have between 6 and 10 years experience, 65 people (31%) have between 11 and 15 years experience, 46 people (21.9%) have between 16 and 20 years experience and 28 people (13.3%) have more than 21 years working experience. 77 people (36.67%) are experts, 56 people (26.67%) are middle managers and 77 people (36.67%) are supreme managers.

The situation of system about marketing information and market efficiency in considered companies:

To assess and measure variable of marketing information system and its dimensions, totally 15 indicators were designed in serial assessment level and in Lickert spectrum shape as multiple choice questions. There are also 15 indicators with Lickert spectrum to assess market efficiency variable and its dimensions.

Table 1: situation of dependant and independent variables of research

Test number =3								
Variable	Dimensions	Average	Criterion deviation	Sig	T	Lower limit	Higher limit	Situation of variable
Independent (marketing information system)	Data collecting	3.42	0.977	0	6.250	0.288	0.554	Good
	Data analysis	3.27	0.928	0	4.219	0.144	0.396	Good
	Decision making	3.24	0.993	0	3.543	0.107	0.378	Good
	Control	3.29	0.943	0	4.479	0.163	0.420	Good
Dependant (market efficiency)	Cost Decreasing	3.16	1.026	0.021	2.331	0.025	0.304	Good
	Sale Increasing	3.21	0.837	0	3.709	0.100	0.328	Good
	Market share	3.20	0.866	0.001	3.466	0.893	0.325	Good
	Customer satisfaction	3.30	0.826	0	5.367	0.193	0.418	Good

Confirmation route analysis according to model of structural equations

In order to be assured from presence or absence of any causation relation between variables of research and to consider proportion of data with research model, theories of research were tested by means of structural equation model. As it is seen in the diagram, the output of software shows the proportion of structural model while performing structural equation model to test the main theory (the ratio of x^2 to df is less than 1 so the amount of x^2 is low and structural model of research is appropriate according to RMSEA=0.053, NNFI=0.97, NFI=0.95, CFI=0.98, GFI=0.98, RMR=0.043 and AGFI=0.89). In other words, achieved data is according to research model.

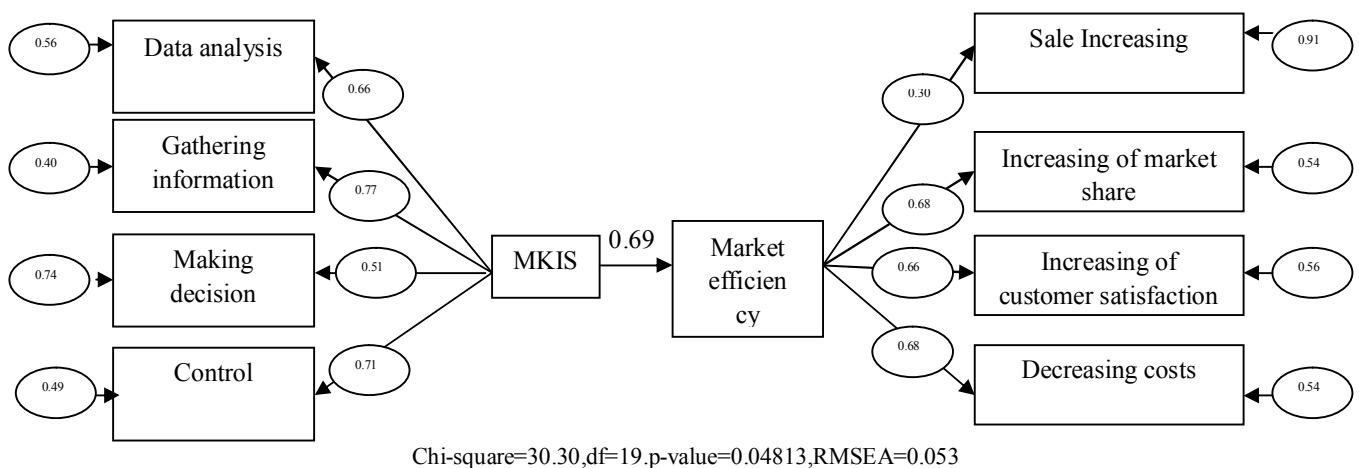Chart 1: Meaningful numbers of structural model

Chi-square=30.30,df=19.p-value=0.04813,RMSEA=0.053

Chart 2: Standard estimation coefficients of structural model

Chi-square=30.30,df=19.p-value=0.04813,RMSEA=0.053
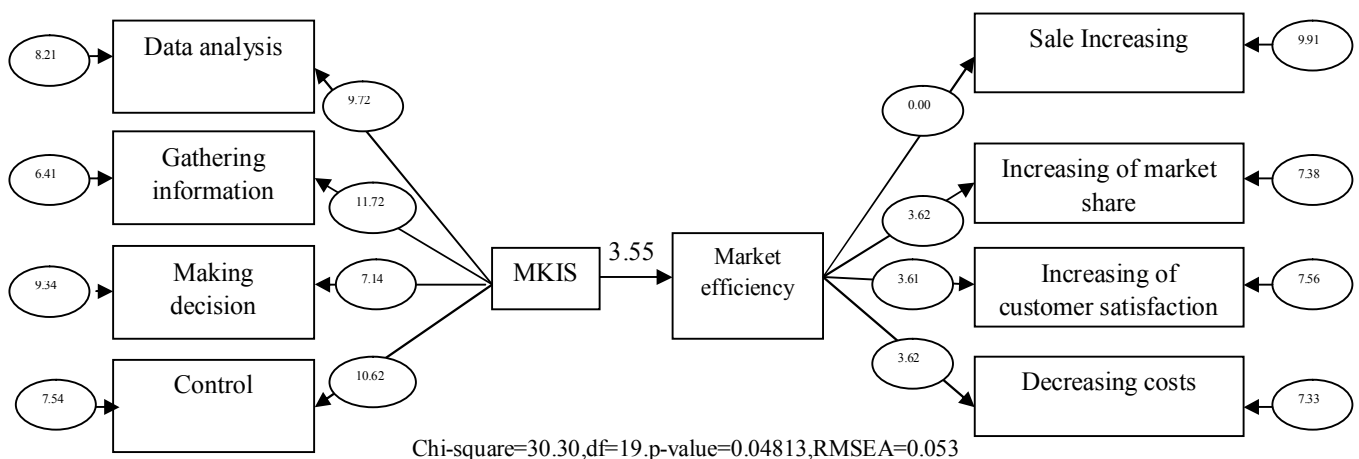
Table 2: Indicators of structural model

Result	Desirable amount	Indicator
1.594	<3.00	X^2/df
0.97	>0.90	GFI (goodness of fit index)
0.053	<0.08	RMSEA (root mean square error of approximation)
0.043	<0.05	RMR (root mean square residual)
0.95	>0.90	NFI (normal fit index)
0.97	>0.90	NNFI (non-normal fit index)
0.98	>0.90	CFI (comparative fit index)

Simple linear regression:

Results of structural model (chart 1) showed that marketing information system has a positive and direct effect on market efficiency. In this part we use simple linear regression to test secondary theories of the research and also to define the rate of effect of marketing information system on each of the aspects of market efficiency variable.

Main theory: Marketing information system increases market efficiency

According to chart 1, the relation between output variable (marketing information system) and input variable (market efficiency) is 99% meaningful in level of confidence (P<0.01).

First secondary theory: Marketing information system increases sale rate in food producing companies.

According to table 3, amount of ANOVA is 0 which is less than 0.05 and shows a linear relation between marketing information system and sale increase.

Second secondary theory: Marketing information system increases customer satisfaction in food producing companies.

According to table 3, amount of ANOVA is 0 which is less than 0.05 and shows a linear relation between marketing information system and customer satisfaction.

Third secondary theory: Marketing information system increases market share in food producing companies.

According to table 3, amount of ANOVA is 0 which is less than 0.05 and shows a linear relation between marketing information system and increasing of market share.

Fourth secondary theory: Marketing information system decreases the costs in food producing companies.

According to table 3, amount of ANOVA is 0 which is less than 0.05 and shows a linear relation between marketing information system and decreasing of costs.

Table 3: Theories and results of regression test

Theories	ANOA (sig)	Improved definition coefficient	Standard β coefficient	Regression sig	Confirmation or rejection of theory
Secondary 1	0	0.156	0.40	0	Confirmed
Secondary 2	0	0.226	0.48	0	Confirmed
Secondary 3	0	0.147	0.389	0	Confirmed
Secondary 4	0	0.192	0.442	0	Confirmed

Findings of Research:

The result of regression analysis indicates that marketing information system has a direct and meaningful relation with all aspects of market efficiency variable. From effectiveness viewpoint, marketing information system has the most effect on customer satisfaction with route coefficient (0.48). Variables of cost decrease with (0.442), sale increase with (0.40) and market share with (0.389) are influenced by market information system respectively.

Conclusion

The purpose of this study is marketing information system improves elevation of efficiency.Main theory was rejected in governmental banks was approved in private banks marketing information system has a positive and direct effect on market efficiency.

A large study conducted in the field of marketing information system in recent years. Mahmoodreza Elahi-Fard (1995): A marketing information system in Alborz Co. increases efficiency of the company. Designing a marketing information system provides the possibility to assess fields of competition among different commodities and also to anticipate behavior of customer[7]. Reza Shafei (2000): In selected companies, a sale and marketing information system increases their selling rate. This research insists on the necessity of creation of a marketing awareness system and reaches this conclusion that creation of marketing and selling information systems will facilitate services, provide the possibility to anticipate behavior of customers, increase satisfaction of customers and provide the possibility to anticipate behavior of competitors[14]. Siamak Charsoughi (2006): Organizing a

marketing professional committee is the most important policy which car manufacturing companies should take to install marketing information systems in order to investigate all sub-systems of marketing information system and to classify these systems and also to use the experiences of other car manufacturing companies which have installed marketing information system.[13]

While performing the research, it was obvious that marketing information system elevates market efficiency, and also marketing information systems help marketing managers take such these decisions by means of the relation between executive units and sections and composing them. Marketing information systems are the tools which are designed to support managers in their decisions. Fast growth of markets necessitates rapid reaction and decision. An effective marketing information system saves some information related to changes and situation of market and at the time, removes additional unrelated information which is achieved by environmental reports. An appropriate marketing information system solves most of the problems that many managers encounter about a lot of incorrect information in an incorrect time and place or when there is not enough and correct information in a specific time and place. For this reason, it is suggested to represent best method to use marketing information systems and their sub-systems to managers continually in order to have more effective systems. Effective answering of marketing information system and other information systems to the personnel and also accessing the targets to recognize and remove requirement of customers should be paid more attention in programs and strategies of the organization. To improve function of personnel and to enjoy marketing information systems in a desirable way, it is suggested to managers to use bonus and reward against function of personnel in marketing and sale process to establish a compensation discipline. Taking correct information is the most important aspect in having and using information, so it is suggested to prepare data input sub-systems based on intra-organization analyzed reports and data such as marketing studies, marketing decisions and strategies and relation between various units and also ultra-organizational environmental reports such as target market, competitors and society to provide appropriate information for appropriate person and in an appropriate time and place to take the best decision and to establish the best marketing strategy. This is a step to reach organizational targets.

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