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**ANALYZING STRATEGIES FOR DEVELOPMENT OF AGRICULTURAL  
ENGINEERING, TECHNICAL AND CONSULTING FIRMS (AETCFs)**

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**ABSTRACT**

Privatization approach is one of a number of promising new and alternative management approaches that have emerged in recent decades for agricultural development. Development of consulting services firms in agricultural sector is an optimal solution to agricultural development of Iran. For this purpose, one of the measures taken by the country's agricultural development planners and policymakers is establishing the network of agricultural engineering and technical consulting services firms (AETCSFs) in terms of outsourcing agricultural services and extension activities. The purpose of this paper was to analyze strategies for development of AETCFs in Hamedan and Malayer County of Iran. For this purpose a multiple case study was used in the mentioned counties. This study was an applied research the method of which is based on survey method. Statistical population of the research consists in 8 firms in Hamedan and 9 firms in Malayer and 102 members of AETCFs, which is done by census. The research instrument was a self-made questionnaire. Questionnaire validity was approved by a panel of experts while the Cronbach's alpha method was utilized to secure its reliability that Cronbach's alpha test score was calculated 0.74 which shows the desirable situation. In analyzing data, it is used from different method; especially from Factor analysis (Amount of KMO is equal to 0.743). The results showed that strategies for development of AETCFs can be categorized in 6 factors; incentive-supportive, making necessary situation, quality improvement, education and learning, local capacity and organizing. In the whole, about 68% of total variance was explained. It can be concluded that there isn't enough support of the real privatization and AETCSFs.

**Keywords: Agricultural privatization, Strategies, Consulting firms, Agricultural services, Firms promotion.**

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## INTRODUCTION

With regard to the policy framework for public and private agricultural delivery services, it is clear that some policies and actions do not support effective services. On the other word, there is growing conflicts between public and private with respect to agricultural engineering and technical consulting services. Together, these considerations raise important questions about the appropriate strategies in agricultural engineering and technical consulting services, and need for interventions, and implementation of new policy prescription and instruments.

In recent years, Agricultural section in different countries, especially developing countries encountered to different challenges like population increase, increasing pressure to produce enough food for them, lack of access to knowledge and modern technology by farmers, low efficiency of governmental organizations and institutes, such as organization of agricultural extension, to transfer new information and knowledge to farmers and other persons (Rezayi, 2009).

Privatization, for the first time, was introduced to Iran in 1983 and was followed then in 1989 but First Program. Since income gained by oil and Gas needs to be allocated and spent, and this is one of the task of the government, for decreasing

government advance in economy, privatization was introduced in Iran (Rasouli, 2006).

Considering decentralization and privatization policies in agriculture section, several activities have been done among which it can be referred to interference reduction of government in the affairs of private section and establishment of farming businesses in the country. In Iran, forming these businesses have been started from the year of 2001, by the support of Agricultural Ministry and in the form of private section of AETCFs (Hashemi &Hejazi, 2011).

Different reasons play role in introducing privatization in agriculture extension. The first and main reason is the reluctance of government in expending money and time for extending and educating agriculture, in some countries. The other reason is government inefficiency in agriculture promotion. The effect of government promotion system has been always disappointing. The other main factor is the commercialization of agriculture. Recently, some countries like India, converted their agriculture level from being for subsistence to being a commercial agriculture (Biglarian, 2002).

Hanchinal et al. (1999) performed a research on the privatization of agricultural

services about the attitudes and trends of promotion employees in Karnataka state of India. In this research almost all of the employees agree upon the effectiveness of privatization in agricultural services. It should be also mentioned that the attitude average of private centers employees (93.36%) about privatization in agricultural services, was more than employees of governmental promotion (79.87%).

Research results of Bloome (1993) didn't foresee a bright future for agricultural services in different understudied region considering experts, managers, and clients viewpoint toward consulting services of private promotion in New-Zealand and Tasmania. According to the managers of agricultural organizations, fee-based promotion policy debilitated promotion services in Tasmania. Organization employees also stated that the new system of agricultural services reduces their direct contact with farmers and also reduces their information resources. Based on this research, since the beginning of commercial consulting services in New-Zealand in 1985, the number of clients and professional employees of promotion services were reduced up to 50%.

Zarafshani et al. (2010), in a research, analyzed farmers expectations who were the members of AETCFs, through a descriptive-surveying method. The results

of this research showed that farmers' expectations from supervisor engineers can be divided in five categories of behavior, technical, educational, related to plan, and availability of resources which their priorities are as it was mentioned.

Rezayi et al. (2011), identified the obstacles for entrepreneur development in AETCFs. Method of surveying-descriptive research were be used for data collecting. This research results showed that about 68.86% of these obstacles consist in five factors of structural, environmental, psychological, skill, and educational respectively.

Mandler (2010) studied about fundamental requirements and preconditions for success of consulting services firms in Tajikistan. His research results stated that understudied services firms were not successful in achieving their goals and they couldn't gain the consent of their clients. According to the research on cost reduction of supplied services, some of the effective factors on the farmers' satisfaction improvement in using consulting services more and more, are as follow: governmental support of farmers for providing some of the cost of services, special situation of firms considering availability for farmers and attitude improvement of farmers toward consulting firms.

Miraniand & Memon (2011), in a research on farmers evaluation from public and

private consulting services in Heidar-Abad of Pakistan, concluded that farmers don't receive new agricultural information and methods, therefore consulting services can convey these information to them. Also, the research results showed that encouraging farmers to participate in seminars and educational workshops can increase their knowledge and information.

According to Chipeta (2006), consulting services are those activities which bring new knowledge to the farmers and help them to formulate and develop agricultural and management skills. He concerns these services as promoting information, training and consulting to the farmers individually or in groups, testing new techniques in farms and developing farm management tools.

Rasoul-Azar et al. (2010) in a research on the efficiency of agricultural consulting services of wheat supervisor experts to the farmers of West Azerbaijan Province concluded that agricultural consulting services of supervisor experts have been effective considering technical knowledge and professional skills of farmers. Also, results showed that farmers, who received consulting services, had better attitudes toward supervisor experts.

In Hamedan province, wheat is the most important crop which is cultivated in

almost 50 percent of total arable land every year. Annual total products of agricultural sector in Hamedan was more than 5 million tons that 5 percent of agricultural production of Iran (Hamedan Jihad of Agriculture Organization, 2014). So, agriculture is the main economic activity and principal land use in the Hamedan and Malayer counties that main crops being wheat and barley. (Hamedan Provincial Government, 2011). However, Analyzing strategies for development of AETCFs for improving services quality level and attaining the consent of villagers and their effective relation with governmental organizations should be considered seriously, and different strategies in different aspects of management, structural, educational, economic and legal which firms are confronted with, should be analyzed. Since there isn't any research on this field, this research performed with the purpose of Analyzing strategies for development of AETCFs in Hamadan and Malayer counties.

## **MATERIAL AND METHODS**

Hamedan province is located in the west of Iran and has a cold semi-arid climate with an annual rainfall of 340 mm. The study area lies between latitude 33° 59' and 35° 48' N and longitudes 47° 34' and 49° 36' E Greenwich Meridian.

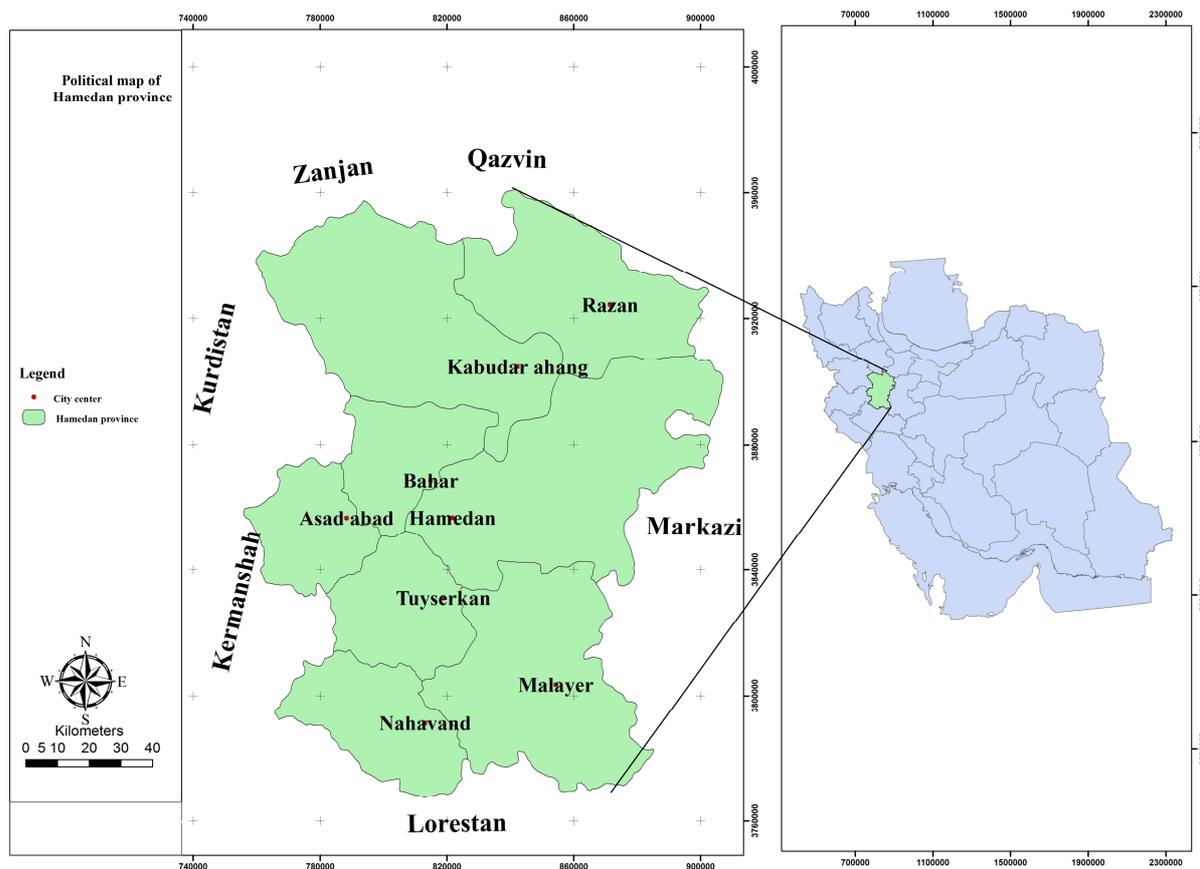


Figure 1: Map of Study Area

This study was an applied research the method of which is based on survey method. Statistical population of the research consists in 8 firms in Hamedan and 9 firms in Malayer and 102 members of AETCFs, which is done by census. The research instrument was a self-made questionnaire which included of two parts; first part consists of questions about individual characteristics of the respondents, and the second part asks about the strategies development of Agricultural Engineering, Technical and Consulting Firms. Questionnaire validity was approved by a panel of experts; while the Cronbach's alpha method was utilized to secure its

reliability. Due to nature of questions and high literacy level of participants, questionnaires were filled through mailing. Reliability of the study were analyzed by Cronbach's alpha test and a reliability coefficient of 74% was calculated which shows the desirable situation of the questionnaire variables and the way of measuring and analyzing data.

## RESULTS AND DISCUSSION

Considering the sex of respondents, 58.8% of the respondents were men and 41.2% were women, and in respect of academic education, 78.4% had bachelor and the remains had master. Work experience status of the respondents were as follow: 15

persons without any experience, 1 person with less than 2 years' experience, 35 persons with the experience between 2 to 5 years and 51 persons with more than 5 years' experience. Birth place of 74.5 % of the respondents were in city and the remains, in village.

Prioritizing strategies for development of AETCFs showed that the main strategies

for developing of firms are as follow: Stability in privatization policies of consulting services (Mean:4.46; SD: 0.715, CV: 0.160), establishment of firms based on regional request (Mean: 4.18; SD:0.741; CV :0.177), and using new techniques for educating farmers by firms experts.

Table 1: Prioritizing strategies for development of AETCFs

Items	Strategies		
	$\bar{x}$	$\delta$	CV
1 Stability in privatization policies of consulting services	4.461	0.715	0.160
2 Establishment of firms based on regional request	4.186	0.741	0.177
3 Using new techniques for educating farmers by firms experts	4.294	0.765	0.178
4 Improving the quality of provided education by firms experts	3.853	0.695	0.180
5 Allocating low-interest, long term loans to the firms	4.392	0.798	0.182
6 Benefit from trustees and local elders for keeping good relation of firms with farmers	3.490	0.671	0.192
7 Using the experiences of advanced farmers by firms experts	3.529	0.685	0.194
8 Encouraging and awarding grants to successful firms	4.441	0.885	0/199
9 Improving technical and professional skills of the experts	3.961	0.832	0.210
10 Diversification transferable services to the firms	4.010	0.850	0.212
11 Increase and acceleration of transferable job outsourcing in Jihad-e-Agriculture Ministry	4.265	0.922	0.216
12 Governmental support for firms Institutionalization in village population	4.029	0.884	0.219
13 Professional education for firms experts	3.686	0.832	0.226
14 Granting license sale of agricultural inputs to the firms	4.265	0.974	0.228
15 Granting tax exemption for consulting services firms	4.265	0.984	0.231
16 Professional education for Chief executive officer of the firms	3.745	0.887	0.237
17 Establishing two-sided relation between firm experts and farmers	3.618	0.868	0.240
18 Targeting governmental contracts with firms	3.745	0.941	0.251
19 Using the experiences of successful firms	3.588	0.916	0.255
20 Establishing suitable situation for the relation between firms with universities and research centers	3.658	0.980	0.268
21 Increasing the number of agricultural experts with different attitudes	3.118	0.947	0.304

Scale: very high=5, high=4, somewhat=3, low=2, very low=1

**Exploratory Factor Analysis**

The first step in exploratory factor analysis is evaluating KMO and Bartlett index. These indexes will be explained later and their results will be interpreted.

**A: Evaluating index of Kaiser-Meyer-Olkin (KMO)**

This index is an index of sampling adequacy analyzes the size of partial correlation between variables through which it identifies whether research

variable variance is affected by common variance of some hidden and fundamental factors. If the amount of index is close to 1, considered data are suitable for exploratory factor analysis; otherwise, the results of factor analysis (usually less than 0.6) are not suitable for considered data.

This index is yield through following equation:

$$KMO = \frac{\sum \sum r_{ij}^2}{\sum \sum r_{ij}^2 + \sum \sum a_{ij}^2}$$

Where  $r_{ij}$  is correlation coefficient between variables of  $i$  and  $j$ , and  $a_{ij}$  is the partial correlation coefficient of them. Kaiser-Meyer-Olkin (KMO) test score was 0.74 and significant level.

### B. Bartlett test

Results of Bartlett test are shown in table 2. As it is clear, if significant level of this test is less than 0.05, factor analysis would be suitable for recognizing structure (factor model), since the being unit of matrix correlation hypothesis is always rejected. Considered results are as following:

Chi-square value	952.277
Degree of freedom	210
Level of significance	0.000

As it can be seen, significant level of Bartlett test is less than 0.05 showing that factor analysis is suitable for identifying factor model structure, and hypothesis that correlation matrix to be known, is rejected. Following table is a revised table of statistics related to the extracted factors. First bloc consists of three columns under the name of Initial Eigenvalues which relate to the Eigenvalues of correlation matrix. Eigenvalue is value of total test variance which is evaluated through a special factor and total variance for each test is equal to 1 (100%). For example, eigenvalue for the first factor is equal to 15.97. Other Eigenvalues for the rest factors are provided in the column of sum. The second column, which shows variance

percentage, is the variance share percentage of that factor from the total variance. In this table, eigenvalues of 6 selected factors are all more than 1 and evaluate more than 60% of total variance which is significance for 6 factors: closer this value to 100, better the interpretation would be. Second bloc consists of three columns under the name of Total non-rotated factor coefficients. The third bloc consists of three columns under the name of Rotated factor solution which distribute variance among variables uniformly, unlike non-rotated one in which the first factor justifies more shares of variance (Bayazidi et al., 2011).

According to this table, Eigenvalue of six first factors is more than 1 showing that items related to strategies for developing of AETCFs generally consist of 6 factors which explain and cover variance of 68.865%.

This means the proper reliability of questionnaire questions. In third bloc, criteria for making decision are the rotated values. In this bloc, the first factor explains 15.97%, the second factor 13.43%, third factor 11.55%, fourth factor 10.70%, fifth factor 10.60% and sixth factor 6.59% of variance. That is to say, in research designed model, more than 68% of changes in dependent variable are explained through independent variables of the research. Then we have factor rotated matrix showing that

which index with which factor loading, relates to these factors.

**Table 3: Eigenvalues and total explained variance of development strategies of firms**

	Initial Eigenvalues			Total non-rotated factor coefficients			Rotated factor solution		
	Sum	Variance%	Cumulative variance %	Sum	Variance%	Cumulative variance%	Sum	Variance %	Cumulative variance%
1	5.110	24.334	24.334	5.110	24.334	24.334	3.354	15.971	15.971
2	2.666	12.695	37.029	2.666	12.695	37.029	2.821	13.434	29.405
3	2.463	11.731	48.760	2.463	11.731	48.760	2.426	11.551	40.957
4	2.041	9.719	58.479	2.041	9.719	58.479	2.249	10.709	51.666
5	1.156	5.506	63.985	1.156	5.506	63.985	2.226	10.601	62.266
6	1.025	4.880	68.865	1.025	4.880	68.865	1.386	6.599	68.865

**Table 5: Final factors that were explained strategies for AETCFs**

Factor	Selected name	Items	Factor loading
First	Incentive-supportive	Stability in privatization policies of consulting services	0.697
		Establishment of firms based on regional request	0.597
		Using new techniques for educating farmers by firms experts	0.696
		Improving the quality of provided education by firms experts	0.699
		Allocating low-interest, long term loans to the firms	0.700
		Benefit from trustees and local elders for keeping good relation of firms with farmers	0.639
Second	Necessary situation	Using the experiences of advanced farmers by firms experts	0.757
		Encouraging and awarding grants to successful firms	0.797
		Improving technical and professional skills of the experts	0.803
Third	Quality improvement	Diversification transferable services to the firms	0.670
		Increase and acceleration of transferable job outsourcing in Jihad-e-Agriculture Ministry	0.828
		Governmental support for firms Institutionalization in village population	0.604
		Professional education for firms experts	0.683
Forth	Education and learning	Granting license sale of agricultural inputs to the firms	0.813
		Granting tax exemption for consulting services firms	0.881
		Professional education for Chief executive officer of the firms	0.782
		Establishing two-sided relation between firm experts and farmers	0.678
Fifth	Local capacities	Targeting governmental contracts with firms	0.865
		Using the experiences of successful firms	0.792
Sixth	Organizing	Establishing suitable situation for the relation between firms with universities and research centers	0.785
		Increasing the number of agricultural experts with different attitudes	0.630

## CONCLUSION

## RECOMMENDATIONS

Based on findings, it can be concluded that there isn't enough support of the firms, so it can be concluded that agricultural services privatization theory as a dominant notion has not established in related practitioners of study area and. So from the viewpoint of respondents, the main strategies for developing of firms are as follows: Stability in privatization policies of consulting

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services, establishment of firms based on regional request, and using new techniques for farmer's education by firms experts. Factor analysis results of strategies for developing Agricultural Engineering, Technical and Consulting Firms showed that items related to developing strategies totally consist of 6 factors and these 6 factors explain 68.865% of strategies variance. That is to say, in research designed model, more than 68% of changes

in dependent variable are explained through independent variables of the research. This implies consideration of local capacity, technical, economic, social, institutional and incentive and supportive solutions in line with participation of all stakeholders in the decision-making process. Endogenous agricultural development in general, and participatory approaches in particular, are to be recommended. They have been developed to empower farmers. Local NGOs, self-help groups and/or producer organizations, and local stakeholders need to become more involved in agricultural services privatization. Participatory approaches will hopefully lead to a decision-making structure that is more informed and equipped to resolve problems; and consequently more accountable.

The best strategies for promotion of firms; were to empowering and encourage them, and also to provide suitable situation by government for their activities.

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