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Analyze of Predictive Model of Innovation Management in Processing and Complementary Industries of Livestock Products

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Abstract

The purpose of this study was designing predictive model for innovation management in processing and complementary industries of livestock products. The method of research was correlative descriptive. The population of this research was managers in processing and complementary industries of livestock products of Khouzestan Province (N=486). By stratified random sampling, a random sample (n=125) was selected for participation in the study. A questionnaire was developed to gather data regarding Innovation Management in processing and complementary industries of livestock products. Data collected were analyzed using the Statistical Package for the Social Sciences (SPSS). According to the results, the innovation management level in processing and complementary industries of Khuzestan province is not desirable. Therefore, practitioners should be required to provide increasing levels of innovation management. Results showed that variables such as income, competitiveness, accountability, risk taking, tend to be creative, level of education and attitude to innovation management played a critical role in improving innovation management

Keywords:
Innovation Management, Processing and Complementary Industries, Livestock Products

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INTRODUCTION

In the knowledge-driven economy, innovation has become central to achievement in the business world. With this growth in importance, organizations large and small have begun to re-evaluate their products and services to maintain their competitiveness in the global markets of today (Office for Official Publications of the European Commission, 2004).

Innovation is also a vital element in the success of small firms (e.g. those with less than 250 employees) (OECD, 2004). Such firms comprise the majority of businesses in most economies and have been recognized as a critical element in the national innovation system (OECD, 2004). Economic analysis of the relationship between research and development (R&D) activity, labor productivity and economic growth shows a significant correlation between these three elements (Crosby, 2000). Innovation allowing companies and economies to stay competitive in ever changing world markets. For all of the talk about the importance of innovation, innovation management and creativity in business, the topics are hardly generally well understood (Riederer *et al.*, 2005). Innovation in business has been studied by multiple researchers (Kleefl and Roome 2007; Kotelinkov, 2008; Kwamena, 2008).

This is recognized across the world and research suggests that a nation's innovation system is positively influenced by the level of investment in R&D, support for higher education, proportion of the workforce engaged in R&D, and the level of government support for innovation and commercialization (Porter and Stern, 1999). In order to be economically useful, innovation must translate into commercialization, which is the process of converting ideas and knowledge into applied outcomes typically as new products or business processes (Jolly, 1997). Also extension agents should also be encouraged to intensify innovation dissemination strategies so as to increase the level of adoption of available improved technologies of agricultural production (Nwaiwu *et al.,* 2012). Innovation can be classified using several different methods. Some apply in certain specific contexts, such as those frequently mentioned in our agricultural milieu (OECD, 2011).

Institutional innovation: These innovations, for our purposes, entail a change of policies, standards, regulations, processes, agreements, models, ways of organizing, institutional practices or relationships with other organizations, so as to create a more dynamic environment that encourages improvements in the performance of an institution or system to make it more interactive and competitive.

Technological innovation: This is the application of new ideas, scientific know how or technological practices to develop, produce and market new or improved goods or services, reorganize or improve production processes or substantially improve a service. Technological innovations are generally associated with changes in goods or productive processes; but technological innovations may also be applied to marketing processes or forms of organization by either producers or institutions.

Social innovation: This is the development or substantial improvement of strategies, concepts, ideas, organizations, goods or services, to bring positive changes in the way of meeting or responding to social needs or serving social purposes. Social innovations are constructed jointly by several different stakeholders for the well-being of individuals and communities; they may generate employment, consumption, participation or introduce some other change to improve the quality of life for individuals and that can be duplicated in other settings (OECD, 2011).

Investment in agricultural science and technology, generally in the form of research and extension services, has proved to be highly valuable for improving crop yields and lessening poverty in developing countries. Nevertheless, such investments should reflect all the parties' diverse needs for knowledge (Nwaiwu *et al.*, 2012). There is broad consensus that innovation is critically important for meeting the challenges that confront the human race, including the need to improve competitiveness, sustainability and equality in agriculture. Agriculture also needs to produce more food for a growing population, using a limited amount of farmland, while at the same

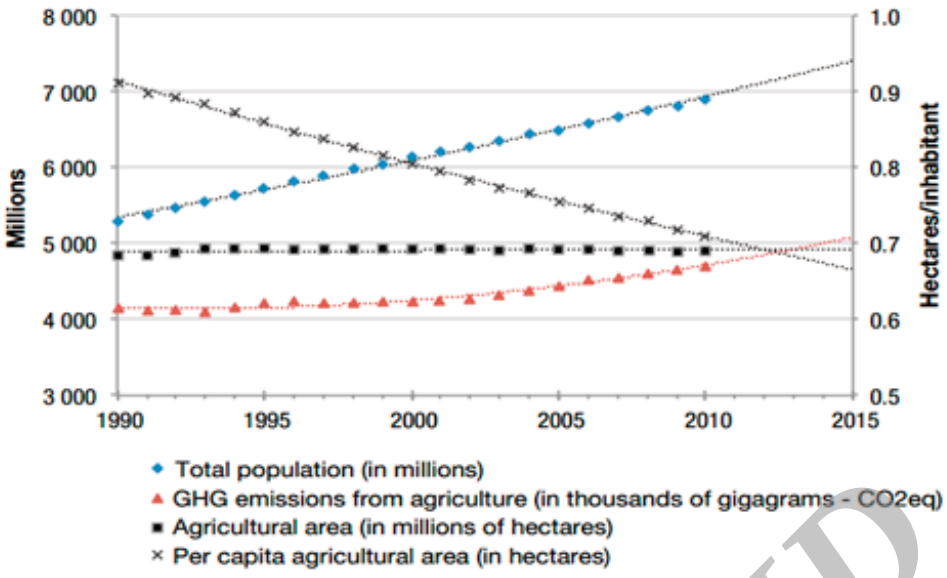

Figure 1: Evolution of selected variables (1990 - 2010) (IICA, 2014)

time reducing its greenhouse gas emissions to avoid worsening climate change (Figure 1). This suggests that agricultural production needs to use knowledge more intensively, which means it must innovate (IICA, 2014). Ryan and Oestreich (1991) observed incidences where a risk-averse attitude became the organizational norm due to an atmosphere of perceived fear, resulting in decreased innovation.

The purpose of this study was designing predicting model for innovation management in processing and complementary industries of livestock products.

MATERIALS AND METHODS

The method of research was correlative descriptive. The population of this research was managers in processing and complementary industries of livestock products of Khuzestan province (N=486). By stratified random sampling, a random sample (n=125) was selected for participation in the study. The researchers used survey research methods in which data was gathered by the questionnaire. A questionnaire was developed to gather data regarding innovation management in processing and complementary industries of livestock products. Questions were generated from the literature review. The instrument consisted of two separate sections according to the purpose and objectives of the study. The first section was designed to gather data on personal characteristics of managers. The second section was designed to gather data regarding the innovation management with 26 items. For assessment level of innovation management in processing and complementary industries of livestock products were used seven subsystems of innovation management and items of each subsystem in Likert domain analyzed. Table 1 explained status of each subsystem. Managers were

Table 1: Status of all subsystems of innovation management in processing and complementary industries of livestock products

Subsystems	Number of items	Mean	SD	Rank
Designing and organizing of innovation	3	2.38	0.94	4
Infrastructure and financial supports	5	2.40	0.99	6
Research and development	4	2.42	0.89	3
Human development	3	2.67	1.02	7
Innovation Diffusion	5	2.48	0.88	2
Commercialization of researches and entrepreneurship development	3	2.05	0.98	5
Exploit of innovation	3	2.25	0.87	1

Table 2: Discriminate Analysis regarding predicting model of innovation management in processing and complementary industries.

Variables	Structure Matrix		Test		Pooled within-group correlation matrix								
	D1	D2	F	p-value	I	SJ	C	Ac	RT	TB	A	E	At
I	0.392	3.255	1.46	0.178	1								
SJ	0.364	-0.151	10.47	0.000	0.46	1							
C	0.496	0.533	31.77	0.000	0.45	0.33	1						
Ac	0.549	0.425	15.75	0.000	0.42	0.54	0.50	1					
RT	-0.546	-0.627	13.52	0.000	0.45	0.85	0.36	0.46	1				
TB	0.644	1.838	13.26	0.000	0.34	0.56	0.45	0.64	0.73	1			
A	0.346	-0.234	1.34	0.207	-0.04	-0.15	0.08	0.76	-0.10	-0.08	1		
E	0.441	0.283	12	0.000	0.32	0.44	0.37	0.55	0.39	0.28	-0.40	1	
At	0.165	0.173	88.97	0.000	0.13	0.18	0.35	0.05	0.24	0.14	0.09	0.35	1

I=Income, SJ=Second Job, C=Competitiveness, Ac=Accountability, RT=Risk Taking, TB=Tend to be Creative, A=Age, E=Education, At=Attitude

asked to rate their skills concerning items on a five point Likert-type scale: 1=very low, 2=low, 3=medium, 4=much and 5=very much. To determine the validity of the questionnaire, agricultural experts' comments were used. The questionnaire was pilot tested and reliability was estimated by calculating Cronbach's alpha. Reliability was calculated by Cronbach's alpha=0.89. Data collected were analyzed using the Statistical Package for the Social Sciences (SPSS).

RESULTS

The ages of the respondents ranged from 24 to 67. The mean age was 42 (SD=7.87, n=125). The majority (38.4%, n=48) of respondent were 41-50 years old. Most of the respondents in the study were male (88%) and only 15 persons (12%) were female.

Three person of managers had a doctoral degree and 64% (n =80) of respondents were a bachelor's degree holders.

Table 1 present the descriptive statistics (Mean and standard deviation) for the subsystems of innovation management. As shown Table 1, "exploit of innovation" (M=2.25, SD=0.78) was believed to have the first priority to accomplish innovation management, followed by "innovation diffusion" (M= 2.48, SD= 0.88) and "research and development" (M= 2.42, SD= 0.89). Based on the results status of all subsystems of innovation management were moderate.

Designing model of innovation management in processing and complementary industries of livestock products

Based on discriminant model (Table 2), different variables such as income, having second job, competitiveness, accountability, risk taking, tend to be creative, age, education and attitude were analyzed. For predicting adoption behavior of managers regarding innovation management the discriminate analysis was used. Based on results a discriminant function is:

D1 = 0.392X1+ 0.364X2+ 0.496X3+ 0.594X4- 0.546X5+ 0.644X6+ 0.346X7+ 0.441X8+ 0.165X9

Wilks' lambda = 0.297 Chi square = 382.733 Sig = 0.000

Table 3: Grouping managers based on innovation management processing and complementary industries.

Group	Number of Cases	Predicted Group Membership		
		G1	G2	G3
G1	30	18 60%	9 30%	3 10%
G2	75	5 6.7%	60 80%	10 13.3%
G3	25	12 48%	5 20%	13 52%

Not: 75% of the original cases was correctly classified

D2 = 3.253X1- 0.151X2+ 0.533X3- 0.425X4- 0.627X5+ 1.183X6- 0.234X7+ 0.283X8+ 0.130X9

Wilks' lambda = 0.334 Chi square = 43.665 Sig = 0.000

Wilks' lambda is used to test the significance of the discriminant function as a whole and the eigenvalue reflects the ratio of importance of the dimensions which classify cases of the dependent variable. The proportion of variance unexplained was 29.7% (Wilks' Lambda=0.297). The eigenvalue of 0.912 indicates that the discriminant function can explain 0.912 times as much as is not being explained. Also, the degree of association between the groups and the discriminant scores was expressed as a canonical correlation of 0.814. The Table 3 shows that the managers are the more accurately classified with 69.6% of the cases correct.

CONCLUSION

According to the results, the innovation management level in processing and complementary industries of Khuzestan province is not desirable. Therefore, practitioners should be required to provide increasing levels of innovation management. Based on the results of the study variables such as income, competitiveness, accountability, risk taking, tend to be creative, level of education and attitude to innovation management played a critical role in improving innovation management. Ryan and Oestreich (1991) observed incidences where a risk-averse attitude became the organizational norm due to an atmosphere of perceived fear, resulting in decreased innovation. Also, innovation management correlation to a company's competitiveness and marketplace success are proven by several empirical studies (Mousavi, 2011).

Improve psychological characteristics such as risk taking, competitiveness, accountability for innovation through workshops, specialized training and scientific visits, will play an important role in the management of innovation.

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