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Benefiting from Knowledge Management in Agricultural Development of Iran: A Case Study of Pistachio

Eldar Mohammadzadeh Seddigh[1] , Zahra Abazari[*1], Nadjla Hariri[2]

[1] *Department of Knowledge and Information Science, Tehran North Branch, Islamic Azad University, Tehran, Iran*

[2] *Department of Communication and Knowledge Science, Science and Research Branch, Islamic Azad University, Tehran, Iran*

A R T I C L E I N F O

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A B S T R A C T

Knowledge management and benefiting from the experiences and knowledge experts in Iranian Pistachio farming will be a method in order to achieve the development of Agriculture and Pistachio gardening in Iran. The present study is based on a qualitative approach and grounded method theory. The research tool was based on interview with 22 members of the Rafsanjan Pistachio Producers Cooperative, and was conducted in three criteria of open (initial), core and selective. Open code includes 34 concepts and core code includes 4 major categories, including cost reduction, product quality enhancement, innovation and continuous improvement. Agricultural development was identified as the central criterion of the present study. In order to understand the experiences of growers in their own language, semi-structured interviews were conducted to provide solutions to develop pistachio agriculture and create a competitive situation. Thus, the interviews begin with general questions and are followed by the solutions of each grower. The interview questions are designed to transfer technical knowledge of the interviewees and achieve solutions in order to benefit from knowledge management in the development of pistachio agriculture in Iran. The findings of this study helps the presentation of strategies to develop agriculture and maintain the position of Iranian pistachio growers in competitive markets that will lead to greater profits. According to our research, establishing a powerful cooperative system could satisfy growers' requirements and will lead to an expansion of agriculture in Iran. Additionally, our system could result into establish a more proactive farming society using knowledge management.

Introduction

Today, knowledge management is a key concept for organizations, as the organizations are constantly improving. Knowledge management will give the opportunity to the organizations to improve their performance based on the five key trends of globalization, increasing competition, changes in organizational structure, new staff conditions, priorities and trends (Hall, 2003).

Agriculture has always been considered by experts as a factor for economic development of developing or undeveloped countries. It is believed that the problem of some of undeveloped countries will be solved if the

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issue of agricultural recession is resolved (Taleghani, 1991).

Pistachio (*Pistacia vera* L.) has been widely cultivated in arid and semi arid land of Iran and Iran has always been one of the first places for pistachio production across the globe (Sharifkhah et al., 2020; Norozi et al., 2019; Eslami et al., 2019). According to the narration in the book of Nowruznameh (attributed to the Omar Khayyam, 11th Century Iranian scientist, mathematician, astronomer, philosopher, and poet), Kiomars was the first person to plant seedlings of fruit trees in a garden. The "phytotherapeutic" and medicinal properties of various organs of the pistachio tree, especially its fruit, have been considered by ancient scholars. In their writings, pistachio kernels have been prescribed for general well-being. It is considered as a general stimulant for human beings (Abrishami, 1994).

Planting, cultivating and harvesting pistachios has been promoted by Iranians in the world and especially in the United States (California). Although pistachio production is common in countries such as Turkey, the United States is Iran's main competitor in the production and export of this agricultural product. (Hashemian 2021).

The importance of scientific production of pistachios and benefiting from knowledge management becomes more apparent when this agricultural product has always been considered as one of the most important non-oil products of Iran, along with saffron, dates, raisins, nuts, silk, rugs, caviar and leather) and has had considerable appreciation. Moreover, it has been subject to fewer sanctions in the global market due to its production and export by the private sector. Iran's pistachio exports during the imposed war brought more currency to Iran than oil. This shows that benefiting from scientific production and knowledge management can improve the production. Knowledge management and any related possibilities can increase the agricultural ability and to develop a path that leads to better production of the product. Increasing the quality of manufactured products, producing more products, gaining more added value in production are the achievements that will be possible by implementing knowledge management in production. (Mohammadi Fateh, 2014).

Cooperative activity of pistachio producers in Rafsanjan city since 1968 has led to the production, harvesting, packaging and sale of this product. This cooperative has been profitable and brought value to Iranian pistachio growers. It has improved Iran's position in production and sale of this agricultural product in the world. Rafsanjan Pistachio Producers Cooperative has been considered a sale reference in pricing pistachios in the world and in the international community for many years. This fact shows the leadership of the cooperative in governing the market. Therefore, the focus of this research is on managers and cooperative activities of pistachio producers in Rafsanjan. (Hashemian, 2021).

Knowledge management and its related concepts can increase the agricultural capability in producing the product which leads to development of a new system in production of that agricultural product. Increasing the quality of manufactured products, producing more products, gaining more value added in production and sales are among achievements that will be possible by implementing knowledge management in production. Today, knowledge management as a very important branch of information technology which can promote the production, and will enable sharing and influence culture of other producers. In the past, the emphasis of knowledge management was based on the knowledge that was identified and organized into forms. This knowledge included knowledge of thought processes, methods, and assets (Nahapit and Gushal 1998). Today, the starting point of knowledge management is in the

traditional SWOT chart (capabilities, weaknesses, opportunities and threats) and the ability to acquire, integrate, share and apply it can offer a competitive advantage (Greco, 1999).

Knowledge management is an attempt to understand the individuals' information about the issue, documents, texts or books which will benefit public and organizations (Davenport, 1998). Knowledge management consists of various processes. The knowledge management cycle is often divided into stages 3 to 8 processes. But researchers have proposed different dimensions and evaluation criteria for knowledge management. For example, Marquardt has recognized that knowledge management involves four dimensions: knowledge acquisition, knowledge creation, knowledge storage, knowledge transfer, and knowledge use (Marquardt, 1996). Similarly, Zack and colleagues expressed the four dimensions of knowledge management (Zack, 1999): knowledge acquisition, knowledge refinement, knowledge storage, retrieval and presentation (supply) of knowledge (Alee, 1997). Organizational knowledge management is divided into four dimensions: Knowledge creation, knowledge retention, knowledge sharing and knowledge innovation. This classification can help evaluate organizational knowledge management (Mohammadi Fateh 2014).

Development, both individual, group and national, is a complex and multifaceted process that includes fundamental changes in society, culture, economy, politics, management and even the environmental aspects of a nation at both micro and macro levels (Davarpanah, 2012). Development is a continuous process in which conflicts at local, national, regional and international levels may arise between the groups that benefit from this process and the groups that suffer from it (Davarpanah, 2012).

Development defines in the sense of creating a change in society's attitude towards work, production relations, planning for economic issues and reducing production costs, innovation and continuous improvement in order to obtain a quality product (Poursoliman, 2000), and possibility of supply and sale in a larger scope and to profit from it in favor of that agricultural product. Agricultural development is impossible without growth. Growth means a steady increase in the production of goods and services in the country. It is estimated that about 60% of development is related to human resources. To improve the quality and quantity of production, a series of moves such as optimizing methods, recognizing and using raw materials or basic and understanding the appropriate technology is done. Separation of labor from knowledge leads to the vicious cycle of poverty. A dynamic economy requires the use of practical and technical knowledge and up-to-date information. (Sadeghi, 2011).

Rafsanjan Pistachio Producers Cooperative (RPPC), is an active organization which are focused on production, harvesting and export of Iranian pistachios. This cooperation was established in 1968 with 200 members and after the Islamic Revolution between 1979 and 1994, the members of this company reached 55000 . RPPC, was successful in stabilizing Iran's pistachio position in the world and provided the necessary facilities for increasing pistachio orchards area and improving the quantity and quality of this vital product for the economy by concentrating its products in the cooperative as much as possible and by adopting policies that benefit the hardworking pistachio growers and limiting harmful intermediaries in the domestic and foreign markets..(Abrishami, 1994).

Materials and Methods

Study design – Interviews

To investigate the role of knowledge management in the agricultural development in Iran, interviews was conducted with 22 experts and well-known growers and members of the Pistachio Cooperative in Rafsanjan. These people were selected meticulously. In qualitative research, data collection will continue until the variables of the study saturate, so a new sample is not going to add a new concept onto the study (Hariri, 2006). The 21 samples were coded from A1 to A22

The following questions were asked:

1. Would knowledge management in agriculture in Iran contribute into development of pistachio agriculture in Iran?

2. What are the components and categories of agricultural development in Iran?

The present study has been done with a qualitative approach and using grounded theory method. The conceptual framework of the theory depends more on the data and interviewees knowledge than on previous studies. In the sense that this theory is data-driven and avoids testing only deductive hypotheses. In this regard, the researcher tries to discover the dominant processes in the social context from the perspective of the subjects and does not limit his research to a mere explanation of the data and units under study (Mohammadpour, 2013) According to this non-random sampling method and semi-structured interview tool were used to obtain data. The research pool was made of members of the cooperative in Rafsanjan. The sample of this research is 22 members of the cooperative of pistachio producers in Rafsanjan city who participated in this research voluntarily by introducing the cooperative board of directors. The interview with each volunteer lasted about 50 minutes. Data collection was followed until theoretical saturation was reached. Then, the data encoding was done in three stages of open, axial and selective coding until saturation was achieved.

Checking the accuracy and reliability of research results

In order to ensure the quality of data and interpretations, a combination of criteria was used for evaluating interpretive research, including credibility, transferability, dependability, and confirmability, integrity, and verifiability. The research was conducted based on the methodology of data theory, including conformity, comprehensibility, generality and controllability. Table 1 shows the described criteria.

Table 1 . Evaluating accuracy and reliability of data was assessed using different criteria. Criteria which was used to evaluate the research is described. Column 1 represents definition for each criterion, column 2 description and conclusion is provided in the third column.

Definition	Criteria	Description and Conclusion
Credibility	The extent to which the results of the research are representative of the data	6 months conducting interviews, submitting reports to supervisors
Transferability	Is the degree to which research findings can be applied to other similar situations	Snowball sampling, the adequacy of the information collected, and observer feedback indicate that the reader can evaluate the transferability of the findings to other similar situations.
Dependability	to the extent that shows the monopoly of the findings to time and place, the stability of the desired explanations has been done	The interviewees expressed their precise opinions and views and the researcher was able to gain the necessary experiences
Conformability	The interpretations are not influenced by incorrect information or manipulating th interviewees.	The interviews were conducted in a friendly atmosphere and they provided their information.
Verifiability	A scale that shows the extent to which the interpretations made are in the opinion of the interviewees and have not been influenced by the researcher's bias.	The researcher has studied and reviewed all the interviews conducted, and in addition, the extracted categories have been approved by experts.
Integrity	The findings are consistent with the mental structure of individuals relative to the phenomenon under study.	The main criteria of the research have been obtained and the categories have been controlled and refined
Understandable (fit)	The results of the research reflect the real world of the interviewees	The research findings were shared with three interviewees who shared the same views and opinions
The generality	The findings show the different dimensions of the phenomenon under study	The openness of the interview, sufficient time and freedom.
Controllability	Describes how much the interviewees are controlled.	Conducting 22 interviews with experts, their active participation in the interview process, the usefulness of the interviews and achieving the desired results

Theoretical narrative of research

In the first step of this study, all interviews were studied. In order to increase the validity of the research (research model), all interviews were studied by census method and it was enough to sample the interviews.

According to grounded theory strategy steps, the interviews were coded. That is, in the first stage, open coding was done, according to which, after counting each key point an original code was assigned. Theoretical coding explains how categories relate to each other. Usually, when sorting and integrating code, the initial theoretical coding graph is formed. Open and axial coding method deals with fragmentation of data and their classification. However, at this stage and through theoretical coding, we connect the categories with each other and the story trajectory and theoretical explanations are expressed to explain the final model.

Result

After analyzing and classifying the data and completing the coding stage, the findings of this study were coded around 4 concepts. The initial codes are shown in Table 2.

Table 2. Open coding of the extracted data. Codes (column 3) are given to the content of the interviews (column 4). The interviewees are kept anonymous and a code was provided to represent different interviewees.

No.	Interviewees	Initial code (open)	Phrase (content)
1	A1	Innovation and manufacturing of processing machines	My father was the inventor of pistachio processing machines in Rafsanjan. In the past, the skin on pistachios was removed by hand. The skin of fresh pistachios can be easily peeled by hand, but raw or unripe pistachios were also soaked in ponds and then beaten with a stick in the morning to remove the skin. The invention of the pistachio processing machine mechanized all this.
2	A1	Concentrated sales of pistachios	In pistachio-owning countries, the grower delivers the pistachio to a reputable and active company in this field, and on the other hand, the company had full supervision from the very first stage to the pistachio harvest. But in Rafsanjan, the grower does the work himself, picking and processing the pistachios and then presenting them to the seller or sellers.
3	A1	International interaction for export success	Due to sanctions and the problem of currency transfer, the company's activities have faced some problems. Companies are not able to trade based on their previous volume. If they do, we have face problems in importing currency into the country.
4	A2	Cooperative support of the grower	This year we have a plan to give fertilizer and pesticides to the members of the company and growers will pay back in pistachios next year.
5	A2	High pressure irrigation system	The government and the Ministry of Agriculture have a plan called pressurized irrigation that supports the grower, but it has not been implemented much in Rafsanjan. For example, in the Hormozgan region during previous years, the government initiated it by themselves. The land was provided by company and the owner signed a contract, and the rest was done by the executing company.
6	A2	Water consumption management	Today, the problem of water shortage in the region is very important. Underground wells provide water at a depth of 300 meters. There is an area in Rafsanjan called the sea well, it was an underground hole that is about 80-70 meters like a cave in which the water level was in form of a lake in this cave and provided water to the Nogh area. 7 years ago, the lake well was completely dry and the water level was much lower. If the situation is the same, all the water in the region will dry up in the next 10 years
7	A2	The need for product pricing	In previous years, at the beginning of the growing season (September), everyone was waiting for announcement of the pricing from the Pistachio Cooperative Company. The pistachio cooperative determined the market price. Fortunately, every year 20 to 30 percent of the cooperative company raised the price compared to the previous year. While this price had not changed compared to global markets. If you go back to the world markets, you will see that the price is fixed at $ 7-8, but the cooperative has increased the price by 20-30% every year in order to support the grower.
8	A3	Lack of political confrontation with organizations	One of the most important problems that the cooperative has faced in the recent years is the political confrontation with the organizations. During the presidency of Mr. …, unfortunately, the governor of the province was sent as a representative of the government, and whenever we raised issues and problems of the cooperative, they acted in such a way that they are in fight with us.
9	A3	Holding training classes for growers	The cooperative held training classes for growers. Experts from the Pistachio Research Center came and taught growers about spraying and irrigation every week.
10	A4	Benefiting from valuable and capable people in the board of directors of cooperatives	In difficult conditions of Iran, the cooperative has always helped.
11	A4	Having a cooperative is an important advantage for growers	The company is reputable among the growers and whatever people say, the people will act on it.
12	A5	The role of cooperatives in the growth and development of the region	People of Rafsanjan are really devoted to the company and consider themselves a supporter of the company and a member of the company and the owner of the

			company.
			The cooperative, has 75000 ordinary members from people. It helped different government. It helped the government during the war. Many machinery was purchased by the cooperative for the armed forces. They built a hospital in town. They established the first MRI system in Iran
			In terms of liquidity, the cooperative gave assistance to the grower with money. When growers produced pistachios, the funds were reduced from their accounts. In other terms, the cooperative paid them in advance. Billions of Tomans of machinery, insecticide and fertilizer were imported into the country, which provided all the general needs of the company. It saved the growers 20% of the market value.
13	A6	Reasonable pricing with the aim of supporting the grower through the organization	Pricing is based on many factors including pistachio size and its export value and its selling price abroad, based on which the price for different types of pistachios was determined.
14	A6	The reason for the success of individual businessmen against the cooperative	The cooperative an obligation to buy everyone's pistachio. However, an individual businessman does not have such an obligation.
15	A7	Marketing at abroad	Pistachio is such that people want to eat it once, not in their daily consumption. We have had a lot of advertisements in different magazines including Clipper, Cracker, Europe magazines. In additions, we participated in fairs, exhibitions in Europe. Our sale was in forms of 45, 60 days or upfront.
16	A7	Dividing the company's profit in accordance with to the cooperative's statute	The company's accounts and books were quite accurate. Dividends were fully received by the company and this was done according to the company's statute.
17	A7	The need for proper packaging of pistachios as food	During, the first conference I attended in Greece, a German client, asked us why we do not have food standard packaging system for our products. He asked us:" Why don't you treat pistachios like food and why should cigarette butts be in your packaging?"
18	A7	The need to control pistachio diseases including aflatoxins	There were a number of large customers in Europe who consumed more than 5,000 tons of pistachios a year. They asked us to provide aflatoxin free certificates to them. This is still a problem.
19	A11	Meet the needs of growers through organizations	The supply of pesticides, fertilizers and machinery should be in the middle of the focus of the cooperative and it should be given to the growers through the cooperative. This is a major problem at the moment as majority of pesticides in the market are counterfeits and all the trees are damaged. This is terrible, and it will damage the hit the economy of Kerman province and the growers.
20	A12	Cooperatives make growers feel comfortable	I have been in contact with the company since 1978. We would safely deliver the pistachios we produced to the cooperative. The cooperative would collect and sell the pistachios and pay our money and our surplus profit. There is very little hassle to the members in this way.
21	A13	Growers (manpower) are very important	Growers who gave pistachios to cooperatives are very important to the company. They are indeed treasures bring prosperity to the region agriculture and cooperative activities.
22	A14	Increase water use efficiency in pistachio production	Today, water consumption management is of great importance in pistachio production
23	A15	Meeting technological needs	Importing and distributing agricultural machinery, equipment and needs in exchange for pistachio exports to the world caused prosperity and self-sufficiency to the growers and encouraged them to produce more pistachio products in the region.
24	A16	Profitability of planting	The profit that we brought into the country, even it was not done by the National Oil Company.
25	A17	The importance of laboratories, research, facilities and equipment	The best and most equipped pistachio laboratory in Iran is built and active in the cooperative. We established 7 warehouses and two customs offices in Kerman and Rafsanjan. To control the containers, we filled them in the companies and sent the ready-to-export containers to the customs.
26	A18	The need to control and comply with standards	The laboratory consists of two parts, chemical and physical. The chemical part measures the amount of aflatoxin. We have two high performance liquid chromatography devices (HPLC) which is the latest technology in the world in measuring aflatoxin and has a very high accuracy. This is the latest European method.

27	A19	The need for rational support for work development	Growers faced shortages of pesticides, fertilizers and lack of money. The pesticide imported from Pakistan and India were unfortunately of poor quality and the grower had to spray 8-7 times, which caused a lot of damage to the plants. Today, more than a hundred acres of trees have dried up due to water shortages.
28	A20	Fresh water causes more pistachio production	Every plant has an ecological demand. Outside of its ecological conditions, it suffers from environmental stresses. For example, pistachios are not grown in humid areas. Because its circulation is also through the wind. It is also susceptible to disease. Pistachios are basically for areas that are dry and the climatic conditions are different in the morning and night and there is a difference in temperature. In general public opinion, people think that it must be in saline water and salty soils. No, this is not the case. The sweeter the water, the higher its yield.
29	A20	Pistachio plant is hardy, convincing, patient and economical.	Pistachio is also more resistant than tamarix. They need watering every 120 days. It is said that the yield of pistachio plant in Iran is low. Yes, by providing fresh water and shorter watering intervals, you will harvest more and a better crop. Now they are working on the organic nature of pistachios. The private sector has almost entered into pistachio research, and this shows the profitability of this plant.
30	A21	Supporting and meeting needs will lead company's development.	The year that I decided to revive the pistachio company, there were not 10,000 acres of farms in Rafsanjan. Currently, 120,000 acres are in the garden area. In the whole of Kerman province, there are 480,000 gardens. I decided that the company would have the purchasing power and pay the fees, and the producer should not be hassled for his pistachio product. They can be provided with a water pump, a tractor and pesticides.
31	A22	Pistachio cooperative is a successful model in the country	Rafsanjan Pistachio Cooperative has always existed its members as a very successful model in the country and we had a lot to say. The result of this cooperation was also very positive. But in other fields, especially rugs, if this action was taken, we could preserve this industry for Iran.
32	A19	Quality production	The aid that the cooperative provided to the growers since the beginning of the revolution caused the growers to invest in their work and develop their work and seek to produce better and higher quality pistachios.
33	A9	Maintain a competitive environment and find quick solutions to problems	The aflatoxin issue that arose, I think the Americans were involved. Not that our pistachios had any problem. American pistachios also have a problem, or Spanish almonds and German corn also have a problem. But the fact that they once magnified the problem, tested it and said that it was affected with aflatoxin was due to the US pistachio competition with Iran.
34	A18	Scientific agriculture	In pistachio growing areas, due to the high pH of the soil, the absorption of trace elements (iron, zinc, copper and manganese) from the soil is difficult. One of the ways to solve this problem is the foliar plant spraying of pistachio trees with these elements in May, which can be used after analyzing the leaves and diagnosing the deficiency of each element. Today, the role of micronutrients in improving the quality and quantity of agricultural products is undeniable

Axial coding

In this step, the relationships between the categories resulting from free coding are specified. The purpose of axial coding is to begin the process of connecting data are lost during free coding (Strauss and Corbin, 1998). In axial coding, categories are linked with their subcategories to provide a more complete and accurate explanation of the phenomenon in question (Hariri, 2006). At this stage, the categories that are most relevant to the research issue were extracted from the codes and interviews. Several sections of the text were then searched as evidence for these boundaries to identify key categories based on interview questions. Fig. 1 shows the research encryption pattern.

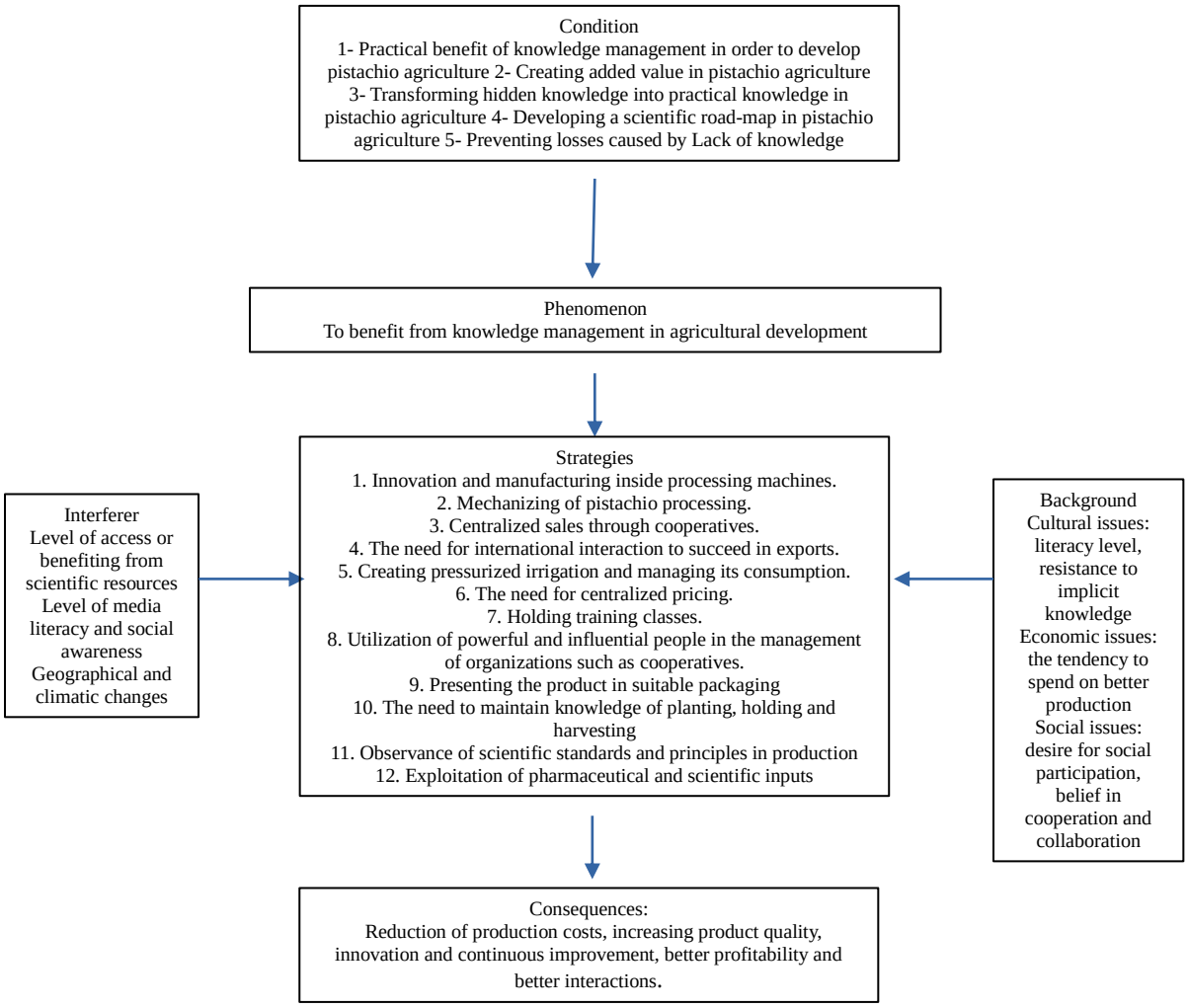

Fig.1. Research coding pattern. A descriptive process for the research coding which was conducted in this study is provided. This model introduces the relationships between phenomena and its relation to the context.

Core codes identification

Core codes were identified, including four major development categories: a) Cost reduction. b) Increasing the quality of manufactured products c) Innovation d) Continuous improvement.

A) Reduction of production costs: Cooperative members of pistachio producers in Rafsanjan city and participants in this study used mechanized equipment and modern technology to reduce costs. These include drip irrigation system, pistachio processing systems, pistachio peeling systems, modern packaging systems and laboratories equipped to test the characteristics of soil, climate and pistachio production and its possible diseases. Commercial companies pack pistachios in aluminum and sulfane cans. They degass it and the whole process is done under in compliance with strict health and safety regulations. They have their trademark and the name of ingredients and products weight (Abrishemi, 1994). Pistachio could vary in its sizes.

They are not uniform in size. Even if the trees are the same, similar genetic back ground and the same graft, they produce different crop. As a result, producers first grade their garden product with pistachio sieves and then take it to the market (Abrishami, 1994).

The main cost of producing each product is determined when designing it. The product must meet the expected capability and efficiency at a reasonable cost. In other words, the design does not take into account over-functionality or an extended unnecessary shelf-life (Sadeghi, 2011). Optimization of efficiency and price of a product in a special field called value engineering. In this method, by analyzing the cost of each part of product, its efficiency and capabilities, its added value is examined until the optimal selling price is obtained (Mohammadzadeh Seddigh, 2017).

"The company has built and exists the best and most equipped pistachio laboratory in Iran. Control, cost and doing things were all with the cooperative. We built 7 warehouses and two customs offices in Kerman and Rafsanjan. "The cooperative filled the containers in the company and sent the ready-to-export containers to the customs."

In the text of the interview, it is clear that the grower is satisfied with the process of work in cooperative activities. The existence of cooperatives was considered as an opportunity for further cooperative works.

Participants in this study also consider the activity of pistachio growers under the umbrella of cooperative support to reduce production costs and increase profitability. Because through cooperatives, the needs and equipment of growers can be met in a timely manner. Pistachios were purchased at a competitive and a reasonable price. It was delivered easily to the consumers. The profits were returned to the grower in accordance with the articles of association and the internal contract. As a member of the cooperative, growers can consider the cooperative as a good support for themselves and resolve their issues (such as union problems) through it in a timely manner. Growers can adjust the pricing of pistachios according to their cost price and to deliver their pistachios to cooperative agencies in their agricultural areas.

B) Increasing the quality of manufactured products: (Sadeghi, 2011) states that it should be taken into account that production process is subject to change and fluctuations. Considering quality in design leads to design and selection of a product that has reduced amount of changes and fluctuations and reduced impact of fluctuations on production performance. According to one of the new engineering methods, quality starts from studying the market and identifying customers. And the costumer's needs. In process of reviewing and analyzing, while identifying the needs of customers, it should be tried to take them into account at all stages of design and production. In other words, the main philosophy of using design for quality is to apply and take into account the quality demands of the customer in different stages of product design and development. (Sadeghi 2011) describes the benefits of proper use of Quality Function Deployment (QFD) as follows:

• Improved design quality will result in greater customer satisfaction

• Shorter product research time due to fewer and earlier (pre-production) changes in specifications

• More coordination between different stages of design and production

• Reduction of the number of product parts

• Promoting a culture of teamwork by integrating the various tasks of the organization

• Ability to emulate the design process of competitors

"The cooperation that the cooperative provided to growers since the beginning of the revolution led

growers to invest in their work and develop their work, and to seek and produce better and higher quality pistachios."

"Imported pesticide were of poor quality. "The pesticide they brought from Pakistan and India were unfortunately of poor quality, and the grower had to spray 7-8 times, which caused a lot of damage to the trees."C and D) innovation and continuous improvement

Establishment of a research and development unit in organizations is essential for continuous innovation and improvement in order to survive in the market and compete with competitors. The research and development unit is responsible for: creating and introducing new products, modifying and improving current products, commercializing research results, changing production plans and processes to reduce prices and increase product quality (Sadeghi, 2011).

Achieving innovation and improvement requires good knowledge of the rules and standards of the product.

Knowledge of pistachio export rules and standards in order to comply with its various aspects is absolutely necessary for producers and traders exporting pistachios. Because domestic consumers will buy pistachios with more confidence. Especially the countries importing pistachios are becoming more strict every day in terms of observing the rules and standards that are effective in the health and hygiene of pistachio consumers. (Abrishami, 1994).

"I think the Americans were involved in the aflatoxin issue," he said. Not that our pistachios had no problem. American pistachios also have such problems, or Spanish almonds and German corn also have such problems. But the fact that they once magnified the problem, tested it and said that it was infected by aflatoxin was due to the US pistachio competition with its Iranian counterpart. The disease is caused by a fungus called *Aspergillus flavus*. This fungus itself is not harmful. But under certain conditions, such as heat and humidity, it secretes a toxin t which is harmful and it is believed that it causes liver cancer. To solve the problem, I brought the relevant European officials, especially the Germans, to visit the terminal. "I had all the hygienic principles and necessary improvements in the pistachio production line from planting to harvesting and exporting."

In the text of the interview that passed, one can well understand the importance of competition, the role of innovation and continuous improvement. Complaints about Iranian pistachios due to the disease in it by the competitor, and timely reaction of the officials in charge led by the Rafsanjan Pistachio Producers Cooperative, caused this problem to be solved by improving the production process and bringing some innovations. All of these caused the exporting of Iranian pistachios to Europe to resume after a month break.

"In pistachio growing areas, due to high soil pH, the absorption of trace elements (iron, zinc, copper and manganese) from the soil is difficult. One of the ways to solve this problem is the foliar spraying of pistachio trees in May, after analyzing the leaves and diagnosing the deficiency of each element. Today, the role of micronutrients in improving the quality and quantity of agricultural products is undeniable (Akhlaghi Amiri et al., 2016; Fallahi et al., 2016; Chbani et al., 2015).

“Utilizing pharmaceutical inputs to produce organic products and improving the quality and quantity of pistachios with an economical view is one of the ways to continuously improve the product.”

In this interview, the benefit of an innovation to improve the quality of pistachio production is evident.

These four categories are the most important factors in the development of agriculture in Iran, which are extracted from the qualitative data of this study. To

speed up a better understanding of the coding step, the codes extracted in this research are shown in Table 3.

Table 3. Open, axial and selective codes extracted from qualitative data. The obtained 34 open codes were divided into 4 axial codes groups related to knowledge management, which finally obtained the selective code for agricultural development.

No	Open source	Axial codes	Selective code
1	Water consumption management	reduction in costs	agricultural development
2	Concentrated sales		
3	Benefit from powerful people in the management of cooperatives		
4	Benefit from research and development		
5	Meeting technological needs		
6	Quality production	Increase the quality of manufactured products	
7	Grower support		
8	Reasonable pricing		
9	The need for control and compliance with the standard		
10	Reasonable support for work development		
11	Enjoy fresh water		
12	Sensitivity in selection and separation of pistachios		
13	Dividend according to the company's articles of association		
14	Increase water use efficiency		
15	Currency with exports		
16	Innovation and manufacturing of processing machines	Innovation	
17	The need for proper packaging of pistachios as food		
18	Benefit from human resources as capital		
19	The importance of the laboratory		
20	Support and meet the needs of growers		
21	International interaction		
22	Product pricing	Continuous improvement	
23	Creating optimal irrigation systems		
24	No political confrontation with the organizations		
25	Holding training classes for growers		
26	Benefiting from honest and caring people in the management of organizations		

27	Playing a role in the growth and development of the region
28	Modeling the organization
29	Observance of scientific principles
30	Forming a complete chain from production to sales
31	Customer acquisition in international markets
32	Maintaining a competitive environment and finding solutions to problems
33	The need to control pistachio diseases
34	Durability and economy of pistachio plant

Discussion

By benefiting from the components of knowledge management, it is possible to develop pistachio agriculture and horticulture. Research data on conceptual breadth, study of effective component dimensions, strategies related to phenomena and consequences have been reviewed and analyzed. In this study, we defined the core concept as "agricultural development". This concept covers all other categories. Participants in this study explain the benefit of knowledge management as a major factor in agricultural development.

The contextual model of this research is influenced by knowledge management that leads to actions and interactions. The consequences of these actions and interactions are agricultural development. One of the actions of this model is the tendency to grow and develop with the benefit of knowledge management. This motivates mobility and the desire to grow and progress. On the other hand, Iranian pistachio growers will succeed in benefiting from the mentioned features in order to offer this profitable agricultural product in the world markets and cause economic prosperity for themselves and the nation.

As it evident from the results, benefiting from a powerful organization or cooperative that can meet the various needs of pistachio growers and gardeners, can lead to agricultural development. This requires the benefit of knowledge management by cooperative members who are growers. The vigilance of cooperative managers, presence in global markets, review of competitive advantages, opportunities and threats and other effective factors are required to achieve this demand. The results of this research are in line with the results of (Sedaghat, 2018). which explains efficiency of pistachio production. In addition, findings of this study is in line with the findings of (Sharafati *et al*., 2018). which discusses Khorasan Razavi pistachio growers.

The results of this research is also in line with the research of (Alipour Moghaddam and *et al*., 2018). which discusses establishing a fund to support the development of pistachio crop. According to this study, reducing oil exports and trying to replace non-oil products are among the priorities of the export sector, so that the export of agricultural products has a major role in non-oil exports and pistachios are of particular importance. This study was conducted to investigate the establishment of a pistachio crop development support fund. The main variables in this study include the production and trade of pistachios in the world and Iran. The relevant data were obtained from the FAO World

Bank, UNCTAD and the Ministry of Agriculture. That's right.

The results of this study are in accordance with the results of the research of Mullah (Mohammadizadeh Noghi, 2018). which shows significant growth in various areas of science is required. For example, in the field of information technology and internet of things and intelligent systems that improvements are required that can meet the country's major goals in saving water and irrigation such as: supply and demand management, integrated resource management, climate change monitoring, modern agriculture and etc.

In addition, findings of this research in the field of knowledge management is also in line with the research of (Murid, 2009) who studies the application of knowledge management tools in agricultural extension activities. Moreover, findings of this study was also in line with the research of (Adir Onal, 2015) on determining the location of major farms of pistachios, olives and vineyards in Ghazi Antep province of Turkey using technological advancement.

The findings of this study lead to the presentation of strategies to develop agriculture and maintain the position of Iranian pistachio growers in competitive markets that will lead to greater profits. Achieving cost reduction, increasing product quality, innovation and continuous improvement are benefits of knowledge management which will lead into development. Benefiting from this method in horticulture and pistachio agriculture will also lead to agricultural development.

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