

# Modeling the strategic paradigm of the agricultural commodity exchange with a grounded data theory approach

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## Abstract

The agricultural commodity exchange in Iran is known not only as a financial tool but also as a key institution for the country's economic development, helping improve farmers' livelihoods. In the present study, the strategic paradigm of the agricultural commodity exchange was modelled with a grounded data theory approach. The present research method was applied and qualitative. In order to achieve a correct understanding of the most important strategic components of the agricultural commodity exchange, in-depth interviews were conducted with 16 university professors in the field of agricultural commodity exchange through purposeful sampling. Then, the collected data were analyzed using the grounded data method to present a comprehensive and localized model for agricultural commodity exchange strategies. Based on the findings, after interviewing experts in the first stage, open coding identified 180 codes, and in the next stage, categorical coding, 30 categories were identified, and the open codes were categorized under these categories. Finally, in the third stage, the 10 categories were axially coded, and the category codes were categorized below. Finally, based on the strategic model of the Iranian Agricultural Products Exchange with a financial futures research approach, it includes the components of culture and society, human resources, supply chain, sustainability and environment, market and demand, technology and innovation, risk and crisis management, international interactions, infrastructure and government policies. As evidence from current advanced societies shows, the origin of the development of many advanced economies lies in surplus production in the agricultural sector in the early stages of development, which has served as a basis for change and transformation.

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## 1 Introduction

The increase in food prices and its fluctuations are accompanied by important micro and macro economic impacts, including adverse effects on the country's gross domestic product, inflation problems, household poverty, the financial life of the people, reduced nutrition, as well as the reduction of essential education and health services. In addition, the price of agricultural commodities affects the underlying agricultural market, government policies and the entire

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agriculture-related industry. Fluctuations in the price of agricultural commodities put agricultural sector operators under emotional and financial pressure because their hard work over the years is wasted (Chulunsaikhan et al. [5]; Sabu, Kumar, [18]). Therefore, to properly guide agricultural production, creating the right balance between supply and demand, increasing farmers' income, helping farmers to plan the next crop, helping the government, farmers, traders and consumers to gain clear market awareness, designing business plans, carefully regulating individual finances, and also reducing risks and uncertainties, accurate control of price forecasting, as well as advance information on prices is essential [22]. Forecasting the price of agricultural products is important for many economic actors and has a special place in their decision-making [11]. One of the major and fundamental institutions in the capital market is an organized institution called the stock exchange. The key philosophy of the formation of the stock market in the world is to pool capital and finance companies and their projects in the form of a coherent, regulated, continuous and transparent market system. The basic basis for the formation of these markets is the same basic and simple concept of partnership, sharing possible profits and losses among partners. By pooling small and scattered capital, the stock exchange enables important and large investments and has significant effects on the economic and social situation of society and the progress of industries and the prosperity of the country, while at the same time creating profits and benefits for shareholders [3]. Given the nascent nature of the Iranian Commodity Exchange and the lack of institutionalization of its role and position in the national economy, the movement of the Iranian Commodity Exchange on the path of development may be disrupted [5]. In Iran, the first step towards establishing commodity exchanges was taken with the necessary preparations in the Third Five-Year Plan, and the metal and agricultural exchanges were established in 2003 and 2004, respectively [2]. Most experts refer to the agricultural commodity exchange as the second green revolution, which allows farmers to make better decisions about growing appropriate crops and timing sales to increase profits [2]. In Iran, agriculture is one of the activities in which decisions are always made under conditions of risk and uncertainty. The randomness of the supply of agricultural products, along with the inelasticity of demand for most agricultural products, causes severe fluctuations in the prices of products offered in the market. In the meantime, the Iranian Agricultural Commodity Exchange, as a new market, has sought to resolve the problems existing in the agricultural products market by creating a comprehensive, integrated, and organized market.

## 2 Theoretical foundations and research background

### 2.1 Commodity exchange

With the passage of more than one hundred and fifty years since the establishment of commodity exchanges in the world, these markets currently play a very prominent role in the economies of developed and developing countries. The commodity exchange is a platform for designing new trading tools based on the real economic needs of the countries. One of the main approaches to designing these tools is to properly direct resources to the productive sectors of the economy, develop domestic commodity markets, upgrade traditional market structures to modern structures, improve and transform current trading methods, and also equip commodity and financial markets by creating a logical, organized, and regulated connection between the two commodity and financial sectors of the country [20]. The Iranian Commodity Exchange has been introduced as a transparent, regulated, and reliable market for the presence of commodity suppliers and demanders in society.

#### Agricultural Commodity Exchange

Given the market risk and the risk of weather conditions faced by farmers, in most cases, farmers' credit needs have been met through loans with high interest rates. Therefore, the absence of appropriate risk management tools, the slightest price change leads to a decrease in farmers' capital, and thus the repayment of loans is a challenge. In addition, the agricultural exchange also plays an important role in preventing the sale of goods due to urgency. Most agricultural commodities have a long supply chain that consists of a number of intermediaries who play the roles and duties of brokers, agents, processing companies and firms, wholesalers, retailers and the like [12]. This is reflected in the high prices of these commodities. In most cases, the costs that an intermediary receives are not proportional to the real value of the economic function of transporting goods from the farm gate to the consumer market. In such circumstances, an unfair marketing system is created that allocates the least share to the producer and receives the most cost from the consumer. This issue forces the actors in this field to search for an efficient market that allows all actors to participate in the price discovery process with complete transparency, while reducing the cost of the value chain. Commodity exchanges have these characteristics and, in addition to forcing the elements of the value chain to increase their efficiency, create a solution for price discovery [9]. The agricultural sector has several important and fundamental functions in achieving economic growth and development, including providing food and food security for the country's growing population, providing foreign exchange for the import of capital goods through increased exports, supplying raw materials needed by the industry, and helping to develop related production activities [1].

This sector contributes to economic growth directly through increased production and exports and indirectly through increased demand for industrial goods and services, and as a result, creates new job opportunities. In other words, agricultural prosperity will encourage and develop agricultural activities, increase productive capital, and improve the efficiency of the factor market.

## 2.2 Importance of Agricultural Commodity Exchange in the Iranian Economy

The agricultural sector is considered one of the important production and economic foundations of Iran and, with an annual production of 118 million tons of agricultural products, plays an important role in meeting the food needs of the society. This sector also provides 16% of the gross national product, 22% of the country's employment, and 25% of non-oil exports. In developing countries, the agricultural sector differs from other sectors of the economy, especially due to its large contribution to national income and the large number of people who work in this sector. It depends on three important features, which are mentioned below: the specific characteristics of the agricultural sector, the importance of domestic consumption of products for the agricultural sector, and the role of agriculture in the form of resource storage. These factors are clearly visible in traditional societies, and the design of agricultural policy in developed and developing societies is complicated due to these factors, so it is necessary to recognize and examine these factors. Considering the trend of the past three decades of the Iranian economy, the agricultural sector has been able to play an important role in Iran's economic growth [13], but unfortunately this growth has not met the country's needs in providing employment and increasing per capita income. Therefore, in addition to using all the capacities of the agricultural sector, special attention should be paid to the leading role of this sector in responding to the country's growing needs. On the other hand, the realization of the country's 20-year vision document requires the provision of prerequisites and requirements without which the goals of the vision document cannot be achieved. Since the vision document outlines an ideal future in a competitive, complex, and rapidly changing world, the need to pay attention to the growth of economic sectors, including the agricultural sector, in the Iranian economy is one of the requirements for achieving the government's economic goals with an emphasis on the vision document and the general goals of development programs in the national economy. A review of research results in this field indicates that there is a reciprocal relationship between agricultural growth and economic growth. Therefore, government support policies in the agricultural sector can have a positive effect on improving national income in addition to the growth of this sector, given the key role of the agricultural sector in food security and employment; therefore, its growth leads to improving the resilience of the entire economy, which ultimately results in increasing the country's national security. Exports of agricultural products are the most important component for the growth of the agricultural sector, because increasing exports, in addition to increasing sustainable foreign exchange earnings, can also improve the use of modern technologies in the country and improve the production performance of farmers [12].

## 3 Research background

The importance of the commodity exchange in the agricultural field requires an analysis of the trading status of agricultural goods under each of the instruments available in this market. In this regard, Hassanzadeh and colleagues [10] analyzed the status of agricultural goods in the capital market. The results of the study and description of agricultural commodity transactions on the commodity exchange show that the supply of agricultural goods has been decreasing since 2018 to 2022 and fewer transactions have been made compared to previous years. Overall, the supply of agricultural products has been declining in recent years. Sam Daliri et al. [19], in a study titled Predicting the Acceptance of Futures Market by Rice Growers: A Case Study of Sari County, examined the position of the futures market for agricultural products as an effective solution to control price fluctuations in these markets. The results of this study showed that about half of the rice producers will be participants in the futures market and will offer their products in the futures market instead of the traditional market. Also, the introduction of the futures market will increase production, consumption, net exports, and profits of the participants. Ghorbani, Amini Zadeh [8] in a study titled Identifying the Factors Affecting Iranian Date Exports examined the key factors of Iranian date exports during the period 2001-2018. The results of this study indicated that international sanctions and the global crisis did not have a negative effect on Iranian exports. Perhaps the reason is that dates are among the products that are not produced by powerful countries in the global trade network, and the added value of exports from these countries is based on the import and re-export of this product. It is worth noting the positive and significant effect of distance, which clearly indicates that distance is not a serious inhibitor for date exports. Regional trade inhibitors do not have a significant effect on Iranian exports, and exporters do not face any specific inhibitors for date exports. Noldeke et al. [14] studied farmers' decision-making process and technology adoption behavior using the Ethnographic Decision Tree Model (EDTM). This study analyzes farmers' mental structures based on the main assumptions including farmers'

decision-making skills, limitations in information processing, and the use of simple models for decision-making. The decision-making process consists of two steps: the first step, which unconsciously adjusts the choices, and the second step, which is the conscious decision-making stage, and includes six steps including evaluating behavioral dimensions, adjusting them, selecting options based on functional validity, and final analyzing the options with different methods. The aim of this study is to clarify the decision-making path of farmers, which is rapidly passed in their minds. Falcone, Rosa, and colleagues [6] have used fuzzy cognitive maps to develop urban political strategies in an applied study. In this study, the FCM method was used to identify the complexities of the system and the forward methods, and finally, they introduced as a participatory modeling method based on stakeholder knowledge. Targetetti et al. [21] proposed a new and sustainable food consumption model using fuzzy cognitive maps. In this study, an empirical study with fuzzy inference was conducted to identify drivers that could potentially lead to unsustainable consumer behavior. Therefore, considering the very important functions of the commodity exchange in the development of trade and the national economy, examining and addressing this issue is essential for various countries, including our country, especially since in Iran the agricultural market plays a strategic role in the economy. Certainly, to achieve this, there is a need to design a suitable local model for the domestic agricultural exchange, and the use of a grounded theory approach can double the success of the model.

## 4 Research Method

The research method of the present study is qualitative. Since this study seeks to generate and develop a theory from qualitative data, it is based on principles based on grounded theory. In fact, what is done in the coding process is a kind of phenomenological meaning-making and conceptualization, although it is not introduced by this name. For this purpose, in the first stage, qualitative data were collected through in-depth interviews and secondary data. The data collected in this process were compared from different angles with each other and with other similar data, and in the next step during the collection process, the data were reviewed and coded. Each grounded theory has three dimensions of conditions, interactions, and consequences that are drawn around a core category. The final product of research with grounded theory is not simply a set of findings or several related categories, but rather a coherent theoretical formulation about the contexts, processes, and consequences of the existence of a phenomenon or event. To examine the validity of the research, four tests of confirmability, believability, transferability, and reliability were used. For sampling in studies of the zero stage of research, we must see how many types and classes of people carrying information and lived and thought experiences are here, and within that framework, we refer to samples that we know have the necessary information and experiences. Therefore, the population of this research includes university experts and professors, specialists familiar with the field of agricultural products, marketing experts, and experts. Purposeful and theoretical sampling method was used to select the samples. The sampling and data collection process continued until theoretical saturation was reached, and finally, 16 in-depth interviews were conducted with the participants, the distribution and details of which are as follows. The interviewees included experts and professors in the field of agricultural products. 13 of the interviewees were men and 3 were women. 6 had a master's degree and 10 had a doctoral degree. Among them, 6 had 15 to 20 years of experience. To assess the validity of the research tool, four main tests were conducted, including confirmability, credibility, reliability, and transferability, to examine the quality of the research design. Table 1 shows the results of the assessments conducted to assess the validity of the qualitative part of the research.

### 4.1 Data analysis results

To analyze the data obtained from the interviews with the research participants, principles related to grounded theory such as continuous comparative analysis, coding, and the creation of concepts and categories were used, in which data are collected and recorded step by step and continuously, and continuous and comparative analysis of the data is carried out nonlinearly step by step. Data coding was also carried out in the following three stages: 1- Open coding 2- Axial coding 3- Selective coding. In open coding in MaxQDA software, the first step in analyzing the conceptualization of the data is. Therefore, the information obtained from the interviews and secondary data was carefully studied and examined, and similar data that have the same semantic load were coded under common codes, and then the appropriate concepts were assigned to each.

In this study, a data-driven approach was used to design the strategic model of the Iranian Agricultural Products Exchange, and qualitative data was collected through interviews with experts. In the coding process, open codes were first identified and then categorized into categorical codes and finally into axial codes.

Table 1: Results of the assessments conducted to assess the validity of the qualitative part of the research

Objective	Actions Taken
<b>Credibility</b>	The researcher has been continuously engaged with the research environment and participants, dedicating significant time to this immersion. Participants were selected based on their expertise and sufficient experience in the research topic. Data collection, analysis, and interpretation were conducted by the researcher, who has a clear background in immersion, lived experience with the research subject, and qualitative research traditions. Actions taken include applying an initial theoretical framework as a basis for discussion with experts, conducting multiple interviews with experts from outside the relevant field, and seeking expert opinions after extracting results.
<b>Dependability</b>	To ensure dependability, all research processes, including detailed documentation and note-taking, were recorded. Additionally, as explained, the results of the data analysis were reviewed by the interviewees, and their feedback was obtained.
<b>Confirmability</b>	Confirmability in this study was achieved by thoroughly reporting all methodological steps in detail. All interviews and coding stages were meticulously recorded and are available for review.
<b>Transferability</b>	To facilitate the transferability of findings, all research processes—including participant selection criteria and characteristics, as well as data collection and analysis methods—were described in detail. Emphasis was placed on shared concepts during the initial framework development and expert interviews, and a standardized framework was consistently applied across all cases.

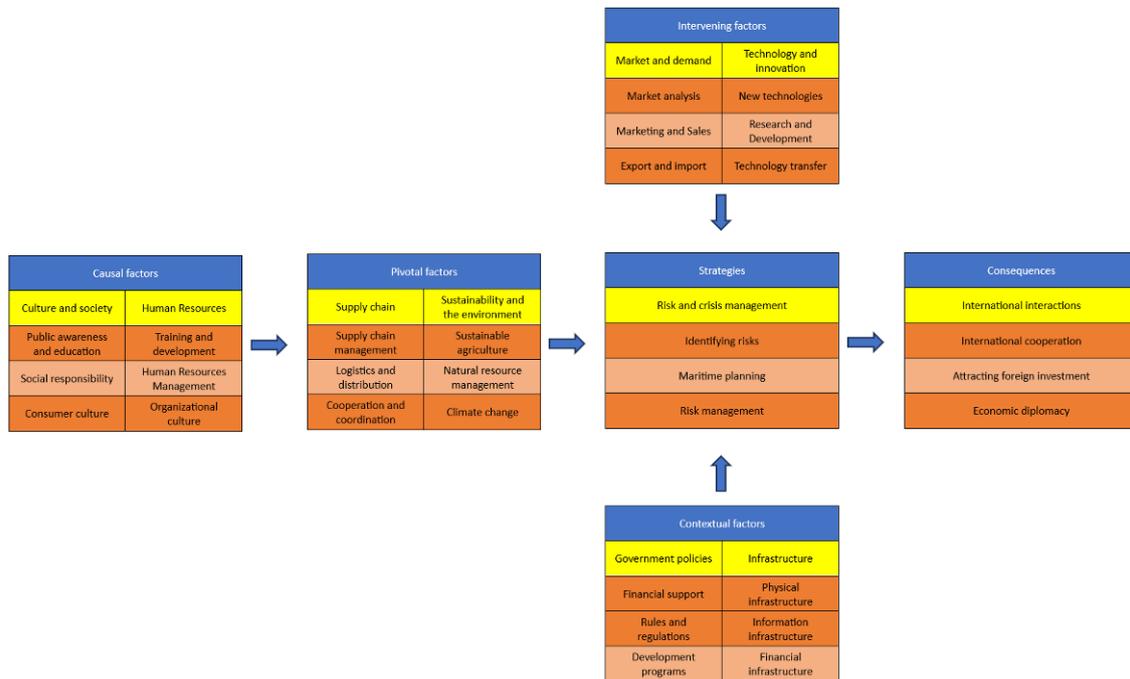


Figure 1: Final paradigm model

## 5 Conclusion and suggestions

The aim of this research was to model the strategic paradigm of the agricultural products exchange with a grounded theory approach. Therefore, in terms of purpose, it is an applied research. Considering the purpose and nature, this research is a qualitative research in terms of method. The results showed that the strategic model of the Iranian agricultural products exchange with a grounded theory approach includes the components of culture and society, human resources, supply chain, sustainability and environment, market and demand, technology and innovation, risk and crisis management, international interactions, infrastructure and government policies. Government policies as one of the central codes in the development of the agricultural sector include financial support, laws and regulations, and development programs. Financial support includes subsidies and low-interest loans, which show the role of the government in supporting agriculture. Export and import laws and health regulations help regulate the market, while development programs improve infrastructure and promote farmers' knowledge. Another core code is Market and Demand, which includes market analysis, marketing and sales, and exports and imports. Market analysis focuses on consumer trends and competitors, while marketing is concerned with advertising strategies and distribution networks. Customs tariffs are also important in the field of exports and imports. Technology and Innovation, as another

core code, includes new technologies such as smart farming and the Internet of Things. Research and development focuses on innovative projects, and technology transfer through workshops helps to improve the skills of farmers. Human resources also includes training, human resource management, and organizational culture. Training improves skills through training courses, while human resource management focuses on recruiting. Infrastructure includes physical, information, and financial infrastructure, which focuses on warehousing, transportation, information systems, and financial instruments. Risk and crisis management also includes risk identification, crisis planning, and risk management. International interactions include international cooperation, attracting foreign investment, and economic diplomacy. Sustainability and environment also emphasize sustainable agriculture, natural resource management, and climate change. Supply chain includes supply chain management, logistics, and distribution, which focuses on coordination between sectors. Culture and society also includes public awareness, social responsibility, and consumer culture. This comprehensive analysis of interview data helps identify key factors affecting the Iranian agricultural stock exchange and designs an appropriate strategic model. These results are in agreement with the findings of Nyarko, Pellegrini [15], Gezahegn [7], Raji [16], Roche [17], Chawla et al. [4], Mir-Emadi et al. [13], Ashk-Torab et al. [3]. The key philosophy of the formation of the stock market in the world is to pool capital and finance companies and their projects in the form of a coherent, regulated, continuous, and transparent market system. The basic basis for the formation of these markets is the basic and simple concept of partnership, the division of profits and possible losses among partners. By pooling small and scattered capital, the stock exchange enables important and large investments and has significant effects on the economic and social status of society and the progress of industries and the prosperity of the country, while at the same time creating profits and benefits for shareholders [3]. A study of the development process of different countries shows that the development of the agricultural sector is essential as one of the most vital economic sectors and a key prerequisite for achieving sustainable development of the country; so that without removing the obstacles to development in this sector, other sectors, including the industrial sector, cannot be expected to flourish and develop. Considering the results, it is suggested that the relevant authorities consider all components and factors for the agricultural products exchange and pay attention to them. Among the limitations of the research, it can be mentioned that the information was obtained from a single source and its generalization to other regions should be cautious. It was also not possible to include other important confounding variables in the study due to their high complexity.

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