Proceeding Paper

The Agricultural Knowledge and Innovation System (AKIS) in a Changing Environment in Greece †

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Abstract: The aim of this paper is to answer the question of whether the Greek AKIS system can contribute to the different requirements of the new trends in agriculture according to its main functions. A SWOT analysis has been applied to examine the internal and external environment. Data were collected from 61 experts/representatives of organizations (policy, education, research, consulting, agricultural cooperatives, credit, private companies, and farmers). The data were analysed using Excel spreadsheets and the Statical Package for Social Sciences (SPSS V.28). Based on this method, dominant strengths and weaknesses as well as opportunities and threats of AKIS were identified as a starting point, as well as useful guidance for decision makers, local authorities, and the other actors in Greece.

Keywords: agricultural sector; AKIS; SWOT analysis

1. Introduction

In our era, the agri-food sector has faced a huge challenge: to boost production with increasing demands and constraints placed on it [1]. In the future, feeding nine billion people with continuous pressure on the Earth's natural resources, health, climate, and welfare for both humans and animals is a big challenge for sustainable agriculture. There is an increasing demand for innovative solutions through the continuous renewal of products, processes, and services [2].

The goals related to innovation are increasing their emphasis on encouraging healthy, high-quality products, and environmentally sustainable production methods, including organic production, renewable materials, and biodiversity protection [3]. New social, technical, and economic solutions are needed for farming and rural areas [4]. Innovation is considered one of the key drivers for competitive and sustainable agriculture [5]. In the conventional view, innovation is mainly embodied in technological artifacts (new knowledge and equipment technologies, improved seeds, vaccines, breeding techniques, fertilizers and pesticides, and other agricultural inputs), and its successful application is related to the capacity of the users to learn to 'adopt' them, according to given guidelines. However, in the new network's view, innovation occurs when the network of production changes its way of doing things, so innovation is mainly related to the resulting pattern of interaction between people, tools, and natural resources [4]. Innovation processes are increasingly conceptualized as the outcome of collaborative networks, where information is exchanged and learning processes happen and lead to an expanded knowledge system, including a wide range of stakeholders who innovate and those who benefit (or suffer) from innovation [4]. The combination of technological innovation, improved skills, and an increased capacity of farmers and their organizations [6], and the effective cooperation between the people who produce the knowledge and the end users who utilize it, are optimal solutions for dealing with the above challenges [2].

In recent years, AKIS studies agreed on the importance of the direct involvement of farmers in the innovation processes to identify the best response to farm issues and improve innovation effectiveness [7–9]. Direct involvement means an interactive and practical collaboration of all actors (scientific, institutional, business, and civil society) using appropriate tools for the target [10], allowing partners to verify the activity carried out and contribute to the change process. Through the AKIS system, they are given the opportunity to collaborate, share their ideas, and turn existing knowledge and research results into innovative solutions that can be more easily implemented in practice [11].

The main aim of this research is to answer the question of whether the Greek AKIS system can contribute to the different requirements of the new trends in agriculture by evaluating the strengths and weaknesses in terms of its internal environment, as well as the opportunities and threats that come from the external environment.

2. Material and Methods

First, a literature review was carried out with the aim of understanding the internal factors of AKIS operations (strengths and weaknesses), where the participating agencies have a greater capacity for action and control, and then the external elements (opportunities and threats), where their actions are quite limited, but which can significantly influence the situation. SWOT analysis allows an assessment of the parameters of the application of AKIS. To analyse the situation of Greek AKIS, the questionnaire consisted of four sections including strengths (13 factors), weaknesses (11 factors), opportunities (7 factors), and finally threats (8 factors). The surveyed actors were asked to identify if they agreed or disagreed on the typical 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Data were collected through a survey of 61 expert representatives (mainly senior managers) from all participating bodies (Ministry, Region, Chamber, NGO, ELGO-Dimitra, Research Institutes, Educational Institutions, private consulting companies, supply of inputs, manufacturing companies, cooperatives, credit institutions, and farmers). Data were collected during December 2022 and March 2023 using an online survey tool after an initial phone communication. Descriptive statistics indicators (mean scores, standard deviations, and standard errors) were used to describe and present the main results.

3. Results

Based on the AKIS internal environment evaluation results, the main strength was finding new solutions for agricultural issues (mean: 3.90; SD: 0.98 and SE: 0.12). The findings revealed that the main weakness of AKIS is the ageing population of farmers (mean: 3.84; SD: 1.05 and SE: 0.13). In terms of external opportunities, AKIS has the potential to develop further, due to new opportunities and environmental factors (mean: 4.16; SD: 0.76 and SE: 0.10). However, the most significant threat to AKIS is the complexity of legal and regulatory frameworks (mean: 4.18; SD: 0.82 and SE: 0.11) (Tables 1 and 2)

Table 1. External factors evaluation matrix.

External Factors	Mean	SE	SD
Opportunities			
O1: Farming system to produce high-value products	4.08	0.09	0.69
O2: New market information system	3.95	0.11	0.82
O3: New opportunities and environmental potential to develop agriculture	4.16	0.10	0.76
O4: Strengthen policies in the European Union	3.72	0.11	0.90
O5: Development of programs, institutions, and facilities	3.87	0.12	0.97
O6: Increasing economic growth rate	3.62	0.12	0.97

Table 1. *Cont.*

External Factors	Mean	SE	SD
Threats			
T1: Complexity of legal and regulatory frameworks	4.18	0.11	0.82
T2: Inadequate balance of supply and demand of products	3.46	0.11	0.87
T3: High fluctuations in prices of inputs and outputs	3.72	0.02	0.93
T4: Adverse environment due to conditions of uncertainty (recession, pandemic, war)	4.10	0.11	0.89
T5: Most innovations are capital-intensive	3.62	0.13	1.00
T6: The lack of financial and government support	3.77	0.14	1.09
T7: Unforeseen environmental changes	3.79	0.13	1.00
T8: Low resilience of agricultural holdings	3.79	0.13	1.02

Table 2. Internal factors evaluation matrix.

Internal Factors	Mean	SE	SD
Strengths			
S1: Strengthening of interactive learning through the sharing of different types of knowledge	3.66	0.15	1.15
S2: Improving farmers' access to a new, diverse, and growing information system	3.74	0.12	0.96
S3: Educating farmers to improve their skills	3.75	0.14	1.10
S4: Boosting productivity and farmers' incomes and subsequently improving their standard of living	3.44	0.14	1.07
S5: Increasing and attracting investment	3.33	0.14	1.08
S6: Finding new solutions for agricultural problems	3.90	0.12	0.98
S7: Enhancing coordination among AKIS actors	3.57	0.14	1.12
S8: Developing each actor's new capacities and skills within AKIS	3.64	0.14	1.10
S9: Changing farmers' knowledge, attitudes, and strengthening of participatory spirit	3.56	0.14	1.10
S10: Improving farmers' access to international markets	3.13	0.12	0.90
S11: Improvement in the responsibility of actors to farmers	3.39	0.13	0.99
S12: Preventing anti-competitive practice	3.05	0.14	1.10
S13: Empowerment of farmers to increase critical thinking skills to be able to analyse situations and determine their main demands	3.43	0.13	1.02
Weaknesses			
W1: Ageing of the agricultural population	3.84	0.13	1.05
W2: Lack of focus in dealing with diverse demands that come from different farmers	3.75	0.10	0.79
W3: Lack of enough development of social capital between farmers	3.80	0.12	0.91
W4: Ignorance of poor and marginal farmers	3.82	0.13	0.99
W5: High costs of advisory service	3.31	0.13	1.02
W6: Lack of enough use of new information and communication technologies	3.39	0.14	1.07
W7: Insufficient opportunities of education and training programs	3.34	0.13	1.03
W8: Inadequate control and evaluation systems by regional authorities	3.82	0.13	1.01
W9: Lack of synergies between actors to co-create the appropriate innovation	3.80	0.13	0.96
W10: Inadequate significant organizational capacity of advisors	3.46	0.12	0.92
W11: Lack of awareness of possibilities to receive advisor services	3.67	0.12	0.89

4. Discussion and Conclusions

This research focuses on the question of whether the Greek AKIS system can contribute to the different requirements of the new trends in agriculture, according to its main functions such as the guidance of search, knowledge development, network formation and knowledge diffusion, entrepreneurial activities, market formation, resource mobilization, and formation of legitimacy [12,13]. The actors supported that the existing AKIS develop new knowledge for solving agricultural problems, mobilize resources for educating farmers to improve their skills, and strengthen the farmers' access to communication information technologies (agreed by 60–75%). The ageing and ignorance of poor and marginal farmers were considered the main inhibiting factors for its operation (agreed by 65%). The existence of agricultural systems such as integrated farming management, organic farming, and precision agriculture were considered opportunities for the development of AKIS (agreed

by 84%). On the other hand, the actors support that the complexity of legal and regulatory frameworks is a threat to the system (agreed by 80%). The analysis presents a starting point and useful guidance both for decision makers and the other actors for the enhancement of AKIS.

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