STAKEHOLDERS AND THEIR INTERESTS IN THE IMPLEMENTATION OF THE LITHUANIAN ARTIFICIAL INTELLIGENCE STRATEGY

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Abstract

The agri-food industry is identified as an area that is too slow to accept technological progress, but plays an important role in the Lithuanian economy. The Lithuanian Artificial Intelligence Strategy presents the agri-food sector as one of the main economic sectors that will benefit the most from the application of artificial intelligence systems, therefore, in order to increase the productivity and competitiveness of the Lithuanian agri-food industry, it is important to implement the Lithuanian Artificial Intelligence Strategy, which can be facilitated by the identification of stakeholders and determination of their interests. In the Lithuanian agri-food industry, 6 stakeholder groups have been identified upon implementation of the Lithuanian Artificial Intelligence Strategy, however, these groups, in cooperation with each other, form new stakeholder groups, therefore, the list is not exhaustive. Stakeholder groups must be constantly analysed in order to determine their interests and expectations in the implementation of the Lithuanian Artificial Intelligence Strategy.

Key words:
artificial intelligence strategy, stakeholders, agriculture, agri-food industry, competitiveness

JEL Classification: J43, Q13, Q16, Q18

INTRODUCTION

In 2019, the Ministry of Economy and Innovation of the Republic of Lithuania presented the Lithuanian Artificial Intelligence Strategy (hereinafter referred to as the AI strategy), which identifies the agri-food sector as one of the main economic sectors that will benefit most from the application of artificial intelligence systems. According to the data of the Lithuanian Department of Statistics, in 2019, the agricultural production was 2.45 billion Eur or 10.4 per cent greater than the production in 2018. In 2019, the value of crop production increased by 16.5 per cent, and the value of livestock production increased by 1.3 per cent in comparison with 2018. In order to increase the productivity and competitiveness of the agri-food industry, it is necessary to implement the AI strategy, and one of the factors determining the success of the strategy is proper identification and analysis of stakeholders. Stakeholder analysis makes it possible to determine how strategic decisions may affect stakeholders. The effectiveness and efficiency of strategy actions can be increased

and negative impact can be reduced by understanding which stakeholders may be affected by the proposed strategic actions. Determination of stakeholder interests facilitates decision-making in their management in order to meet stakeholder expectations and successfully implement the AI strategy. The object of the research is the stakeholders in the implementation of the Lithuanian AI strategy. The aim of the research is to identify the Lithuanian AI strategy stakeholders in the agri-food industry and their interests. The research methods are scientific literature analysis, document analysis, and secondary data analysis.

THEORETICAL BACKGROUND

In 1963, the Stanford Research Institute first introduced the concept of stakeholders, defining stakeholders as groups without which the support organization ceases to exist. This concept has been further developed by noticing the need to identify stakeholders not only in the private but also in the public sector, however,

Freeman's (1984) stakeholder theory is still used, which describes stakeholders as "any group or individual that can influence or be affected by objectives of the organization". Stakeholders may be understood differently in different activities. Scientific literature provides many definitions of stakeholders (Table 1).

Table 1: Definitions of stakeholders

Author	Year	Definition	Source
Stanford Research Institute	1963	Groups without which the support organization ceases to exist	Florea and Florea (2013)
Handen	1981	Parties that may be affected by technology in the private or public sector or that are involved in the technology assessment process through participation in interviews, workshops, surveys, conferences, etc.	Babiuch and Farhar (1994)
Wilekke	1981	Identifiable, but not necessarily socially related groups with a similar pattern of behaviour for the proposed action	Babiuch and Farhar (1994)
Francis	1975	Groups that are immediately affected by the project or policy or that will be affected in the future	Babiuch and Farhar (1994)
Freeman n	1984	A group or an individual that can influence or be influenced by the goals of an organization	Gil-Lafuente and Paula (2013)
Post	2002	Groups or individuals who voluntarily or involuntarily contribute to the well-being of an organization and are potential profit or risk bearers	Gil-Lafuente and Paula (2013)
Florea and Florea	2013	Individuals, institutions, organizations, formal or informal groups, concerned organizations, affected by the decisions or actions of the organization or likely to influence them.	Florea and Florea (2013)
Cambridge Dictionary	2020	An individual, employee, customer, or citizen who is related to an organization, society, or alike, and who is therefore responsible for it and has an interest in its success.	Cambridge Dictionary (2020)

Source: own elaboration (2020)

Table 1 shows that even though the definition of stakeholders has been developed in the work of scholars since 1963, the concept has remained similar, and is best revealed by the definition of stakeholders developed by Freeman (1984), the pioneer of stakeholder

theory. Depending on the subject matter, the most precise definition of stakeholders is revealed by Handen (1981), who defines them as parties that may be affected by technology in the private or public sector or that are involved in the technology assessment process through participation in interviews, workshops, surveys, conferences, etc.

In the scientific literature, stakeholders are divided into groups according to various characteristics. Grouping of stakeholders into internal and external is the most common (Florea, Florea, 2013). According to Freeman's (1984) definition of stakeholders, stakeholders can be divided by the impact, i.e. stakeholders who can influence an organization's goals or stakeholders who are affected by an organization's goals. Babiuch and Farhar (1994) defined the impact as positive, negative, or neutral changes in social, economic, or political structures that result from the proposed actions. Changes can occur in the plane of space and time. Researchers categorised stakeholders according to the impact of the organization's goals that affect them. Stakeholders may be directly affected by the proposed action (fist order impact) may be affected by second or higher order impacts due to the action. In assessing the potential impact of the proposed action, the first, second and third order impacts are distinguished (Table 2).

Table 2: Impact on stakeholders

Impact classification	
First order impact	directly related to the proposed action
Second order impact	resulting from first order impact
Third order impact	indirect impact arising from second order and subsequent impact

Source: Babiuch and Farhar (1994)

Implementing the strategy can be difficult due to the interests of stakeholders. Perez Carillo (2007) emphasises that one of the challenges faced by experts, academics, governments, and private companies is the consensus on how to define and prioritise stakeholder interests. Florea and Florea (2013) note that there may be many different stakeholder interests. The most frequently singled out interests of stakeholders are related to economic aspects, social change, work, security, environment, and education. The decisions of an organisation have a positive effect on one stakeholder while at the same time having a negative impact on the other, so when considering the interests of one stakeholder, the interests of other parties should be considered as well (Florea and Florea, 2013).

In summary, it can be said that, depending on the subject matter, the most precise definition of stakeholders is the following: parties that may be affected by technology in the private or public sector or that are involved in the technology assessment process through participation in interviews, workshops, surveys, conferences, etc. Stakeholders can be grouped according to different characteristics, however, if the technology is still being developed, it remains unclear what the exhaustive list of stakeholders will be, and prioritising their interests is one of the main challenges.

RESULTS AND ANALYSIS

In the AI strategy, the Lithuanian agri-food industry is identified as an area that is too slow to accept technological progress, but plays an important role in the Lithuanian economy. There are already examples of the use of artificial intelligence and innovation in the Lithuanian agri-food: hyperspectral imaging for precision agriculture, distributed algorithm processing infrastructure, farm and grain management software, food integrity using artificial intelligence and Raman spectroscopy, electronic nose for food freshness testing, 3D LiDAR programs in forestry, modelling solutions in agriculture and fruit growing. However, in order to accelerate the processes of artificial intelligence development and application, it is important to identify which stakeholders are affected by the goals of the AI strategy so that their interests can be understood, and thus facilitate stakeholder management in implementation of the AI strategy.

The AI strategy consists of 6 sectors, with principles assigned to each sector and implementation mechanisms established. The following is relevant to the agri-food industry: AI strategy, sector 2 "Integration of artificial intelligence systems into all sectors of the economy", principle 3 "To focus on the key sectors of the economy that will benefit most from the application of artificial intelligence systems" as well as the established implementation mechanism, which is to develop individual methods of adapting AI innovations to the manufacturing, agricultural, healthcare, transportation and energy sectors. Although the mechanism set out in the AI strategy only involves the development of AI application methods, these innovations will have an impact on a wider range of stakeholders in the agri-food industry. Adams et al. (2015) note that when assessing technologies that do not yet exist or have not yet been developed, it is not always clear what the final list of stakeholders will be, but it is useful to consider the potential impact of technologies in determining which stakeholder groups may be affected by change. Based on the definition of stakeholders – parties that may be affected by technology in the private or public sector or that are involved in the technology assessment process through participation in interviews, workshops, surveys, conferences, etc. – stakeholder groups in the Lithuanian agri-food industry have been identified, which will be affected by the development of AI methods directly or indirectly (Fig. 1).

Figures and tables should be shown as in the following example. Make sure that they are within determined margins, centered, numbered and titled. Below the figure or table explanation should be given showing the importance of an illustration.

Figure 1: Identification of stakeholders in the implementation of the Lithuanian artificial intelligence strategy in the agri-food industry

Public authorities
- Ministry of Agriculture of the Republic of Lithuania
- Ministry of Economy and Innovation of the Republic of Lithuania
- Ministry of Education, Science and Sport of the Republic of Lithuania
- Governmental institutional organizations

Entrepreneurs
- Farmers, agricultural cooperatives
- Traders

AI developers
- Universities
- Science and technology parks
- Clusters
- Private companies creating and developing AI in Lithuania
- Private companies importing AI products
- Independent AI enthusiasts

Investors
- Natural and legal entities

Associations, consultancy and support agencies
- Lithuanian Artificial Intelligence Association
- Lithuanian Computer Society
- Chamber of Agriculture of the Republic of Lithuania
- Lithuanian Union of Small and Medium Farmers
- Lithuanian Meat Processors Association
- Association Lithuanian Food Industry
- Lithuanan Family Farmers Union
- Lithuanian Agricultural Advisory Service
- Agencies providing support

Consumers
- End consumers in the agri-food industry

Source: own elaboration (2020)

Upon implementation of the Lithuanian AI strategy in the agri-food industry, 6 stakeholder groups were identified: public authorities, entrepreneurs, AI developers, investors, associations, consultancy and support agencies, consumers, however, the list is not exhaustive due to the continuous development of AI methods. Stakeholders can interact with each other, creating new stakeholders, and public authorities, entrepreneurs, AI developers, investors, associations discover new forms of cooperation, e.g. Lithuania Agro Space Digital Innovation Hub is a non-profit regional network uniting Lithuanian research, education, business and governmental institutional organizations to promote cross-sectoral digital technology innovation; AgriFOOD Lithuania is a centre for digital innovation, bringing together key stakeholders in research, business and society; European Centre for Digital Innovation EDIH4IAE.lt has the aim of streamlining the digital transformation of the industrial, agri-food and energy sectors, giving priority to business and public entities operating in the western and central Lithuanian region and introducing key digital technologies (high-performance computers, artificial intelligence, and cyber security). Stakeholder groups work together in the common interest of fostering innovation through investment, however, each stakeholder differs in its range of interests when implementing the AI strategy (Table 3). Meeting the interests and expectations of stakeholders in a balanced way is important because stakeholders who realize that they are not getting enough benefits may

refuse to implement the AI strategy or find other alternatives.

Table 3: Interests of stakeholders upon implementation of the Lithuanian Artificial Intelligence Strategy in the agri-food industry

Stakeholders	Interests
Public authorities	Support for the implementation of artificial intelligence methods; Economic growth; Increasing the competitiveness of regions and farms facing difficulties; Job creation
Entrepreneurs	To use the developed artificial intelligence products and methods to strengthen their activities; Ton increase competitiveness; To improve financial returns; To use access to qualified workers
AI developers	To commercialise the products under development; To sell the already developed products; Job creation
Investors	Investing in promising artificial intelligence companies boosts economic growth; Quick financial returns
Associations, consultancy and support agencies	Support for companies and farms implementing artificial intelligence methods, their consulting, provision of information; Economic growth; Increasing the competitiveness of regions and farms facing difficulties
Consumers	Quality goods; Lower prices

Source: own elaboration (2020)

Table 3 shows that the interests of all stakeholders are related to economic aspects, but the economic level differs: economic interests of public authorities and associations, and consulting agencies are focused on macro and meso levels, while economic interests of entrepreneurs, AI developers, investors, consumers are related to micro level. Although the interests of all stakeholders are related to economic aspects at various levels, the public authorities combine economic interests with the introduction of technologies, including the social context – increasing the competitiveness of regions and farms facing difficulties, job

creation; whereas entrepreneurs, AI developers and investors focus on fast and higher financial returns; the interests of consumers include the criterion of better quality goods, and the associations and consulting agencies combine their economic interest with the dissemination of information.

4. CONCLUSION

In summary, it can be said that, depending on the subject matter, the most precise definition of stakeholders is the following: parties that may be affected by technology in the private or public sector or that are involved in the technology assessment process through participation in interviews, workshops, surveys, conferences, etc. Stakeholders can be grouped according to different characteristics, however, if the technology is still being developed, it remains unclear what the exhaustive list of stakeholders will be.

In the Lithuanian agri-food industry, 6 stakeholder groups have been identified in the implementation of the Lithuanian AI strategy, i.e. public authorities, entrepreneurs, AI developers, investors, associations, consultancy

and support agencies, and consumers however, this list is not exhaustive due the continuous process of the development of AI methods. The identified stakeholder groups can interact with each other, thus creating new stakeholders with common interests, which are to foster development and introduction of innovation and investment by attracting investment. Stakeholder groups must be constantly analysed in order to determine their interests and expectations in the implementation of the Lithuanian AI strategy.

Upon implementation of the AI strategy, the interests of all stakeholder groups are related to economic aspects, however, public authorities combine economic interests with the introduction of technologies, including the social context – increasing the competitiveness of regions and farms facing difficulties, job creation; whereas entrepreneurs, AI developers and investors focus on fast and higher financial returns; the interests of consumers include the criterion of better quality goods, and associations and consulting agencies combine their economic interest with the dissemination of information.

REFERENCES

Adams C., Pert A, Ross P. and Aziz B. (2015) Temporal Stakeholder Analysis of Future Technologies: Exploring the Impact of the IoV. Cutter Journal Vol. 28, No. 7

Babiuch, W. M., Farhar, B. C. (1994) Stakeholder Analysis Methodologies Resource Book: National Renewable Energy Laboratory

Cambridge online dictionary. https://dictionary.cambridge.org/dictionary/english/stakeholder

Florea, R., Florea, R. (2013). Stakeholders interests analyse and harmonization – starting point of strategic approach. Economy Transdisciplinarity Cognition, Vol. 16, Issue 1/2013, 130-135

Freeman R. E. (1984). Strategic Management: A Stakeholder Approach. Boston: Pitman

Gil-Lafuente, A. M., Paula, L. B. (2013). Algorithm applied in the identification of stakeholders. Kybernetes, 42 (5), 674–685

Perez Carillo E.(2007) Corporate Governance: Shareholders' Interests And Other

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