International Journal of Engineering, Management and Humanities (IJEMH)
Volume 5, Issue 2, Mar.-Apr., 2024 pp: 52-58 ISSN: 2584-2145
www.ijemh.com

Evaluating Advisory Methods in a Digitization-Supportive Pilot Project - the case of INSAC-AGRIS

DR. TÓTH KRISZTINA [1] - DR. ENG. AMARIEI DANIEL[2] - FŰRÉSZ EDINA [3]- Dr. MILICS GÁBOR[4]- - BENCZE TIBOR[5] - NAGY ATTILA[6]
[1,3,4,5] *Magyar Agrár és Élettudományi Egyetem, 2100 Gödöllő Páter Károly u. 1.*
[2]*Projektberatung und Management Expert Assoziation - PAMEA, Austria, 2423*
[6]*Kuspermező Kft., Kömlő Fő út*

Date of Submission: 04-03-2024 Date of Acceptance: 17-03-2024

ABSTRACT The EUREKA INSAC-AGRIS project is developing an integrated system focusing on site-specific farming in the pilot area of Kuspermező Kft. in Kömlő and its dissemination. The pilot project provided an opportunity to test the effectiveness of different extension methods. The extension methods used during the project were effective in helping the farmer to engage in site-specific farming. The study describes the methods used to ensure the extension services support and accelerate the adoption of innovation.
KEYWORDS: agriculture, digitalisation, agricultural extension, extension methods

I. INTRODUCTION Through the project named "Integrated System for Automated Control of Experimental Plants via Aerial/Ground Remote Sensing for Precision Farming - INSAC-AGRIS", financed through EUREKA program, one of the aims is also to demonstrate how the methodological knowledge of agriculture advisors facilitates the integration of digital technologies in agriculture. We are exploring the knowledge transfer methods employed to improve Hungary's Digital Economy and Society Index (DESI) metrics. Since 2014, the European Commission has monitored Member States' progress in digital and published annual Digital Economy and Society Index (DESI) reports [1]. Each year, the reports include country profiles, which help Member States identify areas for priority action, and thematic chapters providing an EU-level analysis in the key digital policy areas. In this regard, Hungary ranks 22nd out of the 27 EU Member States in the Digital Economy and Society Index (DESI) 2022.

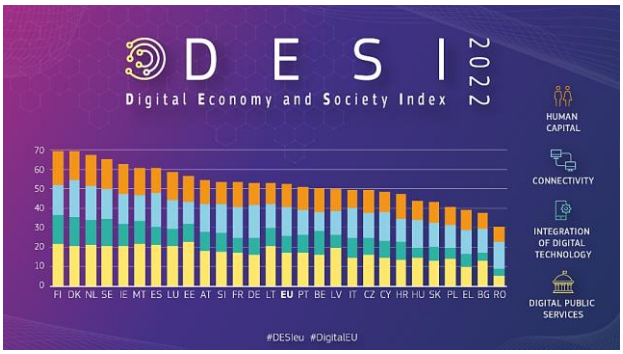

Fig.1 DESI ranking at level of 2022

Over the last few years, Hungary progressed in line with the EU. Regarding digital policies, the Hungarian National Digitalisation Strategy provides the strategic policy framework for 2021-2030. It is an umbrella strategy which groups, clarifies and, in some cases, complements the measures contained in various other strategic documents. The strategy is structured around the four main pillars of the Digital Decade Compass measured in DESI. These are digital infrastructure, digital skills, digital economy and digital state. Hungary has the very ambitious and challenging aim of exceeding the EU average in digital development by the middle of the decade and of being among the 10 leading EU economies in terms of digitalisation by 2030. Hungary ranks 23rd

International Journal of Engineering, Management and Humanities (IJEMH)
Volume 5, Issue 2, Mar.-Apr., 2024 pp: 52-58 ISSN: 2584-2145
www.ijemh.com

among EU countries on Human capital. The country scores below the EU average on the three skills indicators. On the Integration of digital technology in enterprises' activities, Hungary ranks 25th among EU countries. Despite an increase in several indicators in this domain, most Hungarian enterprises still fail to capitalise on digital technology.

The country still performs poorly on the technology adoption indicators. In 2019, the Government of Hungary adopted the Digital Agricultural Strategy by Government Decision 1470/2019 (VIII. 1.) The purpose of Hungary's Digital Agriculture Strategy (DAS) is to leverage the benefits of technological advancement to support and enhance the domestic agricultural economy and its surrounding environment. It aims to identify and manage emerging risks associated with agricultural production and related activities. By employing both vertical and horizontal approaches, DAS encompasses a wide range of areas including agricultural production, farm operations, product pathways, human resource development, research, development and innovation (RDI), administrative and public services, as well as development policy and support systems. [2].

In essence, the strategy seeks to:

- Utilize digital technology advancements to improve efficiency, sustainability, and resilience in the agricultural sector.
- Facilitate the identification and management of risks, promoting a proactive approach to challenges in agriculture.
- Integrate and align with broader national and EU policies and strategies, ensuring a coherent and comprehensive approach to agricultural development.
- Support the sector's actors in adopting digital technologies through targeted actions, facilitating access to finance, knowledge, and infrastructure required for digital transformation.
- Foster innovation and the dissemination of precision agriculture solutions, aligning with the objectives of the Common Agricultural Policy and broader environmental and sustainability goals.

DAS is a strategic framework that positions Hungary among the leading EU countries in terms of agricultural digitalization objectives, ensuring that the agricultural sector remains competitive, sustainable, and capable of adapting to future challenges and opportunities. In this work, agricultural advisors have a key role to play, but in addition to their digital literacy, their methodological skills need to be known and developed. [3].

European Union use in the agricultural sector new tools, forms of support to promote knowledge and innovation [4]. Advisory organizations perform new tasks and roles in order to improve agricultural sustainability. [5]. The advisor must select the knowledge transfer method individually, according to the client's needs. The most important knowledge transfer methods used in consultancy work can be categorized into the following groups:

1. Individual method

A typical baseline scenario in advisory work is when the consultant focuses on a single client at a given time. This is a method with several decades of practice in the field of consultancy. The types include:

- Office consultation (takes place in the consultant's office),
- Telephone communication,
- Farm visit. [6].

For utilising this method, the individual needs can be accurately identified. [10].

2. Group consultancy method

Group consultancy is a key issue in the efficiency of consultant communication, focusing on how many clients the consultant can engage with during their work. The great advantage of group knowledge transfer is that multiple clients can be informed about the same topic at the same time. The most common forms are ***lectures*** and ***on-farm demonstrations***.

2.1. On-farm demonstrations

On-farm demonstrations have a history spanning several decades. Originally as a way

International Journal of Engineering, Management and Humanities (IJEMH)
Volume 5, Issue 2, Mar.-Apr., 2024 pp: 52-58 ISSN: 2584-2145
www.ijemh.com

to introduce farmers to innovation, but more recently also to share experiences in a farmer-to-farmer setting, and to support knowledge co-creation between farmers and other actors. Increasingly, farmers themselves are opening their farms to connect with their peers and the general public as part of business development strategies. [6] In Hungary, in the advisory circle, giving presentations is fully accepted, but organising presentations is less common, as it is now a group effort. [7].

The 6 steps to organise a successful demonstration to promote innovation are:

1. Demo objectives and target groups (What do you want to achieve with the demo?"
2. Select host farm (Demo events can be hosted on different types of sites, ranging from farmer owned farms on fields leased by universities, research centres)
3. Demo set-up (organisation team, a balanced program, suitable time)
4. Promotion (clear invitation adapted to the target groups)
5. Learning methods (The demo event should combination of well-considered and well-balanced activities, to support good learning condition: learning by doing, peer to peer)
6. Evaluation and follow-up

Summarising, the benefits of the demonstration are:

1. Aim to create new knowledge, of the participants the on-farm demonstration event.
2. Help the transfer of new opportunities, novelties or practical experience that can be used directly on farms.
3. Problem solving: Useful platform to link extension to the needs of local farmers. Can demonstrate solutions to farmers' problems, for example, digitalisation.
4. Training. Demos serve as a platform for skills enhancement thus enabling practical implementation of innovative practices on the farm. Building awareness.
5. Can raise awareness on topics like for example data collection, data processing
6. Networking. Demo events can act as meeting place for participants. They can contribute to the strengthening and development of collaboration national and international. Also, the social aspect of networking, being able to meet other farmers, is very attractive to some participants.
7. Research implementation. On-farm demo events can act as a platform to transfer knowledge on applied research results to agricultural practice. Innovations and practices can be trialled, compared or validated in 'real' farm conditions. [8].

Literature and countless EU projects (AgriDemo-F2F, PLAID, NEFERTITI) prove that demonstrations are essential to accelerate the digitalisation of agriculture and to promote site-specific farming. [8].

3. Written documents in print method

The printed media (newspapers, magazines, leaflets and brochures) can be useful for farmers who do not have regular access or are reluctant to use digital technologies. Well produced written material can indeed be used to raise awareness, shape farmers' attitudes and practices, disseminate new techniques, and increase efficiency by providing one-way communication.

Written material for agricultural extension services is usually grouped as follows:

- letters, circulars, reminders,
- newspaper articles, specialist articles, reference books, information publications
- brochures presenting research results
- business reports, economic plans, tenders,
- advertising material, promotional leaflets. [9]

4. Mass communication methods method

International Journal of Engineering, Management and Humanities (IJEMH)
Volume 5, Issue 2, Mar.-Apr., 2024 pp: 52-58 ISSN: 2584-2145
www.ijemh.com

The purpose of using mass media is to get as much information out to as many people as possible. Radio and television: broadcast programmes that present new farming methods, market opportunities, legislative changes, available subsidies. These programmes are popular with farmers and should be followed up as an advisory service.

- ***Online platforms:*** their use is becoming increasingly popular, especially among young farmers, due to the proliferation of smartphones. Guides and videos can be shared with farmers, which not only increases the popularity of your extension service but also demonstrates your professional commitment.
- ***Social media***: Facebook, Instagram, Twitter and YouTube are also a good way to disseminate information and connect with farmers. Farmers can follow accounts or join groups that provide regular updates, advice and opportunities for interaction.

The COVID-19 pandemic has not only accelerated the development of audio and audiovisual technologies, but has also significantly transformed agricultural extension services:

- ***Virtual training and webinars***: traditional face-to-face training and seminars have been replaced by virtual webinars and online training. These sessions allow advisors to share information and interact with farmers without geographical constraints.
- ***Mobile apps***: can provide vital information on crop diseases, pest control, weather forecasts and market trends.

Media can be used to raise awareness, develop knowledge and skills and thus contribute to fostering innovation, and some forms of media, in particular digital media, can facilitate interactions between farmers, allowing them to share experiences, learn from each other and build support networks.

Unfortunately, the presented communication methods do not equally succeed in advancing agricultural digitalization. The challenge in spreading precision farming lies in the consultant's ability to select the appropriate method or a favourable combination thereof according to the given circumstances. Successful consultancy demands from the consultant thorough expertise and the skilful application of methodological knowledge.

II. EVALUATION OF THE EFFECTIVENESS For this article, initially we have processed the major national and international literatures and scientific publications and we studied how the EU guidelines are enforced. We have investigated the opinions and experience of targeted advisors and farmers by qualitative method (unstructured individual interviews), the research being conducted during almost 24 months, in order to have a proper database and knowledge to be able to make a proper comparison with the INSAC-AGRIS project activities.

Thus, in the INSAC-AGRIS project, nine consultants participated from four specialized fields: crop production, soil science, plant protection, and precision farming. According to their educational qualifications, five hold PhD degrees, and four possess MSc degrees, with each having over 10 years of practical experience.

Through interviews, we assessed the knowledge transfer methods used in the project, the results of which are presented in Figure 2. The findings significantly deviated from expectations, as five consultants employed only written communication methods, and only two consultants utilized all four groups of knowledge transfer methods. The interviews also explored programs aimed at expanding the consultants' methodological knowledge, providing an explanation for the observed results. Advisors who used all four knowledge transfer methods had participated in three international projects (AgriDemo-F2F, PLAID, NEFERTITI) in the past five years, focusing on methodological education. The remaining consultants, beyond their basic education, did not spend time developing their methodological skills [11].

International Journal of Engineering, Management and Humanities (IJEMH)
Volume 5, Issue 2, Mar.-Apr., 2024 pp: 52-58 ISSN: 2584-2145
www.ijemh.com

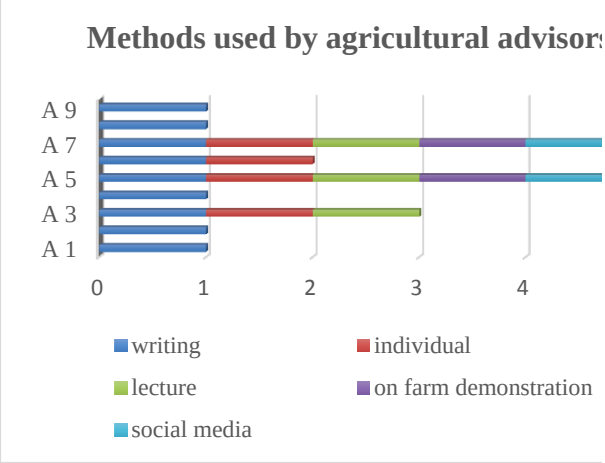

Figure 2. Methods used by agriculture advisors based on own data from 2024

During an interview with a farmer conducted as part of the INSAC-AGRIS project, it emerged that, due to his high level of educational attainment, he considered written knowledge transfer to be sufficient. However, he noted that based on feedback from professional demonstrations and presentations held during the project, his fellow farmers found the demonstrations to be the most effective method.

Over the 24-month period, the team of advisors organized 9 demonstrations, with around 136 farmers participating. Feedback indicates that nearly 90% of the farmers have concerns about data collection and sharing, yet approximately 10% are actively embracing digitalization.

The team of advisors has engaged in domestic and international grant applications where digitalization is also the focus, enabling them to offer new services in a network format. [13].

During farm visits as part of the INSAC-AGRIS project, roadmaps are created for farmers, assessing their current situation, future plans, and exploring financial and technical opportunities to initiate development.

III. CONCLUSIONS The project saw the participation of nine consultants from varied fields such as crop production and precision farming, who brought to the table a rich blend of academic qualifications and practical experience. Despite the diversity in their backgrounds, a surprising pattern emerged in their approach to knowledge transfer, with a significant lean towards written communication, diverging from the broader expectation of employing a multimodal strategy.

The evaluation reveals significant findings about the effectiveness of knowledge transfer in agriculture, specifically within the INSAC-AGRIS project, the key conclusions including:

- ***Diverse Educational Backgrounds and Experience*** - The project involved consultants with extensive experience and higher education degrees, indicating a high level of expertise among the advisors.
- ***Preference for Written Communication*** - A significant number of consultants preferred written methods for knowledge transfer, which may not align with the diverse needs of farmers.
- ***Impact of Methodological Training*** - Advisors who utilized a broader range of knowledge transfer methods had previously participated in international projects focused on methodological education, highlighting the importance of continuous professional development.
- ***Effectiveness of Demonstrations*** - Feedback from farmers suggests that professional demonstrations and presentations were viewed as the most effective method of knowledge transfer, underscoring the value of practical, interactive learning experiences.
- ***Concerns Over Data Collection*** - A majority of farmers expressed reservations about data collection and provision, indicating a potential barrier to digitalization efforts.
- ***Digitalization Commitment*** - Despite concerns, a small but significant portion of farmers showed a commitment to digitalization, suggesting a foundation for future digital adoption in agriculture.
- ***New Services Through Grants*** - The advisors' involvement in grant applications focused on digitalization allowed them to offer new, networked services,

International Journal of Engineering, Management and Humanities (IJEMH)
Volume 5, Issue 2, Mar.-Apr., 2024 pp: 52-58 ISSN: 2584-2145
www.ijemh.com

demonstrating an innovative approach to extending digital agriculture solutions.

The findings further highlighted a correlation between the consultants' methodological diversity and their involvement in international projects focused on educational methodologies. This exposure appeared to be a critical factor in their ability to employ a comprehensive range of knowledge transfer methods.

Moreover, feedback from the farming community revealed a preference for professional demonstrations, underscoring the value of interactive and practical learning experiences over written materials alone. Despite a general apprehension towards data handling, a small yet significant fraction of farmers showed a keen interest in digitalization, reflecting a potential pivot point for future advisory strategies.

The project underscored the importance of continuous professional development for consultants, the effectiveness of diverse knowledge transfer methods, and the nuanced perspectives of farmers towards digitalization. These insights not only contribute to the academic discourse on agricultural advisory services but also offer practical guidance for enhancing the effectiveness of digital transition strategies in agriculture.

Through an extensive two-year evaluation, this study delves into the impact and efficacy of knowledge transfer methods within the framework of the INSAC-AGRIS project. It critically examines the application of EU guidelines, drawing from a wealth of national and international literature, and encapsulates firsthand insights from advisors and farmers through qualitative research. The participation of nine seasoned consultants across various agricultural disciplines underscores a diverse approach to knowledge dissemination. However, the unexpected reliance on written communication by a majority and the comprehensive use of knowledge transfer methods by only a select few highlight a significant discrepancy in methodological adoption. This variance is intricately linked to the consultants' involvement in international projects focused on methodological education, suggesting a pivotal role of continuous professional development in enhancing advisory effectiveness.

The narrative underscores the critical role of demonstrations in bridging the knowledge gap, as evidenced by farmer feedback, which contrasts the perceived sufficiency of written methods against the tangible impact of live demonstrations. The organized demonstrations, attended by a considerable number of farmers, reveal a palpable apprehension towards data collection yet a budding interest in digitalization. The advisors' proactive engagement in grant applications further illustrates a forward-thinking approach to integrating digitalization, offering novel services and fostering a networked advisory landscape. The creation of roadmaps during farm visits not only personalizes the advisory process but also strategically navigates farmers through the complexities of technological adoption, aligning their current operations with future ambitions and available digital opportunities.

The significance of studies like these cannot be overstated. They provide critical insights into the effectiveness of different knowledge transfer methods in agriculture, especially in the context of digitalization. By evaluating the impact of these methods on the adoption of digital technologies, such studies offer valuable guidance for policymakers, advisors, and the agricultural community at large. They help identify best practices, barriers to adoption, and the need for ongoing professional development. This knowledge is essential for designing strategies that effectively support the digital transformation of agriculture, ensuring that it is both inclusive and sustainable. The findings underscore the importance of diversifying knowledge transfer methods and the critical role of demonstrations in enhancing the practical understanding and acceptance of digital technologies among farmers.

ACKNOWLEDGEMENTS The activities developed and described in the paper are financed by EU-funded EUREKA programme which promotes international R&D cooperation projects. The domestic contribution to participation is provided from the National Research, Development and Innovation Fund under the grant agreement E!13295-INSAC AGRIS.

REFERENCES

[1]. European Commisson: Digital Economy and Society Index (DESI) 2022 Hungary https://digital-strategy.ec.europa.eu/hu/policies/desi Letöltés dátuma: 2024.02.26
[2]. European Commisson: The Digitisation of the European Agricultural Sector. https://digital-strategy.ec.europa.eu/en/policies/digitisation-agriculture. Letöltés dátuma: 2023.09.15
[3]. Digital Success Programme: COMPETENT STATE, (DIGITAL STATE GOVERNANCE) https://digitalisjoletprogram.hu/files/a3/93/a393c3e80d27a676f864e378b5e9d6fd.pdf
[4]. Role of agriculture extension in the Agricultural Knowledge System - state-of-the-art. Dr. Tóth Krisztina, Dr, Ec. Monica Ocenean, Edina Fűrész, Edina Vörös-Láczó, Daniel Amarieie. Lucrarilucr Stiintfic E, Seria vol. XXII
[5]. Banat's University of Agricultural Sciences and Veterinary Medicine ”King Michael I of Romania” from Timisoara, Faculty of Management and Rural Tourism
[6]. European Comission: https://ec.europa.eu/info/food-farming-fisheries/key-policies/
[7]. Mezőgazdasági szaktanácsadás alapjai (2023): Dr. Tóth Krisztina, Dr. Vér András Fűrész Edina (28p) Nemzeti Agrárgzadasági Kamara Budapest
[8]. Design guide for on-farm demonstrations file: https://orgprints.org/id/eprint/44531/1/01_Design_guide_for_on-farm_demonstrations_EN.pdf
[9]. Agridemo: https://agridemo-h2020.eu
[10]. Faure, G., Desjeux, Y., & Gasselin, P. (2012. Sep 28). New Challenges in Agricultural Advisory Services from a Research Perspective: A Literature Review, Synthesis and Research Agenda. The Journal of Agricultural Education and Extension, old.: 461-492.
[11]. Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., . . . Cohen, M. (2009). From Best Practice to Best Fit: A Framework for Designing and Analyzing Pluralistic Agricultural Advisory Services Worldwide. The Journal of Agricultural Education and Extension, 341-355.
[12]. NAK https://www.nak.hu/kiadvanyok/kiadvanyok/3191-kisokos-a-mezogazdasagi-es-videkfejlesztesi-szaktanacsadasrol/file
[13]. Herczeg András Dr. Vastag Gyula, DSc „Social network analysis” (SNA: társadalmi háló elemzés) használata az ellátási láncok elemzésében: Áttekintés és alkalmazási lehetőségek
[14]. Győrfyné Dr. Kukoda Andrea: A network-szemlélet, a kapcsolatháló-elemzés alapjai. Első közszervezési és közigazgatástani műhely - fórum 2016 Tanulmánykötet.