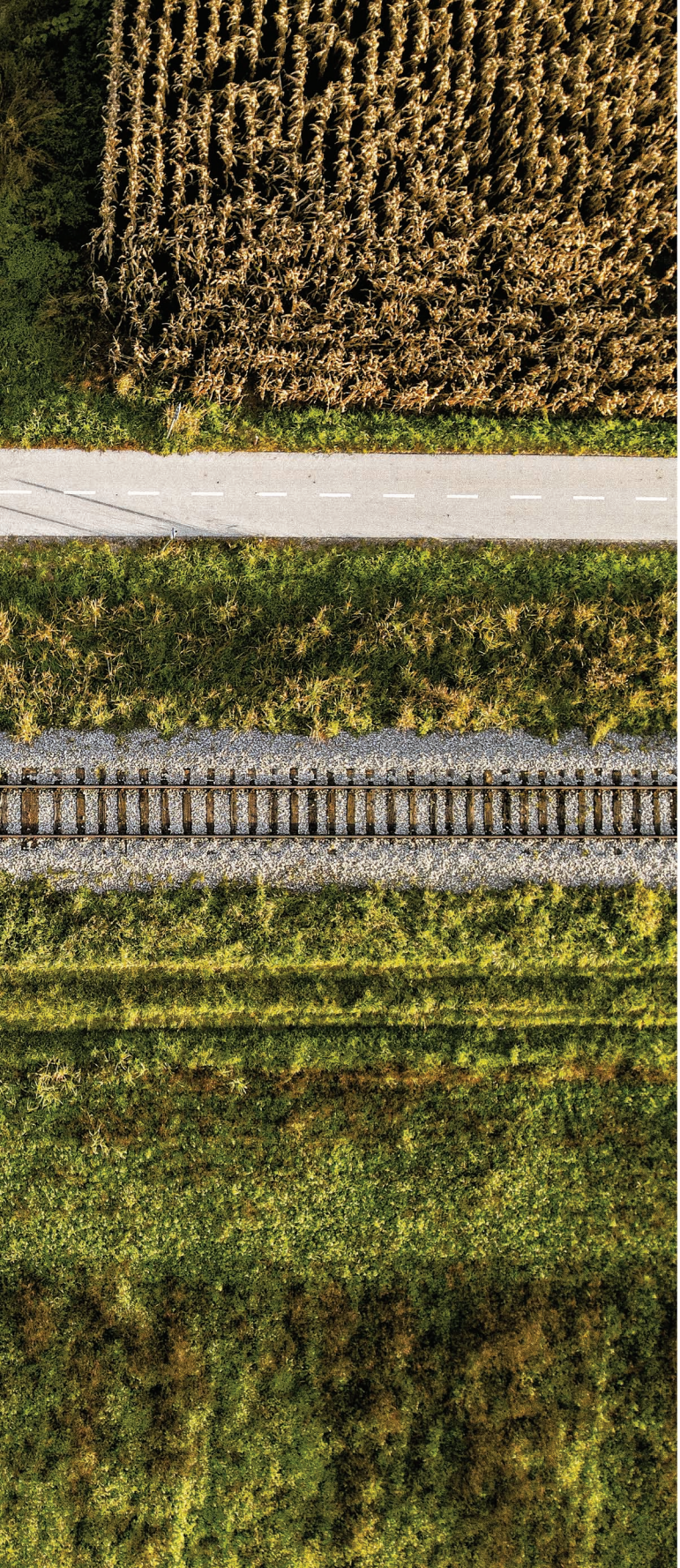

XVII. International Conference

LOGISTICS IN AGRICULTURE 2023

Conference Proceedings

Andrej LISEC
EDITOR

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Examining the Environmental Awareness of Rural Households in Terms of Household Waste Management and Purchasing Decisions

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Achieving sustainability is a shared interest which concerns both macro- and micro-level actors in the economy. Households' environmental awareness can be assessed in several aspects, where the use of resources (energy use; products, and equipment purchased) and the amount of waste produced are the key elements. Conscious purchasing behaviour and, on the other hand, waste reduction is the focus of the present study, being essential not only for sustainability but also for the implementation of a circular economy. In our study, we examined the practice of households in and around Sopron by random sampling and analysed the data with SPSS statistical program. Our aim was to highlight the differences in the attitudes of people living in villages, urban agglomerations, and the city center towards selective waste collection. Our expectation was that the examined demographic variables have an effect on environmentally conscious purchasing behavior and selective waste collection. The main consequences of the research were that the population of Sopron and its surroundings is mostly aware of selective waste collection (supported by the values obtained for the willingness and disposal of selective waste) and the commitment is independent of gender, but influenced by place of residence.

Keywords:
sustainability,
selective waste collection,
environmentally conscious purchasing,
recycling,
waste

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1 Introduction

The spread and growth of consumer society is accompanied by the generation of large amounts of waste. The amount of municipal waste in the EU in 2020 was 505.0 kg/capita, and in that year Hungary ranked third in terms of the lowest amount of municipal waste per capita, with 364.0 kg/capita (Eurostat, 2022). The basic principle of waste is prevention and proper management of the waste generated. Alternatives to waste management include selective collection, reuse and recycling. Although landfilling was used for 24.0% of municipal waste in 2017, the target is to reduce this to below 10.0% by 2035 while increasing the recycling and composting rate from 46.0% to above 55.0% (EP, 2018).

To implement selective waste collection, it is important to know the types of waste that can be collected, as well as to reduce the amount of waste used. In the context of selective collection, the attitudes and awareness of the public with regard to paper, plastic, glass, metal, textiles, and specific types of waste, kitchen, garden and hazardous waste were examined. We also considered it important to examine environmentally conscious purchasing behaviour aimed at reducing the amount of waste. In our research, we highlight the main differences between households in rural areas, urban agglomerations and city centres in terms of separate collection of different types of waste.

The research investigated the selective waste collection habits of the population in Sopron and its 20 km surrounding municipalities, assessing the reasons for not collecting waste separately, possible motivations and the purchasing habits that influence the amount of waste collected later. The latter was the focus of the study depending on the place of residence.

In the past, the rural population's life was essentially dominated by agricultural activity. In fact, they were thrifty, recycling household organic waste, which means that they were, if not consciously, applying the principles of a circular economy. The hypothesis of our research is that, although rural life has changed over time, place of residence, ingrained habits and proximity to nature have led to a greater emphasis on composting for garden and kitchen waste in rural areas, and a greater dominance of incineration and energy recovery from wood and wood-specific waste.

2 Literature review

Individual responsibility is crucial to achieving sustainability. Environmental values, attitudes, willingness to act and action are the salient components of environmental awareness (Nemcsicsné, 2007). According to Gulyás et al. (2007), sustainability at the level of individuals can be examined in three main areas: transport, food consumption and households. At the level of individuals, environmentally responsible behaviour is also shaped along these components.

The first models of environmentally conscious behaviour were developed in 1977 and focused on the crucial role of ecological knowledge, with the direct consequence of the development of attitudes towards the environment. Later, in 1980, Ajzen and Fishbein developed the theory of reasoned action (TORA), which emphasises conscious action. A further development is the theory of planned behaviour (TPB), in which the new element is the 'controlling belief', which leads to the development of 'perceived behavioural control', i.e. a decision influenced by the consideration of the effects (Nemcsics, 2007).

The aim is to achieve circular economy to make human life on Earth sustainable. The three basic principles of circular economy are to conserve and enhance natural capital; to optimise resource extraction; and to minimise negative externalities (EMF, 2015).

According to Winans et al. (2017), the literature sees the circular economy as a combination of concepts such as 3R (reduce, reuse, recycle), 6R (reduce, reuse, recycle, redesign, remanufacture, recover), zero emissions, life cycle assessment (LCA) and resource efficiency.

Minimising and preventing waste and applying waste-based models to the economic system is a key issue. In 2020 (European Parliament, 2021), the European Parliament adopted a new action plan for the circular economy, which aims to achieve a carbon-neutral, environmentally sustainable and toxic-free economy by 2050, with a focus on sustainability.

The concept of sustainability was defined in 1987 by Gro Harlem Burndtland, under the chairmanship of the UN World Commission on Environment and Development, as development that meets the needs of present generations without compromising the ability of future generations to meet their own needs (Our Common Future, 1988). According to Takácsné (2020), sustainable development implies sustainable production in the short and long term, environmental management and stewardship of the environment that ensures a good quality of life for future generations, while it also implies not only the appropriate use of resources and energy-efficient production, but also the reduction of waste in the production, consumption and use of goods and services, and the recycling of waste to promote the shift towards the circular economy. Waste reduction at the household level starts with environmentally responsible purchasing.

Literature generally refers to environmentally conscious consumption as "green" or "eco" and an environmentally conscious consumer is one who makes purchasing decisions based on environmental considerations, even if this involves higher expenditure (Okada-Mais, 2010; Emmert, 2021). According to a 2019 survey on consumer environmental awareness (Emmert, 2021), 35% of respondents consider it important to buy sustainable products to protect the environment, 37% look for products with environmentally friendly packaging and 41% avoid the use of plastic.

The focus of the research is on municipal waste, its quantity and the public's perceptions and practices of recycling and sustainable consumption. The definition of waste is described in a wide range of literature. According to Act CLXXXV of 2012, waste is "any substance or object which the holder discards, intends to discard or is obliged to discard". Waste is therefore not the same as unusable, since an object taken out of use by one person may be a raw material for others. "*Municipal waste means* waste of a household nature and waste similar to household waste, excluding waste from production, agriculture, forestry, fishing, non-publicly collected domestic sewage, waste from sewage networks and treatment plants, in particular sewage sludge, end-of-life vehicles and construction and demolition waste" (Act CLXXXV of 2012).

Figure 1 shows that the total amount of waste also increased from 2 125 599 to 2 443 945 tonnes in the period 2013-2019, i.e. by almost 15%, but the amount of separately collected municipal waste increased much more (from 106 146 to 415 794 tonnes), to 392%.

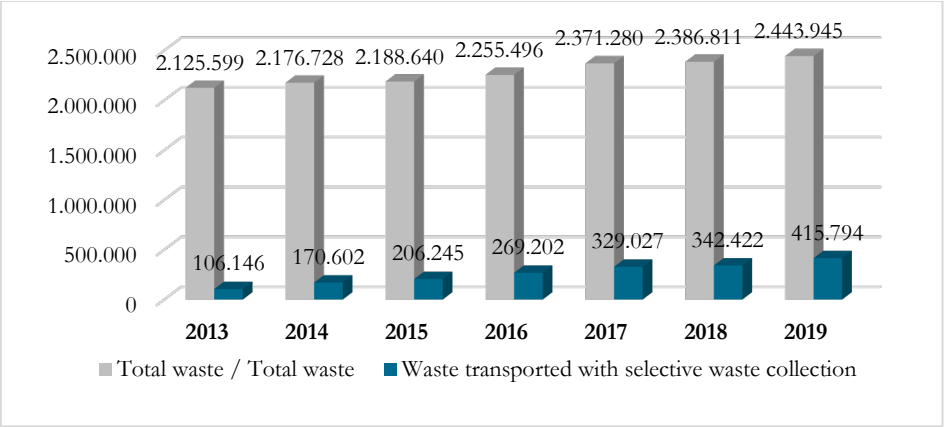

Figure 1 : Municipal waste transported from the population in Hungary within the framework of the public service with conventional and selective collection (tons)
Source: Hungarian Central Statistical Office, 2021

The shift towards circular economy is supported by the recycling of waste generated in production or consumption processes, thus reducing the amount of waste generated (Stahel, 2016; Tóthné Szita et al, 2017). The efficiency of the process can also be improved by selective waste collection, i.e. "the separate collection in appropriate containers of materials within the waste collection system that are contained in waste or garbage and can be directly used or sold as secondary materials" (Boza-Misik, 2010, p. 29). Pieters (1991) highlights the search for a new owner or function in recycling, with the tasks of sorting, storage and transport, and preparation for transport. And although selective waste collection and recycling are the cornerstones of the circular economy, the concept of the circular economy does not end there.

It is important to examine the motivations of the population and the factors that influence their willingness to collect and recycle separately. Previous research by Valle et al. (2004) suggests that selective waste collection is mainly influenced by attitudes and related logistical infrastructure, and the research by Jigani et al. (2020) suggests that it is influenced by social norms, social media, attitudes, opportunities, goals, convenience, governmental efforts, awareness, responsibility, personal norms, trust, environmental knowledge and infrastructure. Among the Hungarian studies, the research of Misik-Kárász (2006) found that the size of the place of residence positively influences willingness, education and gender have no fundamental effect,

while certain age groups have an advantage in the development of environmental awareness. Research by Monostori-Hörich (2008) shows that among the Hungarian population, community trust and its influencing role is less significant and the sanctioning system does not provide the incentive as assumed, but that information is strongly related to environmental awareness in terms of implementation, assumption and willingness to pay. In terms of age, the age group 35-55 years was found to be the most environmentally aware, in terms of gender women were outstanding, while income and type of residence did not have a strong influence, nor did religiosity.

3 Objectives

Among the respondents to the public survey, we expect a high level of support and positive reception of selective waste collection and the adoption of environmentally conscious purchasing behaviour. The survey sought to find out not only whether households use selective waste collection, but also what types of waste they collect separately, what happens to the waste collected and how they think household waste can be reduced.

In particular, we focused on exploring whether rural populations still have old waste recycling habits (especially for kitchen, garden and species-specific waste), despite the fact that they are typically no longer engaged in agricultural activities.

Among the motivations, we also looked at the reasons given by respondents who do not collect household waste separately. Among the sustainability criteria, we looked at the respondents' purchasing preferences, environmental awareness and the related products offered by local producers, in the context of reducing waste. A number of related questions also aim to highlight the fact that a conscious choice can lead not only to responsibility for the natural environment, but also to building a social safety net and cost savings.

3 Material and method

To find out about the attitudes of households towards selective waste collection and the recycling of certain types of household waste, we used an online and face-to-face questionnaire survey among people living in Sopron and in villages and settlements

within a 20 km radius of the city. The questionnaire contained both open and closed questions, and most of the closed questions allowed respondents to tick more than one answer. Demographic aspects included age, place of residence, type of dwelling, education, occupation, number of children, household composition and income.

The results were processed, using frequency and cross tabulation analyses with the help of the statistical-mathematical program SPSS. Chi-square tests were conducted to assess awareness of the colour of collection containers and the types of waste collected and recycled. A chi-square test was used to test for independence focusing on whether age, place of residence and gender influenced responses to questions on separate waste collection. The Chi-square test shows whether there is a significant relationship between two qualitative variables. The test is used to test the null hypothesis, i.e. it is assumed that there is no correlation between the variables under investigation. If the significance level associated with the chi-square value is less than 0.05, the null hypothesis is rejected, i.e. there is a significant relationship between the two variables under test, i.e. one factor influences the other factor.

4 Results

4.1 Demographic characteristics of respondents

A total of 413 people were surveyed in person and online in Sopron and in 13 municipalities within a 20 km radius of the city. The survey is not representative, but the attitudes and receptiveness of respondents to separate waste collection and to sustainability can provide guidance for circular management. 42.6% of the respondents (176) were male and 57.4% (237) were female. 45% of the respondents (186) belong to the young generation, 40.2% (166) to the middle generation and 14.8% (61) to the older generation.

Almost half of the respondents, 49.4%, live in a city centre, 26.2% in an urban agglomeration and 24.2% in a village. By type of dwelling, most respondents (52.8%) live in a detached house with a garden. In villages and urban agglomerations, the majority live in detached houses with a garden, while in the city centre, apart from detached houses with garden, the majority live in apartment blocks and flats with a panel. In our research, we considered it important to know the place of residence of

the respondents and the type of dwelling they live in, which we believe has a strong influence on the use of separate waste collection in each household.

In terms of educational attainment, most of the respondents have a secondary school degree (187, 45.3%) and a university or college degree (119, 28.8%). This is followed by respondents with vocational certificate (68 persons, 16.5%), completion of 8 years of primary school (34 persons, 8.2%), completion of less than 8 years of primary school (2 persons, 0.5%). 3 persons (0.7%) did not answer this question.

Based on the workplace, 41 respondents from the young generation (22.0%) and 64 respondents from the middle generation (38.6%) can be classified as employed professionals. However, it is important to underline that the young generation also includes many students (97, 52.2%). The older generation is dominated by retired people (35, 57.4%).

Out of the 413 respondents, 277 (67.1%) consider their family's standard of living to be average compared to other Hungarian families, while 95 (23%) consider it to be slightly above average.

4.2 Analysis of separate waste collection and recycling by type of residence

In Sopron and the 20 km radius of the city, 81.6% of the 413 respondents collect waste in their households. There is a significant correlation between the use or non-use of generation classification and selective waste collection in the respondents' households as two variables. In other words, being classified as young, middle or old generation based on the year of birth influences whether the respondent collects waste separately or not (Chi^2 =19.429, df=2, p=0.000). 72.6% of the young generation (18-29 years), 87.3% of the middle generation (30-59 years) and 93.4% of the old generation (60 years and over) collect waste separately. 40.1% of those who collect waste separately are in the 18-29 age group, 43.0% in the 30-59 age group and 16.9% in the 60+ age group. When broken down by age group, 72.6% of 18-29 year olds, 87.3% of 30-59 year olds and 93.4% of 60+ year olds collect waste separately.

Place of residence also influences the use of separate waste collection, Chi^2 =17,084, df=2, p=0.000. 95 out of 100 respondents living in villages, 88 out of 109 respondents living in urban agglomerations and 154 out of 204 respondents living in city centres collect waste separately.

When the village and urban agglomeration are considered together, the proportion of those who collect and do not collect is 87.6% and 12.4% respectively, which is in significant contrast to the similar results of 75.5% and 24.5% for those living in the city centre. Of course, when looking at the reasons for this, it can be seen that, in line with the results of previous research (Valle et al., 2004; Domina - Koch, 2002), lack of space is the most frequently cited explanation for those living in non-garden houses or condominiums.

Gender as a demographic characteristic does not affect the uptake of separate waste collection, but it can be observed that 79.0% of men and 83.5% of women respondents collect waste separately.

18.4% of the respondents do not collect waste separately, the reasons are not having enough space for a separate container in the home (26 mentions), not having the right condition from the side of the public service provider (23 mentions), not believing in it because the service providers dump it anyway (22 mentions), the separation island being far away (16 mentions), not feeling like sorting it (15 mentions).

We grouped the types of waste in our questionnaire according to how respondents collect it, where they take it and what they do with the waste they accumulate. 50.8% of respondents put plastic waste in a collection container or bag, 37.5% put paper waste in a collection container or bag. They take glass (46%) and metal (29.5%) to a collection island. Of the four types of waste, most metal waste is not collected separately (28.8%). A significant correlation can be found between the collection of paper, glass and metal waste and the age of the respondents. For paper waste Chi^2 =53.666, df=10, p=0.000, for glass waste Chi^2 =49.819, df=10, p=0.000 and for metal waste Chi^2 =43.965, df=10, p=0.000. Of the four types of waste, respondents' place of residence is the only factor affecting the separate collection of paper waste Chi^2 =39.120, df=10, p=0.000. 51% of respondents in villages, 42.2% in urban agglomerations and 28.4% in city centres collect paper waste in a designated bin or

bag. In the villages, 20.0% of those collecting paper waste, 22.0% in the urban agglomeration and 33.8% in the city centre take it to the collection island.

The next waste group is garden and kitchen waste. Kitchen waste is put in a bin by 31.7% of respondents and composted by 20.6%. Garden waste is composted by 40.0% of respondents and 16.2% put it in a suitable collection container. Composting is the recycling of garden and kitchen waste. Age influences the two waste collection methods. For garden waste Chi^2 =51.084, df=12, p=0.000, for kitchen waste Chi^2 =43.963, df=12, p=0.000. 24.7% of the young generation, 38.6% of the middle generation and 34.4% of the older generation place kitchen waste in a collection container or bag. The same applies to composting: 14.5%, 20.5% and 39.3% respectively. Garden waste is placed in a collection bag or bin by 12.4% of the young generation, 22.3% of the middle generation and 11.5% of the older generation. Composting by generation is 33.9%, 38.6% and 62.3% respectively.
When looking at the type of residence, it is confirmed that composting is more common in rural households for both kitchen (Figure 2) and garden waste.

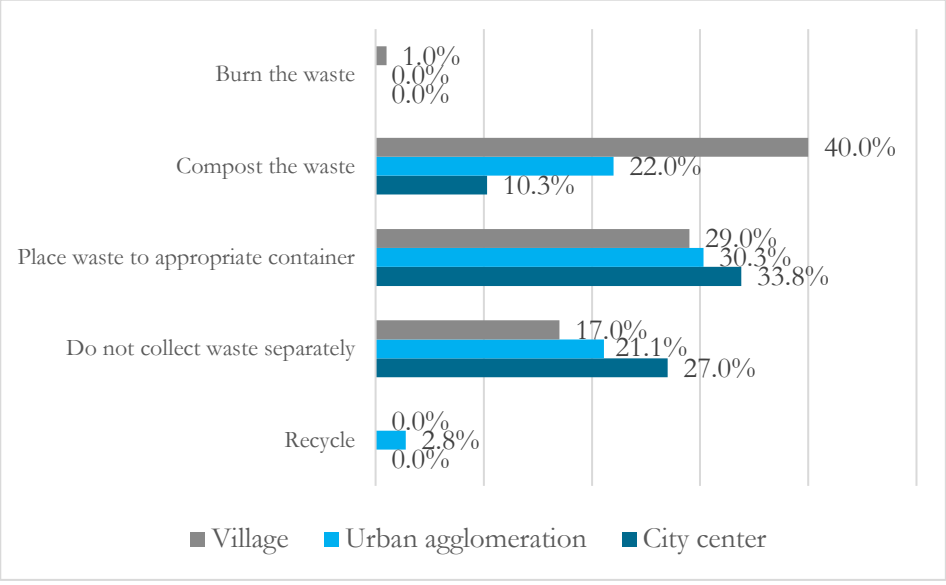

Figure 2 Connection between the way of collecting kitchen waste and the place of living categories

Source: own editing based on the results of the questionnaire survey

For separate collection of kitchen waste, composting is more common in villages and urban agglomerations (40.0% and 22.0% respectively), while putting it in an appropriate container is most common in city centres (33.8%), although there is no significant difference between the places of residence. It is worth noting that, also as expected, the city centre has the highest proportion of responses that do not collect separately (27.0%). An interesting result is that recycling was only chosen by those living in urban agglomerations , but they also chose it in low numbers (2.8%).

The composting rate for garden waste is 66.0% in rural areas and 45.0% in urban agglomerations, but garden waste is also mostly composted (24.5%) or either not collected separately (19.1%) or put in the appropriate collection container (18.6%) by people living in urban centres. Recycling is low among respondents in all three types of dwellings.

29.8% of respondents take textile waste to collection islands, and 37.5% recycle it. Recycling is understood to be not only the reuse within the household but also the resale or sale of the remaining, outgrown or worn-out textiles by the respondent. 18.9% of the respondents take wood-based waste to a collection site and 29.8% recycle (sell or resell) it. 18.6% of the respondents burn the wood-based waste generated. By age group, a significant correlation was found between the use of textile waste (Chi^2 =42.160, df=12, p=0.000) and wood-based waste Chi^2 =43.582, df=12, p=0.000). Type of residence affects the use of wood-based waste (Chi^2 =37.754, df=12, p=0.000)

In villages, the incineration of specific waste is more common (34.0%), which may be due to recovery for heating purposes, while in urban centres it is more common to take it to collection islands (21.1%), while in agglomeration areas, disposal to collection islands (19.3%), incineration (17.4%) and giving it away (16.5%) are similarly usual. However, recycling, such as giving a new function to worn-out furniture (turning a bedside cabinet into a baby kitchen or a children's DIY table), is also common.

Gender does not affect the use or recycling of textile waste (Chi^2 =19,750, df=6, p=0.003). Women are more likely than men to donate or recycle textiles for creative purposes.

Respondents were also asked about the collection of hazardous waste. 72.4% of respondents collect batteries, 52.5% oil and grease, 43.8% paint cans and 50.1% medicines separately and put the waste in the designated collection containers. Age influences the collection technique for three of the four types of waste, with no significant correlation excluding batteries alone. 38.7% of 18-29 year olds, 59.6% of 30-59 year olds and 75.4% of 60+ year olds collect oil and grease separately (Chi^2 =47.687, df=6, p=0.000). For paint cans, the proportions for the age category are 30.6%, 50.0% and 67.2% (Chi^2 =38.551, df=6, p=0.000) and for medicines 32.3%, 61.4% and 73.8% (Chi^2 =75.418, df=6, p=0.000). The type of residence also influences the disposal of the aforementioned types of waste. Medicines are collected selectively and placed in the appropriate collection container by 58.0% of respondents in villages, 55.0% in urban agglomerations and 43.6% in city centres (Chi^2 =25.307, df=6, p=0.000). For oil and grease, the proportions by residence category were 60.0%, 54.1% and 48.0% (Chi^2 =25.766, df=6, p=0.000), and for paint cans 53.0%, 47.7% and 37.3% (Chi^2 =22.237, df=6, p=0.001). No significant association was found for gender in relation to hazardous waste collection.

4.3 Options for reducing household waste by residence

To reduce household waste, respondents highlighted the importance of buying sensible and packaging-free products, as well as quality, long-lasting and environmentally friendly products. To a lesser extent, they mentioned the use of different penalties for not collecting waste separately and the introduction of lower waste charges in households where separate waste collection is introduced and used (Figure 3).

In terms of waste reduction options, the preference for rational purchases was ranked first for all types of dwelling (village, urban agglomeration and city centre) (80.0%, 83.5% and 75.5% per type of dwelling), followed by a similar preference for quality, long life and environmentally friendly products (60.0%). In the case of giving rewards, a slight difference can be seen, with 18.0% of rural respondents choosing this alternative, compared to 28.4% from urban agglomerations and 26.5% from city centres. Also in the urban centre, the motivation to introduce penalties was higher (19.1%). Around 6.0%, mostly with other answers, chose the option "cannot".

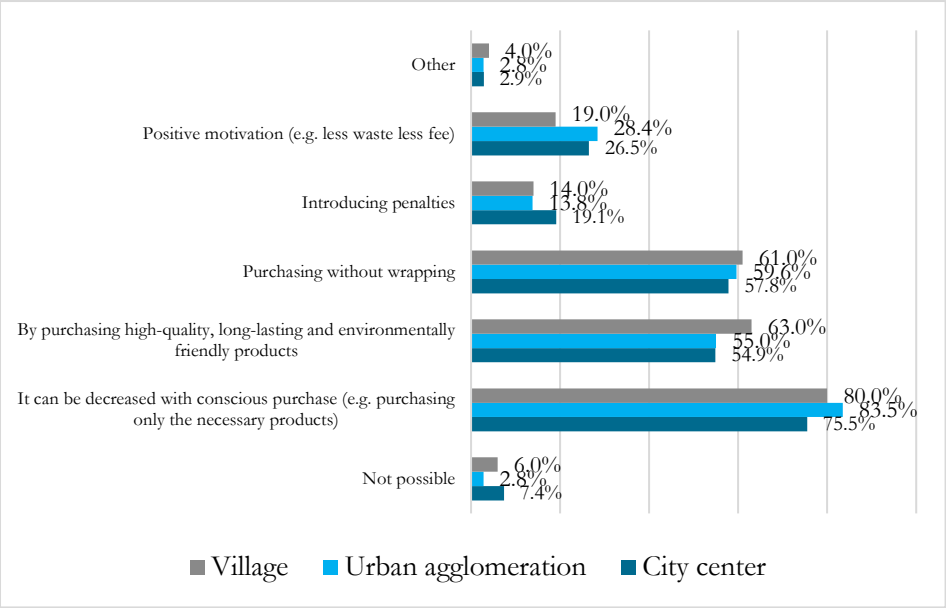

Figure 3 Possible ways of decreasing the quantity of household waste (n=413)
Source: own editing based on the results of the questionnaire survey

4.4 Environmentally conscious consumer behaviour in Sopron and the countryside

We looked at sustainability not only in terms of the waste generated, but also in terms of the environmental impact of purchasing decisions. In terms of place of residence, it was observed that for all respondent groups, the use of a personal bag/basket was the most preferred option, and the purchase of a reusable bag, or the lack thereof, was similarly preferred by those living in villages. Practicality is the most important factor in purchasing decisions, but environmentally friendly packaging is also significant. In the case of durable consumer goods, buying second-hand is more common than buying new. In the survey as a whole, the use of a personal basket/bag (58.8%) or, in the absence of a personal basket/bag, the choice of a reusable bag (38.0%) stands out. 34.6% of respondents consider practicality to be the most important factor and packaging to be less important, and a similar proportion of respondents who prefer environmentally friendly packaging (24.2%) and who do not insist on buying new products for consumer durables (23.2%). There are two correlations between the aforementioned purchasing habits and

demographics, one for age and looking for new products for every purchase (Chi^2 =13.714, df=2, p=0.001) and the other for education and not insisting on buying new products for consumer durables (Chi^2 =20.379, df=5, p=0.001).

There was a typical association (35 responses) between not insisting on buying new consumer durables and putting practicality before packaging (also linked to both characteristics and environmentally friendly packaging).

Finally, the issue of buying from local producers or supermarkets was also linked to environmental awareness, highlighting the link between purchasing preference and choice. Among those living in villages, the highest proportion of people who try to produce at home as much as they can (40.0%) is of course due not only to tradition but also to gardening, and this is especially true for crop production, butcher's products and eggs are also predominantly bought from the market or from butchers. On the whole, at least as many people buy from local producers as from supermarkets. For fruit and vegetables, eggs and meat and butchers' products, the former have a high share. What is also striking, and certainly worth mentioning, is that shopping convenience is much more important for people living in the city centre and less so for those living in villages, while respondents living in urban agglomerations tend to buy everything nearby, preferably at a local market. In 34 cases, "price rather than place of origin" and "I prefer to shop in a supermarket" were both choices, often combined with the decisive role of convenience. There were also responses from the ones who either produce what they can with their own hands or try to source everything close to home (43 mentioned together).

5 Conclusions

It can therefore be concluded that 81.6% of the respondents collect waste separately and that this is influenced by age and the place of residence of the respondents, who can be classified as young, middle-aged or older generations. Selective waste collection is most common among respondents living in rural areas, but three quarters of respondents living in urban centres also use it in their households. Most people collect paper and plastic waste separately. Recycling or reuse is more important for kitchen and garden waste (composting). Composting for kitchen waste is prominent in rural households, while in urban areas (either agglomeration or central location) the use of a suitable collection container is dominant. For garden

waste, composting is already preferred by respondents in both rural and urban agglomerations, while in the city centre, the use of an appropriate collection container or non-segregated collection is also the predominant method for this type of waste (perhaps because it is not generated). Recycling is also mentioned by almost a third of respondents for textile and non-specific waste. For wood and wood-specific waste, the analysis by place of residence shows that in rural households incineration and onward transfer are the most common; in urban agglomerations, transport to collection islands, incineration and onward transfer are the most widespread, while in city centres the use of collection islands is more common. Among hazardous waste, the most common is the selective collection of batteries and their placement in an appropriate collection container, but nearly 50% of respondents also separate oil and grease, and also paint cans mostly according to age and place of residence, while the separate collection of medicines is largely determined by place of residence.

The main reasons given by those who do not collect waste separately were the lack of space at home, the lack of proper conditions from the service provider, the scepticism about the fate of the waste, the distance from the collection island and the lack of desire to sort the waste.

In order to be more environmentally conscious, most people either go shopping with their own bag/basket or, in the absence of a bag, buy a reusable bag (382 mentions in total). Those who do not necessarily insist on buying new consumer durables, for them practicality takes precedence over packaging and tend to choose products with environmentally friendly packaging. This showed a correlation with age and educational attainment. As for the choice of where to buy, the preference for buying close to home (predominant in urban areas) is characterised by a preference for home production (predominant in rural areas), while price and convenience are the determining factors in the supermarket preference.

Overall, our hypothesis that organic waste recycling is more prevalent in rural areas due to the former predominantly agricultural character of the area, which is based on a solid foundation of available "space" and respect for tradition, has been confirmed. There has also been a turn towards nature, a revaluation of the role of agriculture and an increasing tendency to produce more and more goods by ourselves. This not only promotes integration into the circular economy, but also

drives toward sustainability. The growing environmental awareness of the city centre and the urban agglomeration, both in terms of their attitudes towards selective waste collection and their purchasing awareness has to be also highlighted.

A proposal could be made to extend the collection islands in order to accommodate a wider range of waste for separate collection, with more points for the collection of textile and textile waste in addition to plastic, paper and glass waste. For green waste, in addition to regular year-round collection, the distribution of starter collection bags could be an incentive, particularly in urban areas where houses with garden are common. In the case of hazardous waste, positive incentives should be given to pharmacies for the disposal of medicines and information should be provided to the public, especially in city centres. Separate collection of oil and grease can be encouraged by increasing the number of collection points.

By extending the research to regional and then national level, we can obtain further valuable results not only in the study of urban-rural differences, but also in the study of inter-regional differences.

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The Role of MES in Supporting the Implementation of Circular Economy Practices

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Industry 4.0 concept represents a digitalization process that allows manufacturers to produce in a more automated way, through an integrated infrastructure consisting of assets, machines, people, mobile devices and information systems. MES (Manufacturing Execution System) represents Digital Technology (DT) for the complete digitalization of the manufacturing plant. In fact, MES provides real-time information to manage and control the entire manufacturing process, from order to product delivery. In today's business philosophy, the only sustainable way of production is the transition from the classic approach of the "linear" business model, which implies "make-consume-dispose", to the sustainable model of the Circular Economy (CE), which is a way of eliminating all types of waste of already used raw materials. The application of DT enables the implementation of CE practices. The paper will discuss the position of MES digital technology on the implemented practices of CE, classified according to the model of Garza-Reyes et al. (2019).

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1 Introduction

Although the term "Circular Economy" or abbreviated CE is considered a new concept of economic development, the forerunner of CE can be seen in the definitions of system sustainability as far back as the 1960s. First, the author Boulding (Boulding, 1965) states that the planet Earth is a unique system similar to space and in order to have constant reproduction and sustainability, it should have a sustainable cyclic ecological system. After this definition of system sustainability, two more concepts appeared that influence the creation of the CE concept, namely the concept of industrial ecology (IE) and the concept of extended product life (Gregson et al., 2015). From a practical point of view, IE was presented as a concept that took into account material and energy flows, with the aim of recycling residual waste, in order to create industrial "symbiosis" and sustainable development of the business system. As a result of applying the concept, IE offers minimization of the use of raw resources and promotes "clean" production technologies. On the other hand, the concept of extending product life refers to the prevention of waste generation, the creation of sustainable production and sustainable consumption techniques (Andersen, 2007; Gregson et al., 2015). The mentioned directions represent the development path of the new concept, called "Circular Economy - (CE)". The concept of CE is based on the circular flow of materials and energy and transforms the traditional linear "make-consume-discard" model into a circular "resource-product-renew resource" model (Li et al., 2010). In this way, CE aims to reduce the consumption of primary resources, waste and pollution and paves the way for resource recovery and increasing their efficiency in further use (Hu et al., 2011). Although the development and implementation of CE concept practices have great benefits for the natural environment, the CE concept is not an environmental strategy, but rather a sustainable economic strategy, whose main goal is to ensure the continuous development of the economy (Yuan, Bi, & Moriguichi, 2006). There is a common view that the only sustainable way of production is a transition from the current approach of the "linear" model of the economy, which implies "make-consume-discard" to a sustainable model of the circular economy (CE), which contributes to a more environmentally responsible and socially equal society (Gregson et al. , 2015). The concept of CE has the potential to create new ways to eliminate environmental waste in production, as well as to encourage the return of used materials to the material flow using renewable energy sources and new production methods in order to achieve the concept of sustainability (Ciani, Gambardella & Pociovalisteanu, 2016; Yuan, Bi, & Moriguichi, 2006). The concept

of CE implies a shift from traditional "linear" production, i.e. consumption in one direction, towards the circular principle of consumption, by closing the circular flow of materials in order to reduce production and disposal of material waste (Moreno et al., 2019). It also replaces the concept of "end of life cycle" with the reduction, reuse, recycling and recovery of materials in the processes of production, distribution and consumption. The practices of the CE concept can be applied at different levels of the economic system, i.e. at the micro level (one firm), meso level (industrial systems) and macro level (society or country) (Kirchherr et al., 2017). The adoption of digital technologies (DT) of Industry 4.0 can enable the implementation of circular economy practices. However, current indications suggest that how to use the broad set of DTs to transition towards CE is unclear for industry practitioners. In particular, there is general agreement that DTs are critical to enabling the implementation of CE practices (Ertz et al., 2022; Patyal et al., 2022). Industry 4.0 focuses on the development of intelligent factories and products, which implies enormous opportunities for improving production performance, organizational strategy, business models and skills (Massaro et al., 2021). Also, it facilitates interaction and communication between different stakeholders in business (Upadhyay et al., 2021). In this area of digital technology (DT), such as the Internet of Things (IoT), "big" data analytics (BDA) and additive manufacturing (AM) are recognized as essential tools in Industry 4.0 for the transition towards a circular economy (Ardito et al. , 2019).

MES (Manufacturing Execution System) is software that manages and controls the entire production process, from issuing orders to the production of the finished product. MES software solutions simultaneously close the "gap" between the company's ERP system (Enterprise Resource Planning systems - ERP system) and special systems for data collection in production (Supervisory Control And Data Acquisition - SCADA). ERP systems usually contain modules for commodity and financial accounting, as well as other business support modules, but they do not contain modules for monitoring, planning and traceability of material flows. Today, production management implies the integration of ERP and MES systems, which is becoming one of the most important activities of production management. The availability of Web-based XML standards successfully overcomes the "gap" between MES and ERP systems. The ISA SP-95 standard represents the structure of production operations divided into four levels. Levels 1 and 2 include the process control zone. MES level 3 consists of management and control functions, which depend on different types of production. Level 4 corresponds to business planning

and logistics operations. The goal of the ISA-95 standard is to reduce risks, costs and errors associated with the implementation of interfaces between ERP and MES systems.

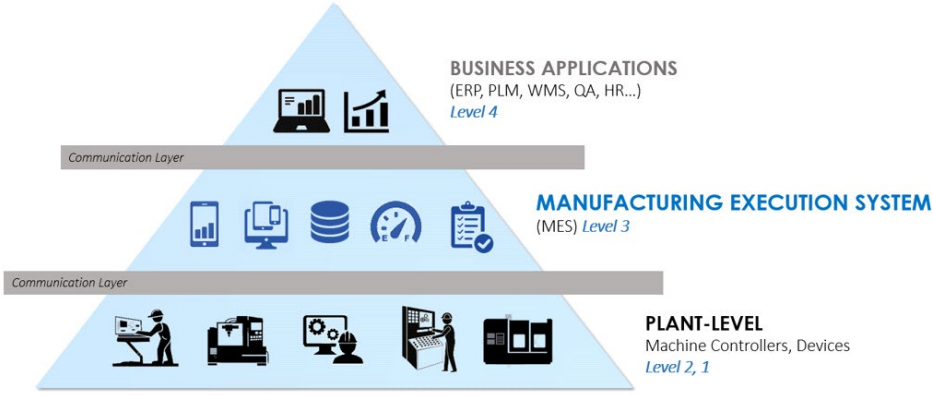

Figure 1: Structure of operations at the factory level
Source: (ANS/ISA-95.00.03, 2000)

2 Production intelligence - the result of using Digital Technologies (DT)

Based on the classification proposed by Rüßmann et al. (2015), as well as the description of digital technologies according to Cagno et al. (2021), digital technologies relevant to CE can be:

- Internet of things (IoT) - represent DTs that enable the collection and exchange of data between people, devices, things or objects using modern wireless telecommunications;
- Big data analytics (BDA) - DT which is characterized by a large volume and variety of data, that is, it requires analytical methods to convert data into information;
- Cloud technologies (Cloud technologies - CLOUD) - DT that enable practical network access to shared resources such as networks or servers;
- Cyber security and blockchain (Cybersecurity and blockchain - CYB) - DT, guidelines and policies that guarantee the protection of the cyber environment;

- Horizontal/vertical system integration (Horizontal/vertical system integration - HVSYS) - Enable an automated value chain within or between companies by connecting software, plants, manufacturers, customers and suppliers;
- Additive manufacturing (AM) - Production of objects directly from computer-aided model design;
- Autonomous robots (Autonomous robots - ROBs) - Robots capable of working completely autonomously, communicating with each other and cooperating with human beings;
- Simulation (Simulation - SIM) - Model of the physical world in real time in a virtual environment. It serves for testing and optimizing the system before implementation;
- Augmented reality (Augmented reality - AR) - Technologies that provide interactive computer simulation, "immersing" the user in a programmed environment, i.e. simulating the feeling of reality either through the sense of sight, hearing or touch.

Considering the presented classification, MES belongs to the DT listed under ordinal numbers 1,2,5, that is, it uses the mentioned DT in the process of production management and control and enables the following:

- Process management with minimization of raw material waste via IoT - machine management via IoT, stopping of machines, enables the automation of the process of monitoring raw materials and products on the "floor" of production, the "pull model" of withdrawing raw materials;

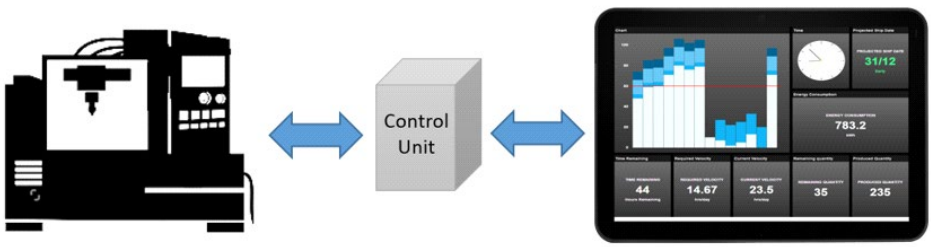

Figure 2: Intelligent factory
Source: (Key-IT, 2022)

- Reduction of losses in the manipulation of the finished product through BDA and HVSYS - monitoring deadlines, planning delivery of the oldest deadlines, optimization of packaging according to delivery requirements, optimization of packaging based on complaints and the like;
- Traceability and control of raw material stock management through BDA and HVSYS – production planning according to customer orders, stock management at micro-locations, complete traceability in case of product withdrawal from the market, enabling action according to special quality standards (HCCP, BRC, FSC and similar);
- Reduction of electricity and water consumption through IoT, BDA and HVSYS - control and optimization of processes in terms of electricity consumption, automatic starting and stopping of machines. Identification of resources and energy-intensive products, Energy consumption in relation to machine inactivity, Detailed analysis of costs and work orders/stages, Correlation between energy consumption and main production variables, Correlation between energy consumption per shift, Energy consumption and possible causes of failure, KPI for improvement of corrective measures.

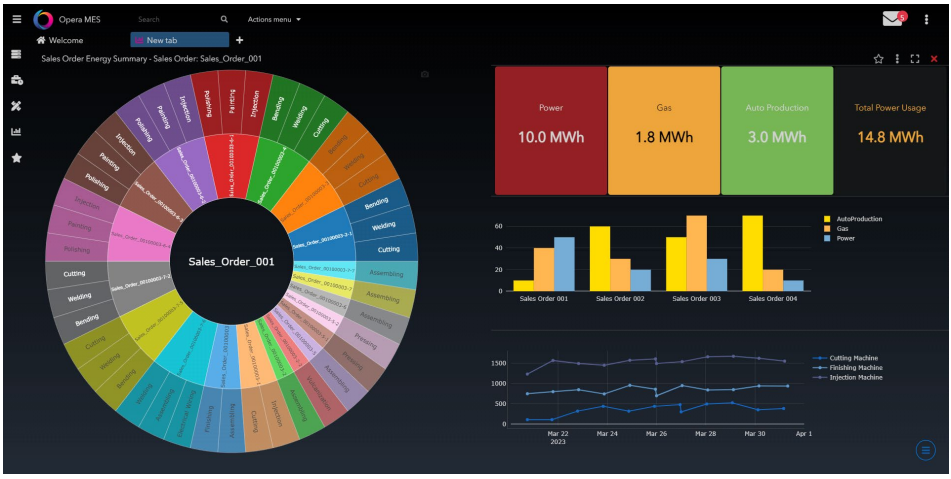

Figure 3: Energy management dashboard
Source: (Key-IT, 2022)

MES implies the following domains of production process management, according to (Key-IT, 2022):

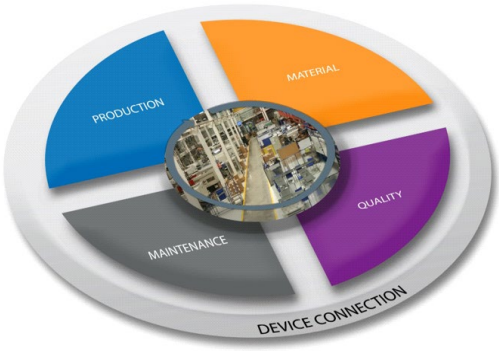

Figure 4: MES – Domain of production process management
Source: (Key-IT, 2022)

- PRODUCTION MANAGEMENT (Business Model Management, Product Management, Work Order Management, Advanced Planning and Scheduling, Electronic Sending of Tasks/Documents, Production Data Collection Paperless Factory Management , Real-time monitoring and supervision, OEE calculation and performance analysis, Web analysis of production conditions, Business application interface);
- MAINTENANCE MANAGEMENT (Asset maintenance management, Preventive maintenance, Failure management, Autonomous maintenance, Predictive maintenance, Spare parts/material consumption, Maintenance Performance Analysis);

Figure 5: Maintanace management dashboard
Source: (Key-IT, 2022)

- MATERIAL MANAGEMENT (Automatic Material Identification, Warehouse/Location/Batch Management, Goods Receipt/Delivery, Material Selection Management, Material Utilization/Manipulation, Condition Monitoring and Stock Level Analysis, Electronic Kanban, Interface with Automated Warehouses);
- QUALITY MANAGEMENT (Control Order Management, Quality Control, Instrumental or Visual Test Management, Quality Test Tracking, Batch Number Traceability, Batch Number Tracking/Genealogy, Automatic Batch Number Identification, Process Data Management , Automatic process data collection);

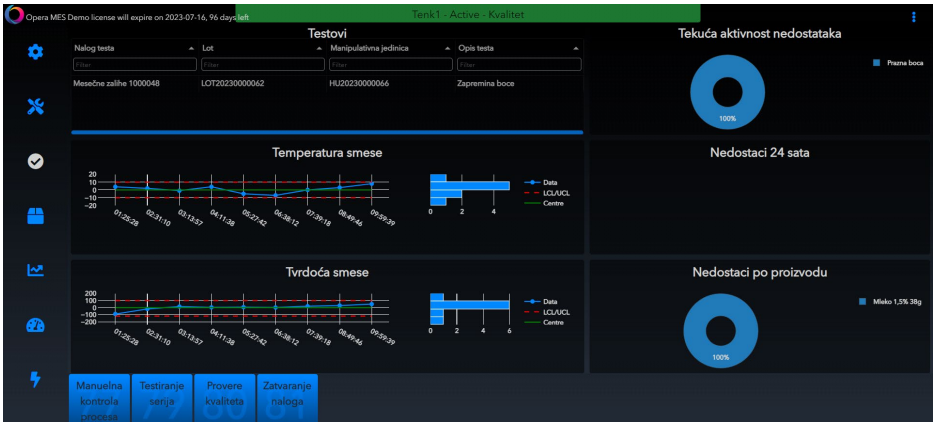

Figure 5: Quality control dashboard
Source: (Key-IT, 2022)

- DEVICE CONNECTION (Device connection logic protocols and management, Automatic data collection from devices, Automatic data sending to devices, Real-time dashboard, Real-time production data monitoring, SPC/Control chart analysis).

3 The position of the mes system in the implementation of circular economy practices

Based on the classification of CE practice categories, as stated by Garza-Reyes et al. (2019), the position of the impact of MES digital technology on applied CE practices will be determined.

Table 1: Classification of practice categories (Garza-Reyes et al., 2019) and position of MES

Broj	Kriteriumi prakse	MES
1.	Internal practices - efficiency and use of resources:	
a.	Designing products for reduced consumption of resources, reuse, recycling, recovery of materials, longer durability;	
b.	Designing processes to minimize waste;	
c.	Reduction of consumption of energy, water and raw materials;	X
d.	Use of renewable materials/energy;	X
e.	Reducing the emission of polluting substances and waste;	X
f.	Green packaging and green distribution;	
2.	Inner awareness:	
a.	Circular management, culture and continuous monitoring;	X
b.	Special training for workers;	X
c.	Inclusion of environmental factors in the internal performance evaluation system;	
d.	Environmental audit program;	
3.	External awareness:	
a.	Development of customer awareness;	
b.	Environmental labeling (customer information);	X
c.	Development of supplier awareness;	
4.	Supporting the value chain:	
a.	Selection of suppliers according to ecological criteria;	
b.	Establishment of eco-industrial chains;	X
c.	Reuse of energy and/or water throughout the value chain;	
5.	External Sustainability Practices:	
a.	Taking over of products from customers - functional life and end of life;	X
b.	Reuse as a business model;	X
c.	Repair/repair as a business model;	X
d.	Re-production as a business model;	X
e.	Recycled material for production;	X
f.	Recycling of waste, end-of-life products;	
g.	Leasing as a business model;	
h.	Updating as a business model;	X
i.	Cascading use of components and materials;	X
6.	Green market development:	
a.	Green or environmentally conscious market;	
b.	Client incentives;	
7.	Technological research and development:	
a.	Cross-functional cooperation for the improvement of the environment;	
8.	Development of legislation:	
a.	Legislation and policies.	X

4 Conclusion

In recent years, both society and business have become aware that in order to achieve rational economic development, it is necessary to use concepts that simultaneously increase productivity and reduce resource consumption. Seen in this

way, there are two closely related trends that are represented in the production paradigm: innovations based on digital technologies (DT) and the transition to a circular economy (CE).

While digital innovation aims to increase productivity, developing a new product or service, the circular economy (CE) enables the reduction of production costs, ensuring the sustainability of production and development of new products in accordance with environmental requirements. DTs support the implementation of CE practices in industry, however, in practice, it seems that most companies adopt DTs for reasons related only to production savings, efficiency gains, cost reductions, and achieving better quality. Only in the second phase do they recognize the opportunities offered by DT to encourage the transition towards CE.

The development of key digital technologies, such as MES digital technologies, help the systemic transition from the "linear economy" to the "circular economy". The main advantages of MES, noted in numerous projects, are: reduction of cycle time (for 45%), reduction of data entry time (for 75%), reduction of rework (for 25%), reduction of paper between shifts (for 50%), reduction control times (for 27%), increase in product quality (for 18%), increase in productivity (for 20%), optimization of primary/secondary resources and process improvement (Lean Manufacturing).

Future research on the impact of MES technologies on CE practices involves directly surveying companies on applied DT, as well as conducting empirical analysis of collected data, in order to investigate common correlations and impacts between MES and CE practices.

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MULTICRITERIA DECISION MAKING FOR THE SELECTION OF AGRI-FOOD SERVICE PROVIDERS

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The agriculture sector in Morocco has become a necessity, given the intensification of global competition and the openness of markets to new regulations and requirements. In this regard, we want to put forward the guidelines for the successful agricultural outsourcing strategy in Morocco. The existence of high-performance and potential stakeholders called Agriculture Service Providers (ASP) to meet the specific contractors' demands is crucial to the strategy's success. Due to the multitude of MultiCriteria Decision Making Methods (MCDM), decision makers are faced with the challenge of selecting the most appropriate MCDM method, as each of these methods has its own limitations, specifities, and can yield different results when applied to a different problem. The study carried out is a comparative approach between a variety of multi-criteria decision making methods (MCDM) :AHP, TOPSIS, VIKOR and PROMETHEE II using fuzzy logic. A MCDM selection process aims to highlight the advantages and limitations of each method for evaluating the quality of the solution generated. We accomplished this by using assessing's indicators. Finally, a sensitivity study was conducted to examine the robustness.

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1 Introduction

Agriculture is a very strategic sector at the national level. Its importance is evaluated by its direct impact on the economy's competitiveness (Arif, 2016).

Many previously integrated company functions have been gradually moved to third parties. Today, outsourcing is booming and affecting the support functions of the value chain, notably agricultures (Quélin, 2003). To remain competitive in the face of trade globalization and increased competition, companies must collaborate closely with external partners (Colin, 2005).

This collaboration requires coordination in the supply chain between Agricultures Service Providers (ASP) and their clients (Contractors) (Aguezzoul, 2019). It is strategic since, in most industries, 60% to 80% of their added value refers to suppliers (Pinedo, 2008).

However, to set up and succeed in this inter-organizational collaboration, the purchasing firm (Contractor) must select a group of performant partners of ASP who must meet its profit and risk reduction requirements (Aguezzoul, 2019).

Many manufacturing and service industries use the decision-making process, which entails affecting resources to the appropriate activities and attempting to optimize one or more objectives (Calvi et al., 2010). In this context, there are three hierarchical levels of decision making: strategic, tactical, and operational, which are differentiated by the horizon time and the level of responsibility.

As a result, selecting an ASP becomes a strategic decision with major impacts for a company's overall performance (Saharidis et al., 2006). However, the repercussions of these decisions might be difficult to undo.

These types of decision problem are handled by different methods such as statistical methods, artificial intelligence, multi-criteria decision methods, mathematical programming, hybrid methods and many others.

In this aim, we will present Multi-Criteria Decision-Making Methods (MCDM) used to solve the problem of provider selection (Efe, 2016). These methods are based on a set of criteria, often conflicting, that are evaluated to come up with the best solution

or alternative. So, their objective is to model the inference decision maker's as precisely as possible.

The goal of this sort of decision issue is to assign the best ASP to assist with the agricultures outsourcing in Morocco context, having regard to the nature of the activity and the contractor's potential.

In this study, a specific attention has been paid to some MCDM methods such AHP, TOPSIS, VIKOR and PROMETHEE. It has been aimed to examine the existing literature as well as their application domains.

Therefore, our approach is based on a comparative study between the various MCDM methods as well as a sensitivity analysis of the alternatives obtained. This study will bring the answer to our research question (RQ): what is the appropriate MCDM for selecting the most suitable ASP for the agricultures outsourcing process?

This approach will serve as a benefical road map for contractors who want to outsource their agricultural services.

This is an original piece of work based on data concerning ASP operating in Morocco, and it is a continuation of the previous work on the importance and benefits of the outsourcing strategy as well as the ASP selection criteria.

The rest of this paper has been structured as follows. The decision-making methods have been explained in detail in Section 2 and reaffirmed with a literature review, particulary the selection of ASP. It is worth noting that, according to this study, the area of applicability of these methods is rich in terms of problems similar to the ones we are looking at. In Section 3, the presentation of data and the approach used to apply the different MCDM have been introduced. The treatment and findings resulting from the comparison between the different methods, which is followed by the selection of the most suited method, has been discussed in Section 4. In Section 5, we will examine the results' robustness by doing a sensitivity analysis. The paper has been concluded with findings and future perspectives in Section 6.

2 Literature Review

The success of the outsourcing of the agriculture services, which has been recognized as a source of competitiveness, is a windfall for shippers who are seeing their agricultural performance improve (Hartmann & De Grahl, 2012). This has impelled contractors to increase their recourse of outsourced agricultures services (Kacioui-Maurin, 2016).

ASP is becoming increasingly important in the execution of agricultural operations (Roveillo et al., 2012). To succeed in this role, they must vary their offerings, spanning from the conduct of agricultures operations to supply chain management (Jharkharia & Shankar, 2005; Fabbe-Costes et al., 2009). The evaluation and selection of suppliers has an impact on almost every decision in supply chain management (Ghadimi et al., 2017).

The decision support system is a crucial component of appropriate decision-making in a complex environment (Sarabi & Darestani, 2021). Therefore, a suitable ASP must offer a combination of reliability, performance, agility, and productivity, to maintain a greater degree of competitiveness (Chen et al., 2018). The challenge of selecting a supplier is a decision issue, according to (Shinkman, 2000).

In the literature, several authors have examined supplier selection and evaluation issues, focusing on supplier evaluation criteria as well as the multidimensional aspect of the problem (Ben Jeddou & Kalboussi, 2015). A different view of the relationship between manufacturers and ASP is proposed by (Hiesse, 2009). The company must, therefore, select a number of providers considered to be suitable partners. This decision might be based on a variety of factors, including strategic, technological, and regional aspects (Kierzkowski, 2005).

2.1 Multi-criteria decision-support

Multi-Criteria Decision Making MCDM is a sub-domain of decision support (ROY, 1985), in which many alternatives are evaluated through several criteria. In these decision-making problems, using a single criterion doesn't allow for efficient distinction of alternatives while considering all of the decision-preferences.

MCDM is an analysis that aims to spell out a coherent family of criteria to understand the different consequences of an alternative (Maystre et al., 1994). In addition, (Vincke, 1992) states that multi-criteria decision-making aims to provide a decision-maker with tools to make headway in solving a decision issue including many, often opposing points of view.

Multicriteria analysis methods or, more precisely, MCDM are fairly recent tools that are in full development (Ben Mena, 2000).

There is a large number of MCDM. In this regard, we distinguish between two schools that follow quite distinct basic concepts.

The first is the "American School", which frequently employs an additive utility function that combines utility values to get a global score for action. The simplest method in this category is the weighted sum method. Multi-Attribute Utility Theory (MAUT), Multicriteria Hierarchization Method (MHM) (Saaty, 1984), or AHP for Analytical Hierarchy Process are examples of this sort of category (FRÄMLING, 1996).

The European school generally favors the application of methods based on the concept of over-ranking between potential actions. The concept of over-ranking emanates from the fact that one element is preferred above another from one or more points of view. The most well-known methods include: ELECTRE (Elimination Et Choice Translating Reality) (Roy, 1968, 1978) and PROMETHEE (Preference Ranking Organisation METHod for Enrichment Evaluations) (Brans et al., 1984).

The main ASP selection models were classified into five categories by (Aguezzoul, 2014):

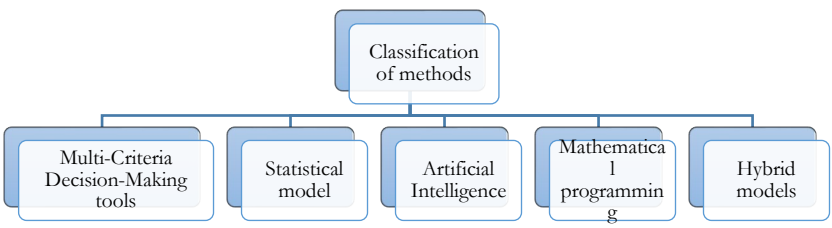

Figure: 1 Classification of methods

Source: own.

The kind of criterion (qualitative or quantitative), the outsourced activity, and the set of an ASP in the competition all influence which model is used.

BOEING has tackled the issue of supplier selection by using DEAHP (Data Envelopment Analytic Hierarchy) method, which combines the DEA and AHP method (Zouggari, 2011).

(Chan & Kumar, 2007) are interested in supplier selection challenges at the international level, using the fuzzy AHP method to solve the problem.

The choice of the AHP method is justified by its practical and systematic nature for this sort (of issue) of problem, whereas the fuzzy logic was chosen because of its ability to represent uncertain data (Zouggari, 2011).

The AHP method is utilized particularly to process the multi-criteria decision problem for supplier classification when it concerns the supplier selection (Zouggari, 2011).

The problem of supplier selection has been adressed by (Lin, 2009), considering the effects of the interdependence between the choice criteria. The method used entails combining the ANP method, which is a mutation of AHP, with mathematical programming in fuzzy numbers.

In the telecommunication field, (Onüt et al., 2009) proposed an approach for a supplier choice problem, this approach combines the fuzzy ANP method and the fuzzy TOPSIS method. In order to assess the relationship between the originator and the supplier, (Lee, 2008) proposed the fuzzy PAA approach to supplier selection.

Likewise, (Guneri et al., 2009) proposed an approach based on a combination of the fuzzy TOPSIS method with linear programming to process the problem.

A supply chain study was conducted by (Shaw, 2012) to select the best supplier. The AHP approach, which is used to examine the weights of several components, was utilized in this situation (Kierzkowski, 2005).

Some approaches involve other methods in a fuzzy environment such as AHP, ANP, DEA, TOPSIS, CBR, P-SVM, GP, MP, and MOMILP (Zouggari, 2011).

(Jayant et al., 2014) have evaluated the 3PL type ASP which can effectively ensure that companies reverse agricultures operations. The purpose of this research is to choose and evaluate several 3PL type ASP for reverse agricultures. They use AHP as technical of analytical hierarchical process and the order of preference by similarity with the ideal solution (TOPSIS).

In the same context, (Akkaya et al., 2015) used the fuzzy AHP approach to assess criteria for the selection of the best provider.

(Yazdani et al., 2016) evaluated the selection concept and the relevance of strategic decision-making in order to minimize operational costs and increase organizational competitiveness for the development of trade opportunities.

(Ebrahimnejad et al., 2012) proposed a decision-making model taking into the account the VIKOR's imprecision for categorizing projects based on their performance.

To solve the supplier selection problem, (Bai & Sarkis, 2018) coupled the theory of Neighbourhood Gross Set (NR) with VIKOR or TOPSIS decision-making techniques, in order to evaluate and classify decision-making techniques including hybridization between TOPSSIS and VIKOR.

(Mutikanga et al., 2011) used the PROMETHEE multi-criteria method to solve the complex water management and the problems of the strategic planning of this management, while taking into consideration decision-makers' preferences and the uncertainty that the problem generates.

(Behzadian et al., 2010) proposed a literature review on the PROMETHEE method's applications, stating that it is a good way to address the issue of supplier choice.

Several models have been presented in the literature for the Multi-Criteria Classification (MCC) (Ben Jeddou & Kalboussi, 2015) that might be used to classify ASP. In the following section, we will focus on the AHP (Analytic Hierarchy Process), TOPSIS, VIKOR and PROMETHEE II methods.

3 Methodology

3.1 Presentation of the approach used

The multi-criteria or multidimensional nature of the problem of choosing ASP makes the problem more complicated, hence we presented MCDM for selecting ASP as part of an outsourcing strategy.

The assessment of ASP will be the emphasis of our strategy which will use a multi-criteria classification technique to prioritize 57 ASP based on five evaluation criteria.

Several papers on the selection problem have suggested a multitude of criteria and utilized various approaches to evaluate them (Aguezzoul, 2014; Chai et al., 2013; Ho et al., 2010).

To do so, we will conduct an exploratory study of a representative sample of ASP operating in Morocco which will include both international ASPs with Moroccan subsidiaries and local ASP company.

As mentioned, 57 ASP were used in this exploratory, quantitative, and qualitative study. It will allow us to get a statistically representative sample of TOP ASP, whether, in terms of technological innovation, service range, or level of traceability employed ..., these ASP selection features will lead us to the formulation of the research criteria.

The study will be based on the following elements:

- Secondary data of ASP operating in Morocco, gathered via their portal or website.
- ASP's approaches for outsourcing agriculture services.
- Synthesizing table summarizing all of the data collected.

On the basis of this information, we will develop a comparative study of the four multi-criteria decision-making methods that we will pick for the ASP selection problem by using multidimensional statistical tools to link all of the ASP and the selection criteria by contractors as examples:

- Dynamic cross-tabulations.
- Correlation test.
- Method sensitivity analysis.
- Charts.
- Dashboard.

The exploratory study's findings will provide the most suitable methods getting relevant results as well as the best selections from all available alternatives, also the similarities between these methods, their intersections, weaknesses and strengths. In this section, the methodology used as well as a sample of Moroccan ASP will be presented in order to identify the ASP that best meets the contractor's needs from a large pool of available ASP on the market (Fig. 2).

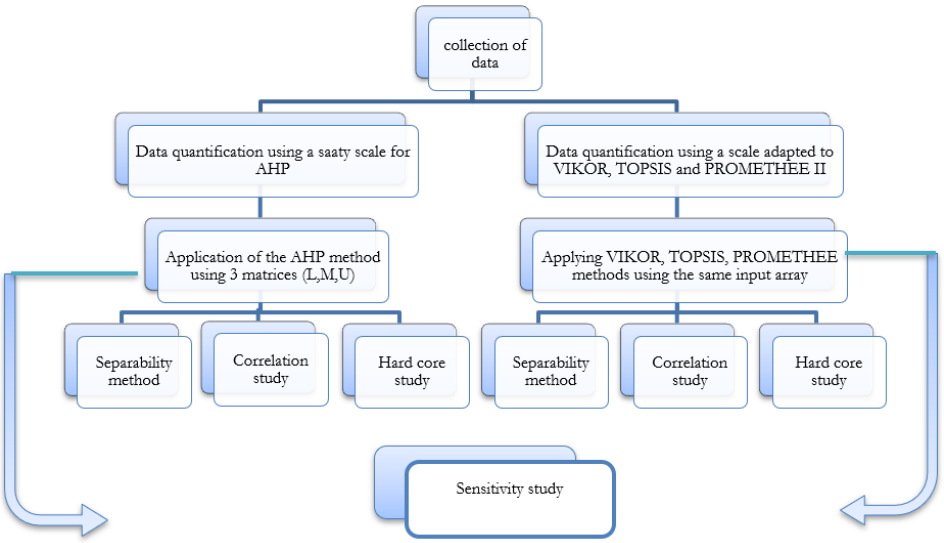

Figure 2: Methodology used

Source: own.

The domain in which we are interested, namely agricultures service provider management, is a promising sector for multi-criteria methods.

We will focus on the following methods: AHP, TOPSIS, PROMETHEE II, and VIKOR, thus we will adopt the fuzzy logic concept to make use of the ASP rating's fuzzy or uncertain nature, as well as the weights attributed to the criteria.

3.2 Decision Making Process

The selection of ASP is one of the strategic decisions that has a considerable impact on the company's performance. The ASP choice challenge for the decision-maker is determining the number of ASP and the ASP portfolio to be kept (Zouggari, 2011). Therefore, our initial task is to collect the essential information using 57 Moroccan ASP sample presented previously (Azzouz et al., 2020a, 2020b). We have created a table that reports all of this data while making the adjustments for the ease of their use.

The statistical study presented in Table 1 gives us a sense of the Moroccan market's physiognomy in terms of ASP services.

We devised a grading system connected with each criterion in terms of its level in order to quantify and assess the data collected.

Table 1: Scores of the different criteria

	Traceability	Agriculture Prividers (AP)	Technology	Services	Transport
1	Site+contact	AP1	Site	Transport	Basic: road, rail
2	Tracking	AP2	IS/EDI	Warehousing, storage, Handling	Maritime
3	Tracking (customer area, blog,...)	AP3	TMS,WMS,…	Cold warehousing, Temperature controlled storage, handling	Air
4	Advanced tracking	AP4	Software, platform,..	Transit	Courier, Express, urgent transport
5	RFID/GPS ….	AP5	AI,RFID,…	Contract agriculture, advanced	Cold transport, Controlled temperature

The transition from one level to the next is cumulative, the maximum score that can be reached is 5 if all of the criterion's underlying levels are met.

We notice that the types of variables are not numeric types, thus in order to manipulate them, we must convert the so-called linguistic variables to numeric variables by assigning quantifications to each linguistic variable on a scale.

This leads us to introduce the fuzzy concept and linguistic variables to deal with the weaknesses of the methods and their uncertainties.

Indeed, the fuzzy sets proposed by (Zadeh, 1965) give a new mathematical tool for dealing with information uncertainty. Because of the real decision-making situations and the imprecision of human thought, it is hard to convey personal preferences and judgments with confidence.

These judgments are frequently the consequence of a lack of knowledge and/or a difficult quantifiable nature. So, the fuzzy set theory can be used successfully (Zadeh, 1965).

Therefore, a fuzzy approximate value can be used to better model human judgment more accurately. Using a supplier'evaluation as an example, adjectives such as bad, medium, good, and outstanding might be assigned instead of standard numerical values (Igoulalene, 2014).

We will define the fuzzy set to understand it better. Assume X is an ordinary set. A fuzzy set of X is defined by its membership function .

:	$X \rightarrow [0, 1]$
x	$(x) \in [0, 1]$

The degree of membership of x in X is represented by the value of (x) (Igoulalene, 2014).

These fuzzy numbers also subjected to mathematical operations like multiplication, summation…

The triangular fuzzy number is the most common of the several types of fuzzy numbers. The triangular fuzzy number's membership function is graphically represented as a triangle, with [L; U] as the traingle's base and the point (M; 1) as the lone vertex. As a result, the triangular fuzzy number A will be defined by the real numbers L, M, and U: (L; M; U) (Barros et al., 2017).

3.3 The input data

We utilized two types of input arrays: one of these arrays will be associated with the TOPSIS, VIKOR, and PROMETHEE methods, and the other will be connected with the AHP method since its treatment way differs from the other and each of these tables has a different scale.

Table 2 presents the fuzzy values associated with the following methods: fuzzy TOPSIS, fuzzy PROMETHEE II and fuzzy VIKOR on an appropriate scale.

Table 2: Fuzzy value considered

	Level	L	M	U
Very bad	1	1	1	3
Bad	2	1	3	5
Mean	3	3	5	7
High	4	5	7	9
Very high	5	7	9	9

Following the presentation of the input data for the three methods, we will now present the table of the fuzzy AHP. However, the functioning principle of fuzzy AHP is to cross over the alternatives that are the topic of the study using a square matrix that contains the in-line and column alternatives.

In fact, (Chang, 1996) proposed a method of calculating priorities for triangular fuzzy comparison matrices by introducing triangular fuzzy numbers for binary comparison between the criteria.

So, we will have three matrices for each criterion: the first is the matrix M, which corresponds to the middle values of triplet (L, M, U) elements, the other two matrices are L and U, which correspond to the other components of the triangular fuzzy number.

We partition the triplet (L, M, U) into three matrices to make it easier to calculate, using the Excel tool.

This method generates a large amount of data, calculation and huge matrices. Consequently, we will give just a portion of the matrix M, L, and U in tables A-2, A-3 and in Appendix A that will contain some ASP and is related with only one criterion, in our instance, traceability.

For the fuzzy AHP method, we use a saaty scale that is adapted to our situation. In fact, the difference between the notes varies for two alternatives between 0 and 4.

Score zero is obtained if it is the crossing of the same alternative or if two alternatives have the same note, and 4 if one of the alternatives had a maximum note and the other has a minimum note.

In this respect, we applied a mathematical formula revealed after observing the behavior of the notes on the saaty scale.

Table 3: Saaty scale (Bellaaj, 2011)

The difference in scores	The assigned scores	Verbal judgement & Numerical evaluation		
1	3	Extremely more important 9	8	9
2	5	Very strongly more important 7	6	7
3	7	Strongly more important 5	4	5
4	8	Moderately more important 3	2	3
5	9	Equal importance 1	1	1

4 Results

After applying these four methods, we have reached the following results. We implemented a dashboard that connects all of the worksheets corresponding to the various methods on the one hand, and the different selected sectors on the other hand, which we have fixed to three sectors: transport, large retailers, and agro-food.

The choice of these sectors is related to their vitality and specialization, whether in terms of services or transportation modalities, while recognizing the indisputable role of technology and traceability in assuring a high level of performance in these sectors.

The decision-makers will then have the option of adding other sectors or adapting them to their own needs.

Any modifications to this dashboard will affect the other worksheets as well.

Table 4 shows the fuzzy scores constituting the weights for each sector based on the appreciation of a decision-maker or a group of decision-makers who are trying to reach an agreement between them to evaluate the weight of each criterion considering the nature of its professional activities and the services to be outsourced.

Table 4: Dashboard extract for fuzzy scores

	Dashboard to compare the results Of Fuzzy AHP Fuzzy TOPSIS Fuzzy PROMETHEE FUZZY VIKOR									
		Transport			Agri-Food industry			Large Retailers		
	Designation	L	M	U	L	M	U	L	M	U
Criterion 1	AP TYPE	1	1	3	7	9	9	1	1	3
Criterion 2	Treacability	3	5	7	1	3	5	1	3	5
Criterion 3	Technology	5	7	9	3	5	7	3	5	7
Criterion 4	Services	7	9	9	5	7	9	5	7	9
Criterion 5	Transport	7	9	9	7	9	9	7	9	9

Table 5 contains the ASP classification for the fuzzy AHP method, so we have specified the occurrences of each classification, for example, in our case, we find two ASP for the first classification, one ASP for the second-ranking and a single ASP for both sectors: transport and agri-food for the third-ranking, which corresponds to the fourth occurrence.

We noticed that the two ASP "Géodis and XPO agricultures" share the first position for the three sectors.

4.1 Study of separability between methods

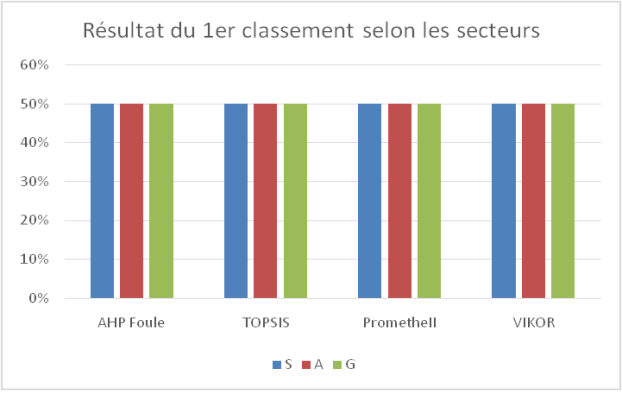

Figure 3: Separability graph of the 1st classification
Source: own.

Table 5: Separability study

Choice quality 1	Transport	Food Industry	Large retailers
Fuzzy AHP	50%	50%	50%
TOPSIS	50%	50%	50%
PROMETHEE	50%	50%	50%
VIKOR	50%	50%	50%

From synthetic dashboard table 6, we will utilize three indicators to assess the classification quality of the alternative ASP.

One of these indicators is the rate of "separability" (Table 5) between the classification levels, which is equal to 1/(number of the level class i), with « i » is the classification order as a percentage. In our case, we noticed that this indicator is equal to 50% for the four methods and for the three sectors giving a one in two chance for the two alternatives. Therefore, we conclude that these methods give a moderately significant precision since they give for each classification two possibilities, they are partially deterministic and account for small differences between the ASP. As a result, the three methods perform similarly for the 1st ranking and they have a consensus on this ranking.

Table 6: General dashboard for the comparison of methods, Result of 2nd choice

			Transport		Food industry		Large retailers	
Fuzzy AHP		1	Bansard Maroc	33%	Bansard Maroc	33%	Bansard Maroc	33%
		2						
		3						
		4						
		5						
TOPSIS		1	Bansard Maroc	33%	Bansard Maroc	33%	Bansard Maroc	33%
		2						
		3						
		4						
		5						
PROMETHEE		1	Bansard Maroc	33%	Bansard Maroc	33%	Bansard Maroc	33%
		2						
		3						
		4						
		5						

			Transport		Food industry		Large retailers	
VIKOR		1	Bansard Maroc	33%	Bansard Maroc	33%	Gefco	25%
		2					OPDR Maroc	25%
		3						
		4						
		5						

Table 7: Separability study of 2nd choice

Choice quality 2	Transport	Food Industry	Large retailers
Fuzzy AHP	33%	33%	33%
TOPSIS	33%	33%	33%
PROMETHEE	33%	33%	33%
VIKOR	33%	33%	25%

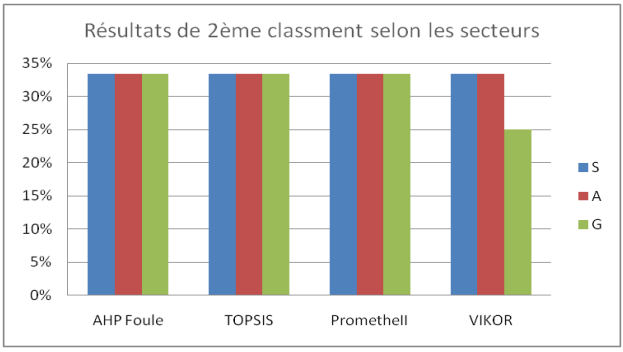

Figure 4: Separability graph of 2nd choice

Source: own.

For the separability index for fuzzy AHP, fuzzy PROMETHEEII and fuzzy TOPSIS is equal to 33% for all three sectors, as the second position is bonded absolutely by the foregoing, so the ASP actually in the second position are associated with rankings 3 since the ranking is shared between two ASP, the second choice is more precise because it corresponds to a single ASP, which is « BANSARD MAROC» as a ranking result for the three methods and the three sectors.

In the two sectors of Transport and agri-food, fuzzy VIKOR acts like the other methods, giving a separability index of 33% and keeping the same ASP that the other methods have chosen in the second position which is «BANSARD Maroc», but for the large-scale distribution sector, fuzzy VIKOR gives rise to two ASP in the second

position, "GEFCO" and "OPDR MAROC", both of which offer the same level of service and both of which are more powerful in terms of the type of PL than BANSARD on the one hand, and on the other hand, the decision-maker gives this criterion a moderately significant weighting for the large-scale distribution sector. Regarding separability index, large-scale distribution has an index less than other methods reaching 25%.

Table 8: General dashboard of the comparaison of methods, Result of 3rd choice

		Transport		Food industry		Large retailers	
Fuzzy AHP	1	DHL	25%	DHL	25%	GEFCO	20%
	2					OPDR MAROC	20%
	3						
	4						
	5						
TOPSIS	1	BOLLORE LOGISTICS	25%	BOLLORE LOGISTICS	25%	BOLLORE LOGISTICS	25%
	2						
	3						
	4						
	5						
PROMETHEE	1	BOLLORE LOGISTICS	25%	BOLLORE LOGISTICS	25%	BOLLORE LOGISTICS	25%%
	2						
	3						
	4						
	5						
VIKOR	1	BOLLORE LOGISTICS	25%	BOLLORE LOGISTICS	25%	BOLLORE LOGISTICS	20%
	2						
	3						
	4						
	5						

Table 9: Separability study of 3rd choice

Choice quality 2	Transport	Food Industry	Large retailers
Fuzzy AHP	25%	25%	20%
TOPSIS	25%	25%	25%
PROMETHEE	25%	25%	25%
VIKOR	25%	25%	20%

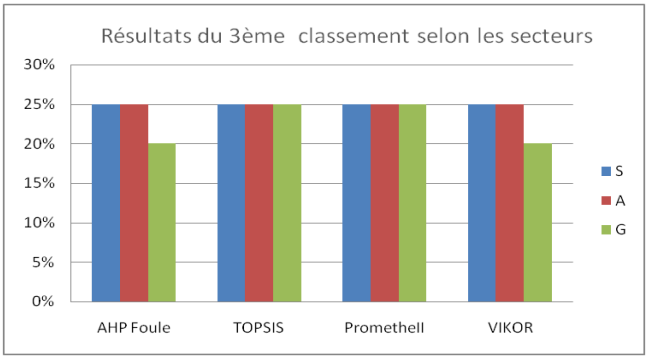

Figure 5: Separability graph of 3rd choic
Source: own.

The separability index is equal to 25% and well represented for the four methods at the Transport and agri-food sector level, especially since this index is dependent on the previous rankings. Furthemore, PROMETHEE II fuzzy and TOPSIS fuzzy maintain this same index value in the third sector, in contrast, the other methods such as fuzzy AHP and fuzzy VIKOR give a separability index of 20%. It is, therefore, less precise for these two methods in the choice of ASP in the large scale distribution; this is due to the previous classification of VIKOR generating two ASP, and the current classification of the fuzzy AHP also gave rise to two ASP.

In addition, regarding the ranking, there is a total unanimity between fuzzy VIKOR, fuzzy PROMETHEE II, and fuzzy TOPSIS on BOLOREE for the three sectors, however, fuzzy AHP, in its classification of ASP, yielded ASP that was completely different from other methods.

In summary, for the three ranks and three sectors, the fuzzy PROMETHHEE II separability index and the fuzzy TOPSIS separability index outperformed the other methods.

As a consequence, we have a broad view of the procedure that provides greater precision and accounts for minor variances in the computation, making it sensitive to slight fluctuations.

The ideal separability for successive choices is to have 100% for the first choice, 50% for the second choice, 33% for the third choice, and 25% for the 4th choice, and so on, this is reflected in the presence of a single ASP for each classification.

Also, PROMETHEE II and fuzzy TOPSIS have a remarkable agreement, in contrast to other methods, where there is a considerable intersection between fuzzy PROMETHEE II and fuzzy TOPSIS.

4.2 Study of the correlation between methods

After examining the separability index, we present the study of the correlation of the rectified order with the average of the rankings. We have introduced the concept of the SPERMAN rank correlation coefficient which aims to make an adjustment to the rankings obtained previously.

We will give correlation tables for the Transport sector only, and the results for the other sectors will be reported.

The SPERMAN rank correlation coefficient formula is

$$=1-$$

Given D, the difference between two ranks related to two methods and N is the sample size studied.

The method consists in classifying the values that allowed each method to classify the ASP, we add the classification based on a comparison conducted between the first position of each variable and the descending classification, with the purpose of calculating the value of D.

We also conducted another correlation study in order to make a comparaison.

Table 10: Calculation with the coefficient correlation function

	Correlation				
	Fuzzy AHP	**Fuzzy TOPSIS**	**Fuzzy PROMETHEE**	**Fuzzy VIKOR**	**Min**
Fuzzy AHP	1	0,954	0,951	0,911	0,977
Fuzzy TOPSIS	0,954	1	0,998	0,981	0,984
Fuzzy PROMETHEE	0,951	0,998	1	0,974	0,982
Fuzzy VIKOR	0,911	0,981	0,974	1	0,960
Min	0,97	0,984	0,9815	0,9604	1

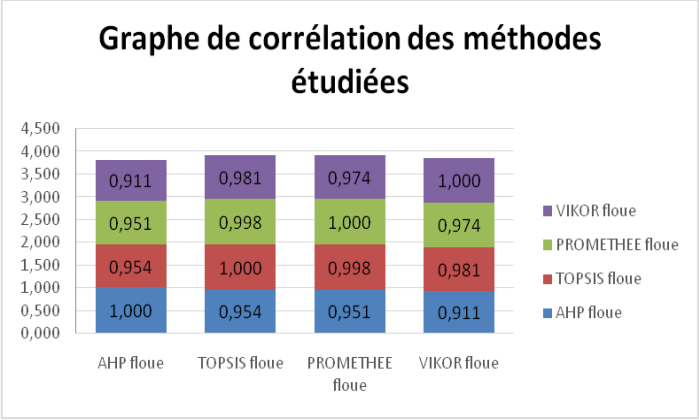

Figure 6: Correlation of methods studied

Source: own.

Table 11: SPEARMAN correlation

	SPEARMAN CORRELATION			
	Fuzzy AHP	**Fuzzy TOPSIS**	**Fuzzy PROMETHEE**	**Fuzzy VIKOR**
Fuzzy AHP	1	0,954	0,951	0,912
Fuzzy TOPSIS	0,954	1	0,998	0,981
Fuzzy PROMETHEE	0,951	0,998	1	0,974
Fuzzy VIKOR	0,912	0,981	0,974	1

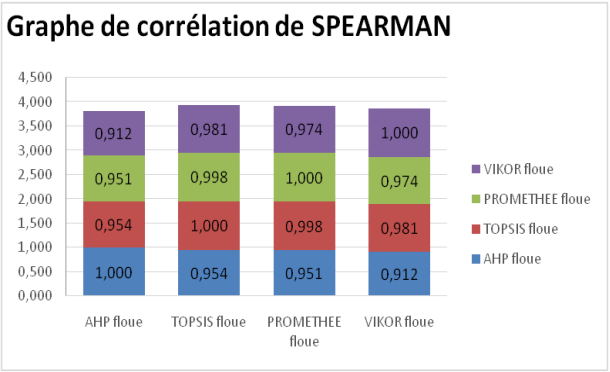

Figure 7: SPERMAN correlation

Source: own.

Table 12: Calculation with formula: 1-6*sum (/(N-1))

	Calcul ation of D squared			
	Fuzzy AHP	**Fuzzy TOPSIS**	**Fuzzy PROMETHEE**	**Fuzzy VIKOR**
Fuzzy AHP	0	1211,5	1273	2309,5
Fuzzy TOPSIS	1211,5	0	63	498,5
Fuzzy PROMETHEE	1273	63	0	674,5
Fuzzy VIKOR	2309,5	498,5	674,5	0

According to the correlation study carried out between the methods studied two by two, it turns out that there is a positive correlation that is quite significant, whether it is the simple correlation or correlation of SPREAMAN. So, there is a variation in the same direction between the methods, but the intensity of the fluctuations and the similarity of the methods varies.

For the correlation table 10, we inserted a minimum ranking for all the ASP by comparing the 4 methods, then we studied the correlation between the different methods and this minimal ranking, it turns out that TOPSIS fuzzy provides better rankings, with a maximal correlation coefficient of 0,985, followed by PROMETHEE II fuzzy with a value of 0,982. At the level of this same table, the methods best correlated between them two by two are PROMETHEE II fuzzy and TOPSIS fuzzy with a value of 0.998 on the one hand, and TOPSIS fuzzy and VIKOR fuzzy on the other hand, with a value of 0.981.

SPERMAN's correlation (Table 12) yields the same results as the other correlations, with a minor fluctuation and which affected rather to fuzzy VIKOR.

This demonstrates the partially similar outcomes between fuzzy PROMETHEE II and fuzzy TOPSIS on the one hand and between fuzzy TOPSIS and VIKOR on the other hand.

For the other sectors, we had the same behavior concerning PROMETHHE II fuzzy and TOPSSIS fuzzy, the value was a bit high as the Transport sector which is equal to 0.999 and for fuzzy TOPSIS and fuzzy VIKOR, the value is equal to 0.979. For the correlation with the min- ranking, fuzzy TOPSIS, and fuzzy PROMETHHE II were on the same level with a value of 0.988.

The type of correlation to choose depends on the data type, but in our case, the two types of correlation produce an almost identical finding with small fluctuations.

The robustness of SPEARMAN stems from it lacks of sensitivity to the variable's typology.

4.3 Hard core study of methods

The objective of this study is to determine the ASP hard core that is linked to the frequency of the same positions for the four methods. The ASP is divided into four groups (A, B, C, D), with the level of each group varying based on the specifications and range of ASP to be retained. « A » denotes the certain and performant ASP, B the least certain, C the mediocre, and the D the ASP «to avoid». We have illustrated these groups with dynamic graphs.

We are just going to present the Transport sector study.

Table 13 shows the 4 groups that were created to classify the four methods

Table 13: Classification of methods according to 4 groups

Groups	A	B	C	D
The ranking margin	5	10	30	57

We observe that the top four ASP are classified among the top ASP for the four methods in the Transport sector, and they constitute the hard core by maintaining their positions for the 4 methods that vary within a range of [1,5].

Any variations in the classification interval margins will reduce the ASP's hard core in the case when the interval margin is reduced, for example, if we limit Group A to the value 3, we obtain the results presented in Table 19.

Table 14: Classification of the methods studied according to 4 categories

	Ranking				Groups			
ASP	VIKOR	AHP	PROMETHEE	TOPSIS	VIKOR	AHP	PROMETHEE	TOPSIS
Geodis Logistics Maroc	1	1	1	1	A	A	A	A
XPO Logistics	1	1	1	1	A	A	A	A
Bansard Maroc	3	3	3	3	A	A	A	A
Bolloré Logistics	4	5	4	4	B	B	B	B
Excel	41	35	37	36	D	D	D	D

The hard core of ASP in this scenario is made up of three ASP: « Géodis Logistics Morocco», « XPO Logistics », and « BANSARD Morocco ».

The more ASP with a higher number of A, in our case 4, are regarded to be better ASP, since all methods converge towards this choice.

The higher number of B in the ASP, the more converging methods towards a medium-high ranking ranging from 5 to 10.

We can also state that there is a general agreement on assigning the ASP to a data group, as seen by the assignment of scores of 4,3 or 0, but the assignment of scores 1 on the 4 methods is uncommon, this means that there is a consensus between the four methods.

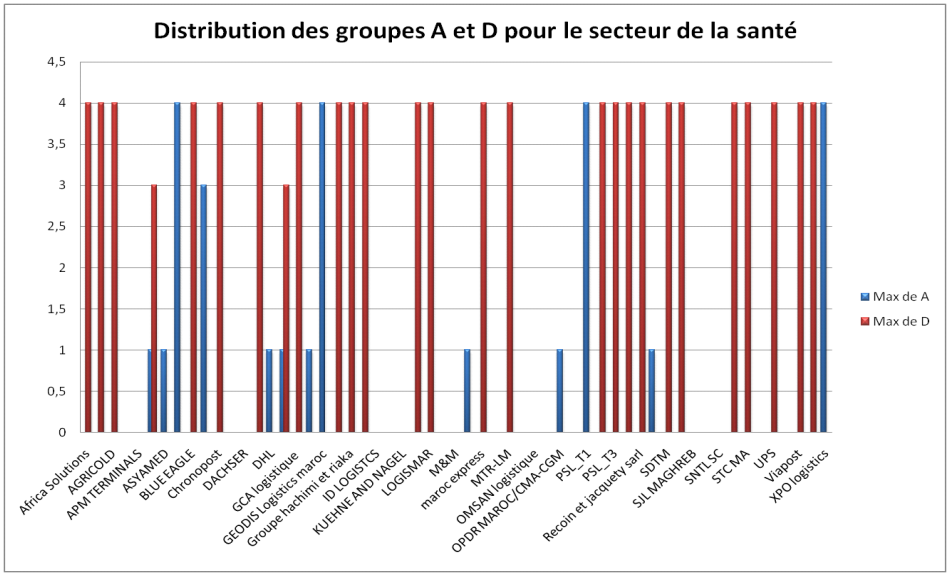

Figure 8: Dynamic distribution of groups A and D for the Transport sector
Source: own.

We visualize the ASP given to Group A that represent the top 5 ASP in terms of the criteria we have chosen, and those assigned to Group D that represent the ASP ranked bottom in terms of the level of their services taking into the account the criteria studied.

The greatest number of A is 4, reflecting the consensus of the 4 methods on the hard core that we have estimated at 5. BANSARD, XPO logistics, GEODIS, and BOLLORE are the ASPs assigned to it.

Therefore, the four methods chose these ASP from the top five ASP. However, for each of the four methods, the maximum number of D is given to many ASP.

5 Synthesis of 4 methods

Our study covered the evaluation of two aspects: the most robust ASP in terms of the criteria we specified, and the other aspect affecting the four methods we used. In addition, to ensure the relevance, feasibility, and good functioning of the 4 methods, we have implemented 3 witnesses ASP, ASP_T1, for which a maximum score of 5 was assigned for the five criteria, ASP_T2, with an average rating, and ASP_T3 with a minimum rating of 1 for all four methods.

The best ASP that has had a consensus of the four methods are: **Géodis logistics Morocco, Bansard Morocco,** and **XPO logistics.**

Based on the three indices we have chosen for the 4 methods, separability, correlation, and hard core, it turned out that fuzzy PROMETHEE II followed by fuzzy TOPSIS were able to obtain the best indices with virtually every classification having a single ASP.

Furthemore, fuzzy TOPSIS performed best at the level of correlation with a minimal ranking, whereas PROMETHEE II had a better SPERMAN correlation and a higher simple correlation.

6 Sensitivity analysis

Sensitivity analysis is an important concept in the effective use of quantitative decision models, it examines the stability of the results as the various parameters vary. In our case, our parameters concern the criteria scores and their priorities that will be represented by the decision-maker as well as the ASP scores for each service.

Therefore, the sensitivity analysis reinforces the multicriteria decision making (Feick & Hall, 2004), and according to (Insua, 1999), the sensitivity analysis determines how the results of quantitative analysis rest on input parameters.

In decision-making, the weightings assigned to decision criteria seek to indicate the real importance of these criteria. It is difficult to accurately reflect the relevance of criteria when they cannot be expressed in quantitative terms. The decision-maker can make better decisions, if he can determine the importance of each criterion (Mouine, 2011).

We will modify the parameters in a more or less random way that needs contemplation and intellect, and we will then analyze the changes through the results generated.

Given the introduction of the concept of randomness, we thought it was necessary to complete this analysis by defining stability intervals for the values obtained during classification, assigning them to each group, and evaluate the small differences between each value that correspond to a given ranking.

Ultimately, the basic subject of sensitivity analysis is the study in a model's input variables in order to examine their impact on the output variables, which is nothing other than decision-making and the selection of a suitable ASP.

7 Conclusion

Decision-making for several structures is a complex and unavoidable task to enhance their processes. This decision is involved in various sectors and the MCDA tools have been the subject of diverse applications in areas such as environment, energy management, economic planning, financial and banking management, urban management and transport, project evaluation and selection, production and supply management, etc.

This strategy has exploded with technological advancement as well as with globalization, especially with demands in terms of quality, technology, and worldwide competitiveness.

Through this paper, we have attempted to give an in-depth analysis of ASPs, using MCDM methodologies to show the best ASP. This choice was based on the priority of the criteria specified by the decision-makers varying according to each contractor's activity and field.

So, it was revealed that the problem of selecting ASP is one of the strategic decisions that has a considerable impact on the company's performance.

This situation has pointed out the importance of decision-making methods in influencing the ASP selection and, subsequently, the outsourcing strategy's success. Indeed, the development of the agricultures sector in Morocco constitutes a major challenge to economic growth and the strengthening of national and international competitiveness. However, to achieve the intended objectives, this strategy should be supported by effective decision-making tools by considering the criteria that have a great impact on the shattering and profitability of contractors, this is, for example, thanks to technology and traceability.

Furthemore, the diversification of the ASP's offer, whether national or international subsidiaries established in Morocco, makes choosing the best ASP more difficult. In fact, it is the central point of our research problem, where we are led to identify a method among a variety that will allow us to pick the best ASP, in the light of the exploratory study conducted on the situation of the offer of ASP operating in Morocco.

The study carried out highlighted and adjusted the existing methods to apply them to a sample of ASP operating in Morocco for choosing the best ones.

In perspective, we plan to develop an automated ASP's choice model, based on dynamic real-time research for the most satisfactory solution through an agriculture decision making system by using a mathematical and artificial intelligence method.

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The Impact of Climate Change on the Quality of Wine Production – Development of a System Dynamics Model

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The aim of this paper is to explore the key factors and interrelationships within a system that examines the impact on how climate change affects wine quality and working practices in vineyards and how winegrowers can adapt to these changes while maintaining their unique wine characteristics. We utilize systems thinking and the system dynamics model to facilitate our investigation. The theoretical section introduces the concepts of systems thinking and system dynamics. The subsequent section outlines the system's structure, including a Causal Loop Diagram (CLD) highlighting significant feedback loops and their dynamic behaviours.

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1 Introduction

Climate change has become a predominant topic in both research and societal discourse, with far-reaching implications for our natural environment, economies, and ways of life (Sokolickova, Meyer & Vlakhov, 2022). While numerous aspects of these changes are under scrutiny, the impact of climate change on agricultural production has emerged as one of the most pressing challenges for global food security (Fones et al., 2020; Gomez-Zavaglia, Mejuto & Simal-Gandara, 2020). The agricultural sector, which provides sustenance for the world's population, is notably sensitive to shifts in climate conditions, including rising temperatures, altered precipitation patterns, and an increased frequency of extreme weather events (Praveen & Sharma, 2019).

As climate change unfolds in diverse forms, such as global temperature increases, shifting rainfall patterns, and the escalation of extreme weather occurrences, it continues to generate a host of difficulties and challenges within the agricultural sphere (Shattuck et al., 2023). Among the many industries affected by these changes, viticulture, or the cultivation of grapes for wine production, finds itself at a critical juncture where traditional practices confront an altered climatic landscape (Bardsley, D. K., Bardsley, A. M., & Conedera, 2023). Increasing temperatures, changing rainfall patterns, and more frequent extreme weather events have introduced challenges that impact grape production, the quality of grapes harvested, and, ultimately, the wine industry as a whole.

The content is structured into two primary sections. Initially, we delve into the theoretical foundations of systems thinking. Following the introduction to systems thinking in the first part, we examine the challenges posed by climate change in the context of agricultural production, specifically within the wine industry. This analysis leverages the application of a causal loop diagram, serving as an invaluable tool for decision-making and understanding the complex interplay between climate variability and wine quality.

2 Literature review

2.1 Systems thinking

Sterman (2000) underscores the pivotal role of systems thinking in effective decision-making. It is a well-established approach that has been refined and honed for more than six decades. This methodology, as articulated by Richmond (1993), embodies a multidimensional perspective:

- **Model-Based Thinking:** Systems thinking encompasses the creation of conceptual models, providing a mechanism to translate acquired knowledge into real-world applications. This enables decision-makers to develop a robust understanding of complex systems and their interdependencies.

- **Dynamic Thinking:** One of the core tenets of systems thinking is dynamic thinking. It empowers decision-makers to anticipate the future behavior of systems while accounting for time delays, fluctuations, and feedback loops. Dynamic thinking is particularly valuable in situations where changes occur over time and where linear cause-and-effect relationships fall short.

- **Interrelated Thinking:** Systems thinking perceives the world as an intricate web of interrelated components, acknowledging that a single cause seldom leads to a solitary consequence. Rather, outcomes are shaped by a multitude of indirect influences, reflecting the complex and interconnected nature of real-world systems.

- **System Management:** Among these dimensions, the pragmatic facet of system management stands out. It encompasses the practical application of systems thinking in real-world contexts, facilitating more effective and adaptive decision-making.

Both systems thinking and system dynamics address similar classes of problems. However, system dynamics, through the employment of computer simulations and mathematical models, offers a unique capability — the ability to visualize how a real system behaves when subjected to various decision scenarios (Dangerfield, 2014). System dynamics models were used in their studies by many authors who researched

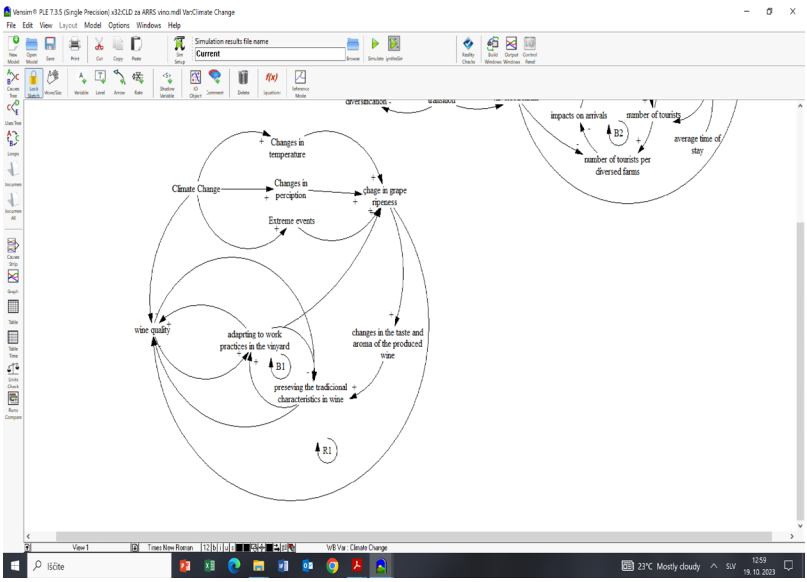
the areas of agricultural systems, for example, Žibert et al., 2021; Jung et al., 2021 and Rozman et al., 2013.

In the forthcoming sections, we will introduce the concept of causal loop diagrams, a fundamental tool within the system dynamics framework (Sterman 2000). These diagrams capture variables and their causal relationships using labeled arrows, with distinctive markings to denote whether they represent reinforcing (R) or balancing (B) feedback loops. Reinforcing loops illustrate a scenario where an increase in a particular variable results in an amplified effect on another variable, creating a snowball effect. In contrast, balancing loops portray situations where an increase in a variable leads to a compensatory decrease in another variable, maintaining equilibrium within the system. Causal loop diagrams are indispensable for mapping the dynamic relationships within complex systems and are instrumental in uncovering insights for informed decision-making.

3 System structure – CLD diagram

This chapter of the study delves into the heart of the matter, introducing a Causal Loop Diagram (CLD) model that vividly illustrates the intricate relationships between climate change and wine quality. In this chapter our objective is to unveil the dynamic connections and feedback loops that underpin this complex interplay, shedding light on the profound impact of climate shifts on the world of viticulture. This paper introduces a decision support method based on system dynamics (SD). In Figure 1, we present a causal loop diagram that depicts the system's structure, specifically focusing on how climate change affects the quality of wine.

The model aims to investigate how climate change affects wine quality and working practices in vineyards and how winegrowers can adapt to these changes while maintaining their unique wine characteristics. With the model, we analyze different scenarios and strategies for managing climate challenges in the wine sector. Figure 1 represents a qualitative model and discusses the important relationships of causal loops.



Fifure 1: Causal loop diagram - how climate change affects the quality of wine.
Source: own.

The model comprises several key components:

- **Climate Change:** This fundamental force represents changes in temperature, precipitation, and extreme events.
- **Changes in Temperature, Changes in Precipitation, Extreme Events:** These intermediate variables reflect different aspects of climate change, all of which impact "Changes in Grape Ripeness."
- **Changes in Grape Ripeness:** This pivotal variable directly affects the quality of wine produced. Any alterations in grape ripeness due to climate change will influence "Changes in the Flavor and Aroma of the Produced Wine."
- **Changes in Flavor and Aroma of Produced Wine:** This variable signifies the direct influence of grape quality on the final wine product. Climate-induced variations in grape ripeness can lead to changes in the taste and aroma of the wine.

- **Adaptation to Vineyard Work Practices:** Here, we observe how winegrowers respond to climate change. The implementation of suitable practices can enhance grape quality.
- **Preservation of the Traditional Characteristics of Individual Wines:** An essential aspect of the wine industry, this variable illustrates winegrowers' efforts to maintain the unique traits of their wines despite climate challenges.
- **Wine Quality:** This variable represents the overall quality of all wines produced in the vineyard.

The model provides a clear representation of the causal connections between climate change, vineyard practices, and wine quality. It highlights two significant feedback loops:

- **Positive Feedback Loop (R1):** When major climate changes affect "Changes in Grape Ripeness," wine quality may decline. This can motivate winegrowers to adapt their practices and work harder to preserve the traditional characteristics of their wines, potentially resulting in improved wine quality.
- **Negative Feedback Loop (B1):** Conversely, improving vineyard practices related to "Grape Maturity Changes" can enhance wine quality. This might reduce the need for substantial practice adjustments and the preservation of traditional characteristics since the wine quality may already meet market requirements.

The diagram indicates that climate change has a multi-faceted impact on the wine industry. Changes in temperature and precipitation directly affect grape ripeness, which subsequently alters the taste and aroma of wine. The wine industry, in turn, attempts to mitigate these changes through adaptive practices in vineyards, aiming to preserve the traditional wine characteristics.

Extreme events are another primary concern as they directly impact quality.

4 Conclusion

This study has delved into the pressing issue of climate change and its effects on agricultural production, with a particular focus on the wine industry. By reviewing existing literature and presenting a system dynamics model (CLD), we have aimed to address the strategic inquiries surrounding the dynamic relationship between climate change and agriculture. This model is designed to be a valuable decision support tool, enabling stakeholders to gain insights into the complex interplay between climate variability and wine quality.

The agricultural sector, including viticulture, faces significant challenges arising from shifting temperature and precipitation patterns, as well as an increased frequency of extreme weather events, all consequences of climate change. These changes impact the ripening of grapes, and ultimately, the quality and flavor of the wine produced.

Our model illustrates the causal relationships between climate change, vineyard practices, and wine quality. It highlights two crucial feedback loops: one demonstrating how major climate changes affecting grape ripeness can negatively affect wine quality but potentially encourage winegrowers to adapt their practices, and the other showing that improved vineyard practices can lead to better wine quality, potentially reducing the incentive to make further adaptations.

By examining these complexities, our study provides a foundation for understanding the far-reaching implications of climate change on agriculture and the potential strategies to mitigate its adverse effects. The insights gained from this model may assist in making informed decisions to enhance the sustainability and quality of agricultural production in the face of a changing climate.

The model, developed as part of this research, not only contributes to our understanding of the challenges but also offers a valuable resource for decision-makers, farmers, and stakeholders in the agricultural sector. It provides a platform for exploring the consequences of different choices over time, aiding in the development of effective strategies to navigate the complexities of climate change and maintain the quality and tradition of wine production. Its utility lies in its potential to guide effective responses to climate challenges, thereby safeguarding the future of agricultural production and the quality of the products it delivers.

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YACHTING'S ROLE IN ADVANCING SUSTAINABLE ECO LOGISTICS

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This article provides an experience of sailing yachting with a focus on sustainable logistics, transport, and renewable energy. It actively encourages young people and stakeholders to embrace these concepts to protect our environment. This comprehensive article underscores the pivotal social impact of yachting's evolution. It actively educates and engages people by offering eco-tourism experiences that provide insights into sustainable green nature protection and the challenges posed by climate change. This educational aspect is fundamental to fostering a deeper understanding of how logistics impacts both the environment and society. The article presents successfully realized events and activities that attracted people of different interests, ages, and nationalities. Special attention is given to disadvantaged children, who are presented with the positive experience of how modern eco-technological transports such as sailing yachting powered by ecological solar, wind and water energy can interact with an emphasis on nature conservation. At the same time, sharing experiences with young people further promotes their motivation for a fulfilling life in line with responsibility towards nature. The article presents a full extended paper that covers a range of positive practices beneficial to stakeholders.

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1 Introduction

In an era characterized by escalating global challenges and growing environmental concerns, the role of yachts in marine transport and logistics has risen to prominence as a sustainable solution to address pressing issues [Giusti et. all 2021, Guo et. all 2022, Degiuli et. all 2023, Kim, J.; Kim, H. 2021, Mauro et. all 2021, Xiao et. all 2023, Xu et. all 2023]. The adoption of ecological transport and renewable energy aligns with the imperative to transition towards more sustainable, eco-friendly logistics and transportation systems. The critical challenges of climate change, resource depletion, and environmental degradation resulting from conventional transportation methods have catalyzed the quest for innovative and sustainable alternatives. It is against this backdrop that sailing yachts have emerged as a potent force for change (Longarela-Ares et all. 2020, Mancuso and Tumino 2022, Pintér et. all 2021, Tsai and Lin 2023).

The modern yachts offer a distinctive proposition within the realm of marine transport and logistics. Powered by the natural forces of wind, water, and sun, they symbolize a green vision for relationship with the environment. In response to the urgent need to reduce greenhouse gas emissions, transition to renewable energy sources, and safeguard fragile marine ecosystems, sailing yachts occupy a pivotal position at the intersection of these global challenges, offering a sustainable path forward.

This article seeks to promote the important role of yachting as a crucial component of the solution to the global problem of unsustainable logistics and transport. By actively engaging young people and stakeholders, it encourages the embrace of sustainable concepts and practices that are essential for preserving our environment. The article delves deeper into the significant social impact of yachting's evolution, with education and engagement emerging as the keystones of change. Furthermore, it presents practical experiences and events that vividly illustrate how yachting's transition to ecological solar, wind, and water energy sources harmoniously interacts with nature and contributes to its conservation (Guo et. all 2021, Minak 2023, Trstenjak et. all 2020).

2 Synergy between nature and social environment and maritime logistics

The conventional transportation of goods (foods, cargo and etc.) via large ships, propelled by outdated technologies, has had a detrimental impact on both the environment and nature. These conventional ships often rely on fossil fuels, emitting significant greenhouse gases and contributing to air and water pollution. Their use can result in oil spills, damaging marine ecosystems, and causing long-lasting harm to coastal areas and wildlife (Koboević et. all 2022, Ortigosa et. all 2022).

In stark contrast, modern yachting represents a positive shift towards eco-conscious maritime logistics and eco-tourism (Dragičević et. all 2023, Łapko et. all 2019, Yao et. all 2023). Yachts are equipped with advanced technologies such as solar panels, wind turbines, and hydrodynamic generators, minimizing their carbon footprint and reducing emissions. This transition to renewable energy sources significantly mitigates the environmental harm caused by conventional ships.

2.1 Yachting's role in logistics

The yachting's role in logistics epitomizes the fusion of sustainability and innovation. By harnessing renewable energy sources and instilling eco-conscious practices, yachting offers a forward-looking solution to the pressing challenges of modern logistics. This evolution reflects a broader trend toward greener and more efficient supply chain management, paving the way for a more sustainable and responsible future.

2.1.1 Importance of yachting sustainable design for logistics

The focus on high-strength yacht design within the realm of eco-friendly logistics represents a pivotal element in the evolution of sustainable marine transportation. This emphasis on the physical structure of yachts, characterized by durability, resilience, and adaptability, has far-reaching implications for the logistics industry. At its core, a high-strength yacht is engineered to prioritize safety and longevity. Its robust construction ensures that it can withstand the unpredictable forces of the sea, providing a secure and dependable mode of transportation. This is of paramount importance, not only for the well-being of passengers and crew but also for

minimizing the risks of accidents or environmental damage that may result from structural failures.

The efficiency of high-strength yacht design is closely intertwined with its ergonomic features (Begović et. all 2023, Ingrassia et. all 2021, Mitkov and Dovramadjiev 2022, Santos et. all 2016). These yachts are conceived to harness natural forces, such as wind and water currents, with remarkable effectiveness. Their streamlined form reduces resistance and enhances their ability to glide through the water with minimal energy expenditure. This, in turn, translates to lower fuel consumption and reduced greenhouse gas emissions, aligning with the broader goals of sustainability and environmental responsibility. The construction of high-strength yachts frequently involves lightweight yet durable materials, resulting in a vessel that is not only strong but also resource-efficient. The reduction in weight contributes to a decrease in energy consumption during the construction phase and throughout the operational lifespan of the yacht. These yachts are not just enduring but also sustainable, fostering a more eco-conscious approach to marine transportation.

The versatility and adaptability of these yachts further enhance their appeal within the logistics sector. Their construction can accommodate innovative technologies and modular systems, making them agile and capable of meeting various logistical requirements. This adaptability is crucial for navigating the dynamic landscape of modern logistics. From a logistics standpoint, the high-strength, eco-conscious design of yachts optimizes cargo capacity, allowing for efficient storage and transportation of goods. This efficiency is invaluable, as it streamlines the movement of cargo, reducing the need for additional vessels and transport methods. High-strength yachts have a positive impact on logistics efficiency, contributing to cost savings and enhanced supply chain management.

The ergonomic and logistics-compliant design of these yachts adds a layer of appeal to their functionality. They adhere to industry regulations and guidelines, ensuring seamless integration into logistics processes. This adherence to standards is fundamental for logistics companies to operate efficiently and in compliance with governmental and international regulations.

2.1.2 Importance of renewable energy in yachting for autonomous logistic movement

The importance of renewable energy in yachting for autonomous logistic movement is multifaceted (Akiyama et. all 2021, An et. all 2023). It encompasses environmental preservation, reduced reliance on fossil fuels, energy independence, economic efficiency, technological progress, and the promotion of sustainability. By embracing renewable energy sources, yachting is not only advancing autonomous logistics but also leading the charge in fostering a more sustainable and environmentally responsible future for marine transportation.

Autonomous logistic movements powered by renewable energy embody the values of sustainability and eco-consciousness. They set an example for other transportation sectors and logistics operations to follow, encouraging the adoption of green technologies and practices. This include:

- Environmental Stewardship: Renewable energy sources, such as solar panels and wind turbines, offer a clean and sustainable means of powering yachts. By harnessing these natural energies, yachting embraces a greener approach to logistics, significantly reducing carbon emissions and minimizing its environmental impact. This eco-conscious approach aligns with global efforts to combat climate change and protect marine ecosystems.

- Reduced Dependence on Fossil Fuels: Yachts powered by renewable energy reduce their reliance on fossil fuels, which are a major source of greenhouse gas emissions. This transition away from traditional fuel sources plays a critical role in mitigating climate change and reducing the carbon footprint of autonomous logistic movements.

- Energy Independence: The adoption of renewable energy sources enhances the autonomy and self-sufficiency of yachts. They can generate their own energy from the sun, wind, or other eco-friendly methods, reducing the need for frequent refueling stops and minimizing logistics disruptions. This energy independence is particularly advantageous in autonomous logistic operations, where sustainability and reliability are paramount.

- Economic Efficiency: Renewable energy sources provide a cost-effective solution for powering yachts. While there may be an initial investment in the installation of solar panels or wind turbines, the long-term savings on fuel costs and maintenance make autonomous logistics economically efficient. This cost-effectiveness can translate into more accessible and sustainable logistics solutions.

- Technological Advancements: The integration of renewable energy sources into yachting for autonomous logistic movements drives technological innovation. Advanced energy storage systems, efficient power management, and smart grid solutions become pivotal in optimizing energy use. These technological advancements are not only beneficial for yachting but also have broader applications in the logistics industry.

2.2 Advancement of yachting

The advancement of yachting represents a dynamic progress toward a more sustainable and innovative maritime future. It encompasses the integration of cutting-edge technologies, renewable energy sources, and eco-friendly design, transforming yachting from a traditional leisure activity into a force for positive change in logistics and transportation. This progress underscores the pivotal role yachting plays in the evolution of sustainable marine solutions, embracing a harmonious relationship between nature and logistics.

2.2.1 Advancement of yachting for nature protection

The progression of yachting for nature protection reflects a transformative approach in the maritime domain. It embraces sustainable technologies, renewable energy sources, and ecologically conscious measures to shield marine ecosystems, coastal environments, and natural habitats. This evolution underscores yachting's dedication to optimizing logistics with the preservation of environment, solidifying its position as a steward of environmental integrity (Byrnes and Dunn 2020, Wu 2021).

2.2.2 Advancement of yachting for education

The advancement of yachting for education represents a dynamic shift within the maritime industry (Łapko 2023, Okşaş et. all 2022). It leverages sailing experiences to actively engage and educate individuals, particularly young people and stakeholders, about sustainable practices, marine conservation, and the importance of responsible logistics. This transformation positions yachting as a catalyst for a deeper understanding of the environment, logistics, and society, nurturing a new generation of environmentally conscious persons.

2.2.3 Advancement of yachting for socialization

The advancement of yachting for socialization signifies a compelling evolution within the maritime world. It transforms yachting experiences into opportunities for individuals to connect, engage, and build meaningful relationships. By fostering social bonds and shared adventures, yachting becomes a catalyst for enhanced human interaction, promoting unity, and camaraderie among diverse groups of people. The advancement of yachting for socialization takes on an even more profound dimension when considering individuals, including children, with disabilities. It represents an inclusive shift in the maritime world, where yachting experiences become avenues for people from all walks of life to come together, bond, and create lasting connections. In this environment, individuals with disabilities find not only acceptance but also opportunities for enriched social interactions, fostering a sense of belonging and unity among diverse groups of people. Yachting, in this context, transcends its traditional role, becoming a powerful tool for social integration and inclusivity.

3 Real examples of the positive application of yachting

Real-life examples of the positive application of yachting are difficult to cover and are not limited. Given the multifaceted activities, the photographic material presents carried out activities related to transport, ecology, social activity.

3.1 Yachting's role in transport

Yachting's role in transport is undergoing a notable transformation with an emphasis on sustainable design and sizes (Petacco et. all 2023). This shift prioritizes sustainable technologies and vessel dimensions that enhance efficiency, reduce fuel consumption, and minimize environmental impact. Figure 1 shows a sustainable design of sailing yacht with wooden teak elements.

Figure 1: Sustainable design of sailing yacht with wooden teak elements.
Foto: Mitkov, Dovramadjiev, 2023

3.2 Yachting's role in ecology

Yachting's role in ecology is evolving as it embraces sustainable practices and eco-friendly technologies. By prioritizing environmental protection and responsible logistics, yachting contributes to the preservation of marine ecosystems and coastal landscapes (Paramana et. all 2023, Vogel et. all 2018). It embodies a harmonious relationship between logistics and nature, fostering a more ecologically conscious approach in the maritime industry. Figure 2 shows part of a sailing yacht where the use of wind energy is of great importance.

Figure 2: Part of a sailing yacht where the use of wind energy is of utmost importance.
Foto: Mitkov, Dovramadjiev, 2023

3.3 Yachting's role in social interactions

Yachting's role in social interactions is about bringing people together in a unique setting, fostering connections, and promoting teamwork and communication (Kwon et. all 2021, Lim and Park 2023). It offers inclusive opportunities for individuals of diverse backgrounds and ages to share experiences, form lasting relationships, and create memories, making it a powerful catalyst for social engagement and unity. A particularly important place is the role of yachting for disadvantaged children who, for one reason or another, do not have the opportunity and/or access to yachting. It is the social responsibility of all yachting stakeholders to attract and support young people. In Fig. 3 shows a photo from a real event supporting young people to yachting.

Figure 3: A real-life activity supporting young people to yachting.
Foto: Mitkov, Dovramadjiev, 2023

4 Conclusion

This article covers the advancement of yachting's role in sustainable eco logistics. It delves into the dynamic interplay of design, transport, environmental stewardship, eco-conscious practices, renewable energy, and the pivotal social impact of yachting.

To represent yachting's contribution to sustainable eco logistics through its innovative design, which prioritizes efficiency, safety, and environmental responsibility, is recommended as very important and useful for modern logistics responsiveness. By harnessing renewable energy sources such as solar, wind, and water, yachting has become a leader of eco-conscious transportation, reducing carbon emissions and minimizing its ecological footprint.

This article extends beyond logistics, highlighting the social impact of yachting by actively engaging young people and stakeholders in embracing sustainable practices and marine conservation.

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Fostering Sustainable Wine Tourism Through Collaboration of Grape Growers and Winemakers: Case of Ljutomer-Ormož Hills

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Sustainable tourism endeavors to harmonize present and future economic, social, and environmental concerns while meeting the diverse needs of visitors, industry stakeholders, the environment, and host communities. This study delves into the pivotal role of collaboration between grape growers and winemakers in advancing sustainable wine tourism within the Ljutomer-Ormož Hills region. Emphasizing horizontal integration within the sector, this research probes the perspectives and attitudes of various stakeholders concerning collaboration and their views on wine tourism. The findings underscore stakeholders' recognition of the importance of collaboration, as it holds the potential to drive increased visitor numbers, reduced operational costs, and the creation of innovative tourism offerings. Grape growers and winemakers demonstrate a strong inclination to engage in wine tourism activities, placing significant importance on holistic visitor experiences, which encompass gastronomy, accommodations, and cultural engagement. The study spotlights ongoing endeavors, such as the collective trademark "Jeruzalem Slovenia," while briefly addressing the influence of climate change on wine tourism, underscoring the imperative of adapting to evolving weather patterns and their implications for viticulture. To thrive as a wine tourism destination, the Ljutomer-Ormož Hills region should prioritize bolstering collaboration efforts and offering a diverse, locally rooted tourism experience.

Keywords:
wine tourism, sustainable tourism, cooperation, Ljutomer-Ormož Hills, grape growers

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1 Introduction

The UNWTO defines sustainable tourism as tourism that fully considers its present and future economic, social, and environmental impacts while simultaneously meeting the needs of visitors, the industry, the environment, and the host communities. Sustainable tourism optimally uses environmental resources, which are a key element in tourism development, preserves essential ecological processes, and contributes to the conservation of natural heritage and biodiversity. Sustainable tourism also respects the socio-cultural authenticity of the host community, preserves cultural heritage and traditional values of the host community, and fosters intercultural understanding. Sustainable tourism ensures successful and long-term economic activities, subsequently providing social and economic benefits. These benefits should be fairly distributed among all stakeholders. Sustainable tourism must maintain a high level of tourist satisfaction and provide a significant experience for tourists, strengthen their awareness of sustainability issues, and promote the practice of sustainable tourism among them (UNWTO, 2005, pp. 11–12).

An essential element in the sustainable development of tourism is integration. Most authors talk about integration between different sectors, but horizontal integration within a specific sector is equally important (Bramwell and Lane, 2000). According to the Tourism Opportunity Bank of Slovenia (2016), the fundamental shortcoming of tourism in Slovenia is the fragmented activity of individual tourism providers and associations and their lack of connection. It is necessary to connect all tourism providers, which reduces costs, increases visits, adds new content to leisure time, creates new jobs, organizes volunteer work, and enables information transfer.

The cooperation and collaboration of grape growers and winemakers are crucial factors for the successful sustainable development of wine tourism. Wine tourism is essentially defined as visiting vineyards, wineries, wine-related events, where wine tasting and/or discovering the characteristics of a particular wine region are the primary motivating factors for visitors (Hall, Mitchell, and Johnson, 2000). For the effective operation of this type of tourism, it is advisable to understand the cooperation of stakeholders and its positive and potential negative effects. The collaboration of grape growers and winemakers can take place in various ways, but the essence is that all stakeholders benefit from this collaboration. Collaboration can occur through promoting other providers, recommending other providers to guests

or customers, exchanging goods, organizing joint events, performing under the same brand, and similar methods. By connecting these providers, the promotion of viticulture and winemaking, as well as the image of the tourist destination in which these stakeholders operate, is built. Successful collaboration among grape growers and winemakers can lead to the development of new tourism products such as wine routes, cycling and hiking paths related to wine, cellar visits, demonstrations of vineyard work, various events, and more. All of this is crucial for the successful operation of a tourist destination.

The problem of the lack of connectivity among providers is also present in the Prlekija region, as highlighted in the Regional Development Program of Prlekija 2014–2020 and the Regional Development Program for the Prlekija Region 2007–2013 (Public Development Agency of the Municipality of Ormož, Prlekija Development Agency, Entrepreneurship Development Agency Gornja Radgona, 2006, 2013). The fragmentation and lack of connection in tourism offerings and tourism actors are also recognized in the Regional Development Program of Pomurje 2014–2020 (Mura Development Agency, 2015). Currently, tourism providers in this area are quite disconnected. It is essential to unify all ideas and demands into a single tourism offer that will represent the story of Prlekija. The lack of connectivity can hinder operations due to higher promotion costs, increased investments, lower visibility, and so on. Additionally, there is no destination management organization or local tourism organization operating in the Ljutomer-Ormož hills area. A Local Tourism Organization Prlekija Ljutomer operated in this area until 2016 but is no longer active.

Centuries of rich history have left their mark on the culture of gastronomy and the renowned wines of Prlekija. Prlekija offers significant gastronomic and wine potential, so efforts should be made to preserve and enhance this direction of tourism.

In the municipality of Ljutomer, there is a place that is one of the most well-known in Slovenia and beyond for its wine - Jeruzalem. Jeruzalem offers tremendous potential and, in our opinion, can become the center of wine tourism for both Prlekija and beyond. The area under consideration certainly has the potential for the development of this type of tourism, and by researching this topic, we can contribute

to the successful sustainable development of wine tourism in the Ljutomer-Ormož hills area.

2 Collaboration and Stakeholder Engagement in Tourism Destinations

Collaboration involves stakeholders working together, addressing common issues or solving specific problems. Each stakeholder controls their resources, such as knowledge, skills, supporters, and capital, but as individuals, they may find it challenging to provide all the necessary resources to achieve their goals and plan for the future effectively in the direction of tourism development. Therefore, stakeholders can work collectively under the assumption that their chances of achieving their goals and creating new opportunities to address problems are greater when they collaborate with others than when they act individually (Bramwell and Lane, 2000).

Crotts, Buhalis, and March (2000) state that strategic partnerships and relationships, joint ventures, and similar concepts describe intentional alliances between two companies that have some synergistic and strategic value. Partnerships can take various forms:

- Buyer-seller relationship, as in the case of collaboration between event planners and conference hotels, restaurants, and suppliers.
- Supplier-distributor relationship, as in the case of airlines and travel agencies.
- Alliance among two or more providers.
- Joint ventures formed by two or more previously separate companies.

Atallah (2002) suggests that authors generally cite three types of collaboration based on direction, which are:

- Horizontal collaboration – the collaboration of companies in the same activity within the same sector, e.g., grape growers and winemakers involved in wine tourism.

- Vertical collaboration – the collaboration of companies from different activities within the same sector or a related sector, e.g., a company collaborating with suppliers or customers.
- Diagonal collaboration – the collaboration of companies from different activities or sectors.

Some authors (Brigham and Houston, 2016, p. 721; Gryszel, 2010) mention concentric and conglomerate collaboration in addition to horizontal and vertical collaboration. Essentially, strategic collaboration can be understood as two companies sharing their technological or market resources for joint product development and marketing efforts. It is a reciprocal relationship in which each partner brings certain advantages. In strategic collaboration, resources, investments, and risks are combined for mutual benefit (Okumus, Altinay, and Chatho, 2010, p. 130). Regarding this, Crotts and others (2000) suggest that there are significant growth and success opportunities in companies that form strong synergistic partnerships. However, when collaboration fails, there is a significant risk of losing both a competitive position and a considerable amount of money.

Strategic collaboration can enable the exchange of tangible assets or intangible capabilities of companies, such as knowledge, skills, financial capital, technological capabilities, leadership abilities, and other intangible assets, such as a company's reputation (Okumus, Altinay, and Chatho, 2010, p. 130). The first step in choosing a partner is for the company to identify areas where a potential partner can positively impact its business. When assessing a potential partner's ability to reduce business risk, factors such as consistent high quality, reliable operation, and trust in the other company must be considered (Crotts et al., 2000). Organizations with fewer resources can learn new technical and managerial skills, while organizations with more resources seek to gain market knowledge and build relationships to ensure access to various markets. Knowledge exchange among partners is the most common reason for collaboration today, as knowledge represents a leading force for development. Product and service differentiation and the pooling of resources to gain a competitive advantage are the main motives for collaboration in the tourism industry (Okumus, Altinay, and Chatho, 2010, p. 130). In the future, collaborations and strategic partnerships will continue to exist in the travel and tourism industry, but companies must develop programs that facilitate cultural and business changes necessary to build successful and enduring partnerships (Crotts et al., 2000).

Crotts et al. (2000) mention five key questions that need to be addressed before successful collaboration is established:

- Do we want to collaborate?
- Are we capable of collaborating?
- With whom would we collaborate?
- How would we collaborate?
- How would we sustain and maintain long-term collaboration?

Answering the first question requires evaluating the extent to which collaboration can play a role in gaining a strategic advantage in the market. A strategic advantage results from collaboration where companies can jointly achieve something that the customer values, with reduced risk for all participating companies. Many tourism providers choose to collaborate due to technological innovations, increased market coverage, expanded service offerings, and cost savings (Crotts et al., 2000).

For successful collaboration, a company must be prepared to collaborate. Being a good partner often requires changes in the organization and its people. The question of the capability to collaborate necessitates that the company conduct an internal audit of its own capability to collaborate successfully. Reputation, operational capability, a "win-win" orientation, and the ability to build and maintain trust are key elements in attracting good partners. Companies that collaborate poorly within their own operations often find it challenging to identify partners for collaboration. Individuals within companies must understand why external relationships are important and how to support them (Crotts et al., 2000). Selin (1999) believes that collaboration can take various forms. Ironically, in a time of increasing competition, tourism stakeholders support joint decision-making and resource sharing. Partnerships in tourism are still poorly developed due to numerous geographic, organizational, and political constraints. He believes that coordinated efforts from different sectors are needed to ensure the contribution of current and future partnerships to the sustainable development of tourism.

3 Research on the Connection of Grape Growers and Winemakers in the Case of the Ljutomer-Ormož Hills

Mutual connection and collaboration among grape growers and winemakers are one of the key factors for the successful sustainable development of wine tourism. In the empirical part of this study, we examined the attitudes of grape growers and winemakers in the Ljutomer-Ormož Hills region regarding collaboration and cooperation, as well as their perspectives on wine tourism. According to Radovan (2001), most psychological definitions describe attitudes as something we either favor or disfavor. Maio and Haddock (2014, p. 2) argue that defining attitudes is a decision regarding whether we like or dislike a particular matter, object, or person. Attitudes summarize various types of information about an issue, object, or individual. This means that all thoughts, emotions, and past experiences are combined into a unified evaluative summary and serve as an important source of information for forming attitudes.

The first research question that we will answer through the analysis of the research results is:

What are the attitudes of grape growers and winemakers towards horizontal collaboration and cooperation in the areas of knowledge, promotion, and events in the Ljutomer-Ormož Hills region?

In the context of this research question, we were interested in whether grape growers and winemakers would be willing to:

- Collaborate with other grape growers/wineries under the same brand.
- Allocate resources for joint promotion with other grape growers/wineries.
- Advertise the products of other grape growers/wineries if they advertised theirs.
- Recommend visits to other grape growers/wineries if they did the same.
- Exchange opinions and experiences with other grape growers/wineries.
- Participate in joint projects with other grape growers/wineries.
- Collaborate in organizing events with other grape growers/wineries.

We also asked grape growers and winemakers how important they consider the following activities in establishing successful collaboration among grape growers and winemakers:

- Grape growers/wineries collaborating under a common name.
- Joint promotion.
- Advertising other grape growers/wineries.
- Exchanging opinions and experiences with other grape growers/wineries.
- Grape growers/wineries participating in joint projects.
- Jointly organizing events with other grape growers/wineries.

We also asked them to what extent they believe that connecting grape growers and winemakers can influence:

- Increasing the effectiveness of promotion.
- Reducing the share of promotion costs.
- Exchanging and gaining professional experience.
- Complementing and shaping their own offerings.
- Exploring common interests among grape growers and winemakers.
- Creating and actively participating in regional events.

The second research question, which we will answer through the analysis of research results, is:

What are the attitudes of grape growers and winemakers in the Ljutomer-Ormož Hills region towards wine tourism?

In the context of this research question, we were interested in whether grape growers and winemakers are:

- Willing to host tourists in their wine cellars, vineyards, and homesteads.
- Willing to invest more time in managing their wine cellars for the purpose of wine tourism.

- Willing to allocate more resources to manage their wine cellars for wine tourism.

We also asked them to what extent they believe that engaging in wine tourism can impact:

- The exposure of their products and the opportunity for consumers to taste their products (wine).
- Strengthening awareness and loyalty to their own brand.
- Expanding awareness and understanding of wine and the wine industry.
- A significant increase in sales.

In the context of this research question, we also asked grape growers and winemakers how important they believe the following advantages of wine tourism are for grape growers and winemakers:

- Immediate and valuable feedback from consumers regarding existing products and the ability to promptly update the product range.
- Adding visitors to an email list that can function as a customer database for targeted marketing and consumer information.
- Higher margins through direct sales to consumers.
- An additional sales point for their products, as grape growers/wineries can sell them on-site.

Finally, at the end of the questionnaire, we offered the respondents the opportunity to provide their opinions, perspectives, and insights on the topic of collaboration among grape growers and winemakers and on the topic of wine tourism.

3.1 Research Methods

We obtained primary data through a survey conducted with grape growers and winemakers in the Ljutomer-Ormož Hills region. The survey was conducted in the form of questionnaires. The respondents in the study were grape growers and winemakers from the Ljutomer-Ormož Hills region. There are 60-70 grape growers or wineries operating in the area under consideration. The survey was conducted as

an online survey from June 14, 2017, to July 9, 2017. Email invitations to complete the survey were sent to grape growers and winemakers. The invitations were sent to everyone whose email addresses could be found online. Questionnaires were emailed to 84 addresses, but we do not have insights into how many people were informed about the survey through other channels. The first invitation was sent to grape growers and winemakers on June 14, 2017, with a deadline for completing the survey by June 22, 2017. Due to the low response rate, a reminder was sent on June 20, 2017, urging them to complete the survey. Because we still believed the responses were insufficient after the deadline, a follow-up invitation with a deadline of June 29, 2017, was sent on June 26, 2017. The final reminder was sent to grape growers and winemakers on July 5, 2017, by the President of the Ljutomer Winegrowers and Wine Friends Society. The final deadline for completing the survey was July 9, 2017. We processed the collected data statistically, analyzed it, and provided conclusions with our own opinions. We used nominal measurement with a simple scale and the Likert scale to gather data on attitudes in the survey. With nominal measurement using a simple scale, we used questions with two exclusive answers (yes, no). We assessed attitudes towards the topics using the Likert scale by presenting respondents with a set of statements and asking them to express the degree of importance and influence. Numeric values were assigned to these responses, and we compared the calculated average values of all respondents.

3.2 Research Results

In the scope of researching the attitudes of grape growers and winemakers regarding horizontal collaboration and cooperation in the areas of knowledge, promotion, and events in the Ljutomer-Ormož Hills region and inquiring about the attitudes of grape growers and winemakers towards wine tourism, we examined 30 completed questionnaires. The questionnaire was completed by 24 male and 6 female respondents. The average age of the respondents is 45.23 years. Out of the respondents, 13 have completed high school, vocational-technical education, technical school, or other professional education. Seven respondents have completed higher professional education, nine have completed a university or higher professional program, and one respondent holds a master's degree.

Data on the number of grapevines were provided by 29 grape growers or winemakers. The average number of vines among these 29 respondents is 18,634, with a median of 12,000 vines. Three grape growers or winemakers do not sell wine or only produce it for personal use. Excluding these three respondents, the average quantity of wine sold is 23,529.63 liters, with a median of 13,500 liters. This calculation considered the middle value of the range of stated liters sold by the three respondents.

We found that the majority of respondents would allocate funds for joint promotion, advertise the products of other grape growers/wineries, exchange opinions and experiences with other grape growers/wineries, and participate in joint projects and events with other grape growers/wineries. Slightly fewer respondents would collaborate under the same brand with other grape growers/wineries.

In the survey, respondents rated joint promotion, exchanging opinions and experiences, collaborating on joint projects, and jointly organizing events as important or very important for establishing successful collaboration. They considered collaborating under a shared brand and advertising products of other grape growers/wineries somewhat less important than the activities mentioned above.

The overall average ratings indicate that, according to respondents, collaboration and cooperation affect increasing the effectiveness of promotion, reducing the share of promotion costs, exchanging and gaining experience, complementing and shaping their own offerings, seeking common interests, and actively participating in regional events. There are no significant differences in the assessment of the impact among these activities.

Respondents highlighted that in 2017, collaboration among grape growers and winemakers in the region was poor. According to one respondent, this problem was partly due to administrative boundaries set by the state. The Ljutomer-Ormož wine subregion is divided because Ormož is under the jurisdiction of the Ptuj Agricultural Institute, while Ljutomer falls under Murska Sobota. Establishing local collaboration among grape growers with a common wine store in major tourist centers within the region is crucial. Respondents emphasized that, despite the efforts of some

individuals, winemakers are not collaborating enough and are not actively participating in wine events organized in their local area.

Grape growers and winemakers mentioned the lack of professional guidance on how to collaborate, apply for various grants, and other aspects of the wine tourism industry. They noted a need for a person or organization responsible for this role. Respondents also highlighted the lack of professional knowledge and experience that young grape growers should gain, even through international experiences.

Among other things, grape growers and winemakers indicated the difficulty of connecting winemakers with tourism entities that offer accommodations because these entities prefer to keep guests on their own premises. They see untapped potential in linking local winemakers with producers of other products (such as fruit, meat products, cheese) and service providers (accommodations, spas) to create a comprehensive offering that would be widely available to guests. This approach could yield more than just collaboration among grape growers/wineries.

The research found that the majority of respondents are willing to host tourists in their wine cellars, vineyards, and homesteads. They are willing to invest more time in managing wine cellars for wine tourism and allocate more resources for this purpose. Results indicate that, according to respondents in the Ljutomer-Ormož Hills region, engaging in wine tourism affects exposure, strengthens brand awareness and loyalty, spreads knowledge about wine and the wine industry, and significantly increases sales.

The arithmetic means of the importance ratings of the discussed advantages of wine tourism are all around 4.00, indicating that respondents consider these advantages important. These advantages of engaging in wine tourism include immediate and valuable feedback from consumers regarding existing products and the ability to update the product range, higher margins through direct sales to consumers, an additional sales outlet for their products, and adding visitors to an email list that can be used for targeted marketing and informing customers. An additional sales outlet for their products was slightly more important than the others.

Regarding wine tourism, respondents emphasized that the offerings should include not only wine but also gastronomy, accommodation, relaxation, active experiences, history, and more. This involves connecting grape growers and winemakers with local food producers, craftspeople, and accommodation providers. The offerings need to be comprehensive and adaptable to the needs of wine tourists, who are often wealthier individual travelers rather than large bus tour groups. One respondent suggested that all these activities and offerings should be carried out at the Styria Slovenia region level, rather than at the subregion level, which is considered too small and has too few relevant actors.

Respondents also saw a problem with wine of lower quality from certain producers. In their view, the value of the region is significantly reduced when guests pay for a tasting of poor-quality wine. This negative information can quickly spread and impact the entire area's tourism.

Respondents identified an opportunity in simplifying bureaucratic procedures for operating in wine tourism, as seen in neighboring Austria. It is necessary to activate local entities and tourism development services, primarily tourist associations and the tourist board, which is no longer active in Ljutomer. Respondents believed that municipalities should play a more supportive role, which is often lacking. They also felt that young people should be educated about the future potential of wine tourism in the region.

3.3 Research Findings

Grape growers and winemakers emphasize the lack of professional expertise to advise them on successful collaboration, applying for various grants, and related matters. They are aware of the importance and impacts of collaboration and cooperation in the areas of knowledge, promotion, and events. However, they miss an individual or organization capable of coordinating all the elements into a cohesive whole. As an example of good practice, the Steirisches Vulkanland destination is highlighted. Their work program includes numerous courses available exclusively to members of the association of grape growers and winemakers. These training programs cover various aspects, such as wine production (new technologies, trends, and development), sustainable viticulture concerning land management and sustainable use of all available resources. They also explore new marketing

approaches, taking into account market trends and wine business. Howie (2003) believes that destination management plays a crucial role in addressing many contemporary and sometimes contentious issues in modern tourism. Destinations pose complex challenges to management as it must meet the needs of tourists and tourism businesses, as well as local communities, local companies, and industries. Therefore, for the Prlekija or Ljutomer-Ormož Hills destination, it is recommended to consider establishing an organization for destination management.

Despite grape growers and winemakers being aware of the importance and impacts of collaboration and cooperation, they have pointed out that the current collaboration among grape growers and winemakers in the area is weak. They believe that it is necessary and important to establish local collaboration among grape growers. Respondents express that, despite the efforts of certain individuals, winemakers are not collaborating enough and are not actively participating in wine events organized in their local environment. Grape growers and winemakers also highlighted the difficulty of connecting winemakers with tourism entities that provide accommodation in addition to wine since the latter aims to retain guests on their premises. They see untapped potential in connecting local winemakers with producers of other products (fruit, meat, cheese) and service providers (accommodations, spas) in a comprehensive chain/arrangement, offered widely to guests. It is found that the majority of respondents would allocate funds for joint promotion, advertise the products of other grape growers/wineries, exchange opinions and experiences with other grape growers/winemakers, and participate in joint projects and events with other grape growers/winemakers. Slightly fewer respondents would collaborate under the same brand with other grape growers/wineries.

Based on the results obtained, it is recommended that collaboration is established in the Prlekija or Ljutomer-Ormož Hills region. This should encompass the involvement of stakeholders, who would mutually work towards addressing general issues or solving specific problems. Each stakeholder would still control their resources, such as knowledge, skills, a circle of supporters, and capital. A formally registered network or partnership would provide the necessary resources for achieving the destination's goals and effectively planning the future in terms of tourism development (Bramwell and Lane, 2000).

Rusjan and colleagues (2012) suggest that Slovenian grape growers and winemakers need to organize themselves economically in an organizational sense. A significant challenge in this regard lies in closer collaboration and integration with tourism, as part of comprehensive tourism offerings. It is found that grape growers and winemakers in the Ljutomer-Ormož Hills region are willing to host tourists in their wine cellars, vineyards, homesteads, and the like. They are ready to invest more time in managing wine cellars for wine tourism and allocate more resources for this purpose. Hall and colleagues (2009) summarized certain advantages and disadvantages of wine tourism for grape growers and winemakers, which were included in the questionnaire. Grape growers and winemakers in the Ljutomer-Ormož Hills region believe that engagement in wine tourism affects all the factors outlined, and they consider all the discussed advantages important for the development of wine tourism.

Respondents emphasized that the offerings of wine tourism should include not only wine but also gastronomy, accommodations, relaxation, active experiences, history, and similar aspects. Various authors affirm that wine tourism encompasses both enological aspects dealing with vineyards, wine, and tastings, as well as tourism features. To successfully implement wine tourism, tourist infrastructure (accommodation, restaurants, accessibility), specific activities of this form of tourism, and the requirements of tourists interested in this activity are necessary. Besides tourism, wine tourism must also include wine-related activities that can take place in vineyards, wine cellars, etc. (Mănilă, 2012). It is believed that with the implementation of certain measures, Prlekija could become a successful wine tourism destination, but this will require significant effort, time, and resources.

3.4 Development of area after the research

Since 2018, the collective trademark Jeruzalem Slovenia has been linking the offerings of the three municipalities in the Destination Jeruzalem Slovenia, namely Ormož, Sveti Tomaž, and Središče ob Dravi. Part of Ljutomer-Ormož Hills is included in this area. The trademark signifies a comprehensive offering with local added value from Prlekija, which defines the wine sub-region Ljutomer - Ormož in the eastern Slovenian hills (one of the six wine sub-regions in the Štajerska Slovenia region in the wine region of Podravje). The first evaluation of products and food products, artisan products, and culinary events for the collective trademark

Jeruzalem Slovenia took place in November 2018. Already on the first call, farms and artisans showed great interest in participation, and thus, after training and counseling, 270 products (67 artisan and 142 products and food products) received a quality certificate. Three gastronomic events were also assessed, namely St. Martin's Day in Ormož, St. Anton's Day in Kog - Čurkarijada, and the Pumpkin Festival in Središče (Lešnik Štuhec, 2021). The vision for Destination Jeruzalem Slovenia by 2025 is to create a fully integrated boutique wine destination in the rural area between the Drava and Mura rivers. It will attract visitors with its peaceful landscapes, local traditions, excellent wines, and opportunities for outdoor activities. The destination will focus on preserving local customs and the Prlekija dialect, offering a genuine and immersive experience. Visitors can engage in artisanal activities, relax in spas, and enjoy treatments for their well-being, emphasizing the unique and unhurried pace of life in the region (Občina Ormož, Občina Središče ob Dravi in Občina Sveti Tomaž, 2019a). The strategic document "Development Plan for the Economy and Quality of Life Improvement in the Area of the Local Action Group (LAS) UE Ormož for the Period 2019-2025," commissioned by the municipalities of Ormož, Središče ob Dravi, and Sveti Tomaž, comprises seven chapters. The first chapter serves as an introduction, providing a brief overview of the LAS UE Ormož area, the methodology for project implementation and document formulation, the development and marketing of tourism in the regions of Slovenia, Podravje, and Pomurje. The second chapter presents the basis for developing tourism and improving the quality of life in the LAS UE Ormož area. The third chapter provides a detailed overview of the tourism development strategy in the Destination Jeruzalem Slovenia for the period 2019-2025. The fourth chapter introduces the Model for Organizing Tourism Development and Marketing in Destination Jeruzalem Slovenia for the period 2019-2025, which is based on partnership for joint planning, co-organization, co-management, co-guidance, co-administration, monitoring, and evaluation of the Destination Jeruzalem Slovenia offer for the period 2019-2025. Also defined are the recruitment for the efficient operation of DMO Jeruzalem Slovenia, funding sources for implementing the tourism development strategy in Destination Jeruzalem Slovenia, and the model for realizing the vision - measures for tourism development and marketing in the period 2019-2025 in Destination Jeruzalem Slovenia (Občina Ormož, Občina Središče ob Dravi in Občina Sveti Tomaž, 2019b). We can see that in recent years, providers in the area have been collaborating, which was also highlighted as desirable in the research.

Furthermore, the development strategy predicts sustainable tourism development in the future.

4 Wine tourism and climate change

Wine tourism emerges as a prime prospect for rural development, yet its susceptibility to climatic conditions classifies it as a climate-vulnerable facet of the tourism industry (Sottini et al., 2021). On one hand, the shifting weather patterns, including increased temperatures and changing rainfall patterns, may disrupt traditional grape growing practices. On the other hand, it may open up new opportunities for wine growing in regions previously unsuitable for vine cultivation (Outreville, 2019). Climate change has begun to exert profound effects on wine growing and wine tourism. Rising temperatures, altered precipitation patterns, and increased instances of extreme weather events are shifting traditional winegrowing regions, impacting grape ripening, and challenging the suitability of grape varieties. As a result, wine producers are modifying viticultural practices, exploring new regions, and adjusting their grape varieties to adapt to the changing climate (Jones et al., 2005; Hannah et al., 2013).

5 Conclusion

In conclusion, sustainable tourism, as defined by the UNWTO, encompasses an approach that is vital for the responsible development of tourism in any region. This approach requires a delicate balance between economic, social, and environmental considerations while respecting the local culture and heritage. The case of the Ljutomer-Ormož Hills region in Slovenia, with its rich wine tradition and untapped wine tourism potential, highlights the need for increased collaboration and cooperation among grape growers, winemakers, and other stakeholders in the tourism industry.

The research findings indicate that stakeholders in this region recognize the importance of collaboration but also acknowledge its current weaknesses. They are eager to allocate resources, engage in joint promotion, and actively participate in events, all of which are essential for establishing successful collaboration. It is evident that the potential for growth in wine tourism is significant, provided that the various actors within the region can work together effectively.

The collective trademark "Jeruzalem Slovenia" demonstrates a step in the right direction by linking offerings across municipalities and promoting local products. This integrated approach contributes to the sustainable development of wine tourism. The area's development strategy outlines a vision for creating a fully integrated boutique wine destination that focuses on preserving local customs and traditions.

However, the region also faces and also will face challenges due to climate change in the future, which will impact wine growing and wine tourism. The industry must adapt to shifting weather patterns and extreme events, which may necessitate changes in viticultural practices and grape varieties.

In summary, the success of wine tourism in the Ljutomer-Ormož Hills region hinges on effective collaboration, sustainability, adaptation to climate change, and a shared vision for the future. With the right strategies in place, this area has the potential to become a thriving and sustainable wine tourism destination.

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SLOVENE LANGUAGE

PODNEBNE SPREMEMBE IN LOGISTIKA - NUJNO JE TUDI PRILAGAJANJE NA NOVO PODNEBJE

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Podnebne spremembe so realnost po vsem svetu. Obseg postaja vedno večji in spremembe so vedno hitrejše (WMO, 2022). Zadnje desetletje je bilo najtoplejše, kar jih je bilo v Evropi kdaj izmerjenih. Povprečna temperatura zraka v Evropi je sedaj 1,3° C višja, kot je bila v predindustrijskem obdobju. Temperatura ozračja v Sloveniji je bila v zadnjih 20 letih kar za 1,8 °C nad tisto v 20. stoletju. Kmetijstvo že občuti škodljive vplive podnebnih sprememb. Ekstremne vremenske razmere, vključno s poplavami, sušami, neurji in vročinskimi valovi v mnogih delih EU tudi zaradi neprilagojene logistike povzročajo gospodarske izgube kmetom in kmetijskemu sektorju EU.

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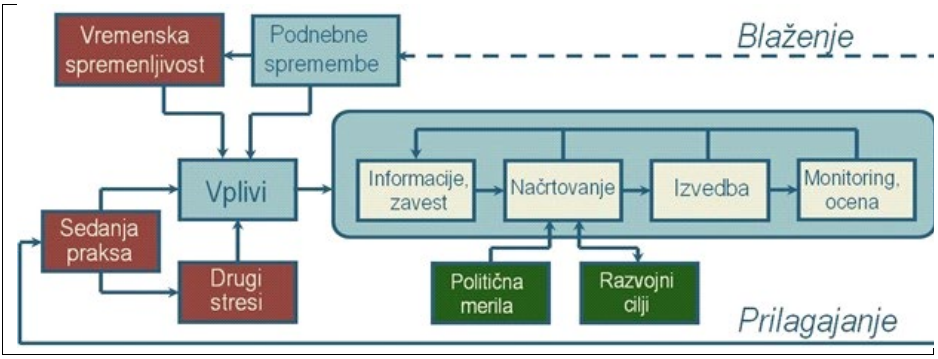
1 Uvod

Projekcije klimatskih modelov kažejo, da bi lahko bila Evropa v drugi polovici 21. stoletja za 2,5 do 4° C toplejša od povprečja v obdobju od leta 1961 do 1990, kar velja tudi za Slovenijo (IPCC, 2022). Prihodnje podnebne spremembe lahko prinesejo kmetijstvu nekatere pozitivne učinke zaradi daljših rastnih sezon in bolj ustreznih pogojev za pridelavo, vendar bodo ti učinki izničeni zaradi negativnega vpliva povečanja ekstremnih dogodkov. Brez primernega ukrepanja bodo nadaljnje podnebne spremembe sprožile prehranske, gospodarske, energetske, begunske, zdravstveno-epidemiološke, politične in celo vojaške krize. Podnebne spremembe močno vplivajo tudi na zmanjševanje števila rastlinskih in živalskih vrst na Zemlji.

2 Podnebne spremembe

Ukrepanje glede podnebnih sprememb zahteva dve vrsti reagiranja. Poleg zmanjševanja izpustov toplogrednih plinov, kar pomeni zmanjšano rabo fosilne energije in povečevanje ponorov, npr. s pogozdovanjem ali z drugačnim gospodarjenjem s tlemi so nujni tudi ukrepi za prilagajanje na nove podnebne razmere (Hill and Martinez-Diaz, 2019). Četudi bi nam uspelo omejiti rast izpustov in jih nato popolnoma zmanjšati, bi naš planet še vedno potreboval čas, da bi si opomogel od toplogrednih plinov, ki so že v ozračju. Namen prilagajanja je zmanjšati tveganje in škodo zaradi sedanjih in prihodnjih škodljivih učinkov podnebnih sprememb, in sicer na način, ki je stroškovno učinkovit ali izkorišča možne koristi. Z vplivi podnebnih sprememb se bomo ukvarjali vsaj še naslednjih petdeset let, zato nujno potrebujemo ukrepe za prilagajanje. To sicer že poteka, vendar je razdrobljeno in neorganizirano (UNEP, 2021). Prilagajanje na ravni kmetij v mnogih primerih še ne poteka zaradi različnih razlogov, kot so pomanjkanje virov za naložbe, pobude politike za prilagajanje, institucionalne zmogljivosti in dostop do znanja o prilagajanju. V kmetijski logistiki bo potrebno učinkovito sodelovanje različnih segmentov družbe, dobro poznavanje področja odločanja in poznavanje potencialnih prilagoditvenih možnosti (Kajfež Bogataj, 2012). Nenazadnje, kmetijska zemljišča predstavljajo 40 % celotnega ozemlja EU, kmetijstvo in industrija ter storitve, povezane s hrano, pa zagotavljajo več kot 44 milijonov delovnih mest v EU.

Pri načrtovanju možnih prilagoditev je modro upoštevati oba vidika hkrati: spremenjeno podnebje in potrebo po zmanjšanju izpustov toplogrednih plinov (Slika 1). Smiselno je načrtovati take prilagoditve, ki lahko koristijo več ciljem hkrati. Idealne prilagoditve bi po eni strani zmanjšale izpuste, po drugi pa zmanjševale odvisnost kakšne dejavnosti od vremena oziroma spremenjenih podnebnih razmer.



Slika 1: Potek prilagajanja na podnebne spremembe.
Vir: lasten.

V pomoč pri prilagajanju nam je evropska platforma za prilagajanje podnebnim spremembam (Climate-ADAPT), ki je plod partnerstva med Generalnim direktoratom Evropske komisije za podnebne ukrepe in Evropsko agencijo za okolje. Glavni cilji platforme so izmenjava znanja in praktičnih izkušenj na področju prilagajanja podnebnim spremembam ter pomoč nosilcem odločanja pri učinkovitem prevzemanju tega znanja. Uporabnikom omogoča dostop in deljenje podatkov ter informacij o ranljivosti regij in sektorjev, o nacionalnih strategijah prilagajanja, o primerih dobrih praks prilagajanja. Ponuja pa tudi orodja, ki podpirajo načrtovanje prilagajanja, in se posveča tudi vplivom na zdravje prek Evropskega podnebnega in zdravstvenega observatorija.

Prilagajanje v kmetijstvu obsega celo vrsto možnih ukrepov (EEA, 2019), od katerih se največkrat omenjajo diverzifikacija pridelkov in kmetijskih sort, uvajanje novih kultur, obujanje starih sort, uporaba pokrovnih rastlin, minimalna obdelava tal za povečanje vlažnosti tal in shranjevanje ogljika, prilagojen čas setve in spravila, precizno kmetijstvo, izboljšana učinkovitost namakanja, nove pasme živine, izboljšanje pogojev reje živine, zamenjava krme; izboljšano upravljanje pašnikov, ekološko kmetijstvo in predvsem diverzifikacija kmetijske proizvodnje in dohodkov.

Kmetijstvo v Sloveniji se bo moralo prilagoditi na vremenske ekstreme, zlasti na pogostejše suše. Obstajajo številni prilagoditveni ukrepi, ki se začnejo z raziskavami procesov suše, določitvijo območij s povečanim tveganjem zaradi suše in boljšim napovedovanjem tega pojava. Možne so tudi razne tehnološke izboljšave, kot so namakanje in novi načini obdelave tal. Možno je tudi uvajanje na sušo odpornejših rastlinskih vrst.

S stališča kmetijske logistike pa so zelo pomembne tudi prilagoditve infrastrukture, saj podnebne spremembe prinašajo dvig morske gladine, povečana tveganja za poplave, vročino, vetrolome in druge dejavnike. Dobra prilagoditev je razvoj zelene infrastrukture, kot so zeleni pasovi in mokrišča. Ti lahko absorbirajo odvečno vodo, zmanjšujejo učinke vročinskih valov in izboljšujejo kakovost zraka. Ključna je prilagoditev energetske infrastrukture, saj moramo električna omrežja prilagoditi večji variabilnosti v proizvodnji energije zaradi podnebnih sprememb. To pomeni razvoj pametnih omrežij in sistemov za shranjevanje energije in pa povečanje odpornosti energetskih sistemov na ekstremne vremenske razmere, kot so neurja, poplave in suše. V prometnem sektorju moramo povečati odpornost cestnega omrežja. Na primer, asfaltne mešanice, obogatene s posebnimi materiali, lahko izboljšajo odpornost na visoke temperature. Modificirane bitumenske emulzije omogočajo boljšo odpornost proti razpokam in deformacijam zaradi visokih temperatur. Prilagoditveni ukrepi lahko vključujejo izboljšanje drenaže cest, uporabo odpornih materialov in redno vzdrževanje. Poplave so poleg zemeljskih plazov ena izmed glavnih nevarnosti za železniško infrastrukturo. Pravilno načrtovanje in izgradnja železniških prog z višjimi nasipi in drenažnimi sistemi zmanjšata tveganje in ohranita delovanje železniškega prometa v ekstremnih vremenskih razmerah.

3 Zaključek

Prilagoditve na podnebne spremembe so nujne. Dobre prilagoditve morajo ugodno vplivati na gospodarstvo, okolje ali družbo že pri današnjih podnebnih razmerah, torej neodvisno od podnebnih sprememb. Prilagajanje mora biti praktično izvedljivo, zato dobri ukrepi niso preveč odvisni od institucionalnih, družbeno-kulturnih, denarnih ali tehnoloških preprek. Čim več ukrepov naj ima obliko priložnosti, npr. nakupovanje zemljišč, ponovna obravnava okoljskih akcij ali razvojnih planov, raziskav in razvoja. Visoko prednostne prilagoditve so tiste, ki bodo preprečile nepovratne učinke podnebnih sprememb (npr. izumrtje vrst), ki

zadevajo dolgoročna načrtovanja (npr. infrastrukture) in zaustavljajo neugodne trende (npr. onesnaževanje vodnih virov). Ukrepi na posameznem področju gospodarstva morajo biti združljivi ali celo dopolnjujoči se med seboj glede na prilagoditvene napore v drugih sektorjih. Preventivno in takojšnje ukrepanje ima gospodarske, okoljske in družbene koristi, hkrati pa so stroški prilagajanja bistveno nižji od stroškov »neukrepanja«, ki bodo nastali v naslednjih desetletjih.

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UČINKOVITO IZOBRAŽEVANJE ZA ZELENI PREHOD, KOMPETENCE ZA TRAJNOST IN PROJEKTNO DELO S ŠTUDENTI

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Visokošolsko izobraževanje je ključno pri spodbujanju zelenega prehoda in pri povečanju odpornosti družbe na izzive prihodnosti. Raziskave, inovacije ter izobraževanje, ki se izvajajo na univerzah in visokošolskih ustanovah, so pomembni, če ne celo najpomembnejši dejavniki za uresničevanje trajnostnih ciljev in oblikovanje prihodnosti, ki bo bolj odporna na spremembe. Pomen visokošolskega izobraževanja za zeleni prehod in odpornost je zlasti v raziskovanju in inovacijah, izobraževanju in osveščanju, sodelovanju s podjetji in odločevalci, učenju kritičnega razmišljanja in v izobraževanju za trajnost. Pri vseh kategorijah, še zlasti pa pri slednji, velja izpostaviti kompetence za trajnost in tako imenovani Evropski okvir kompetenc za trajnost. Ena od učinkovitejših metod učenja trajnostnih kompetenc je projektno delo, kar bomo prikazali na primeru študentskih projektov PKP in ŠIPK.

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1 Uvod

Koncept trajnosti je tesno povezan s konceptom pravičnosti. Že Aristotel (2002) je v svoji Nikomahovi etiki pravičnost obravnaval kot eno izmed pomembnih moralnih vrlin, pri čemer izpostavlja dve glavni obliki pravičnosti: pravičnost v razdeljevanju (distributivna pravičnost) in pravičnost v izmenjavi (izmenjevalna pravičnost). Pri doseganju pravičnosti je koncept trajnosti ključen, prav tako procesi visokošolskega izobraževanja. Študenti kot glavni deležniki procesa na primer menijo, da je učenje o trajnosti pomemben del njihovega izobraževanja in kažejo močno zanimanje za učenje o trajnosti (Boström, 2020), raziskovalca Annelin HYPERLINK "https://www.emerald.com/insight/search?q=Alice%20Annelin" in Boström (2023) pa ugotavljata, da obstaja potreba po razvoju orodja za boljšo vpetost trajnosti v visokošolske učne načrte preko različnih disciplin, pri čemer menita, da gre za nalogo, ki je izvedljiva. Tudi sami se s tem strinjamo, kar bomo pokazali v nadaljevanju, saj obstajajo učinkovite metode poučevanja, kot je npr. projektno delo, ki so delno (prek posameznih iniciativ) že vpeljane v pedagoško delo na univerzah in visokošolskih zavodih. Pogosto so delno ali v celoti financirane s strani Evropske unije.

Prav Evropska unija je za spodbujanje in olajšanje razvoja kompetenc za trajnost v različnih izobraževalnih kontekstih že razvila tudi Evropski okvir kompetenc za trajnost, imenovan tudi European Competence Framework for Sustainability (ESCF, 2022). Gre za orodje in koncept, katerega namen je zagotoviti boljše razumevanje in usklajevanje kompetenc, ki so potrebne za trajnostno delovanje v različnih sektorjih in na različnih ravneh, kot tudi omogočiti lažje prepoznavanje in vrednotenje teh kompetenc.

ESCF (2022) temelji na več ključnih načelih, kot so:

Vsestranskost: Okvir poudarja, da kompetence za trajnost niso omejene na en sektor ali vrsto dela, ampak so prenosljive in se lahko uporabljajo v različnih kontekstih.

Širok spekter kompetenc: ESCF prepoznava različne dimenzije kompetenc, vključno s tehničnimi, socialnimi, etičnimi in kritičnimi vidiki trajnosti.

Povezovanje s politikami: Okvir naj bi bil v pomoč pri oblikovanju politik in izobraževalnih programov, ki spodbujajo trajnostno razmišljanje in delovanje.
ESCF je torej instrument za razvoj in ocenjevanje kompetenc posameznikov v zvezi s trajnostjo ter za spodbujanje trajnostnih praks v izobraževalnih in delovnih okoljih v Evropi. Uporablja se v različnih sektorjih, vključno z izobraževanjem, poklicnim usposabljanjem, gospodarstvom, in javnim sektorjem, da se zagotovi, da se trajnostne kompetence vgradijo v vse vidike družbe in gospodarstva. Ena od oblik pedagoškega dela, ki jo predlaga kot učinkovito za usvajanje kompetenc trajnosti oz. trajnostnosti, je projektno delo.

2 Evropski okvir kompetenc za trajnost

Evropski okvir kompetenc za trajnost zajema štiri medsebojno povezana področja kompetenc:

- 1) „poosebljanje vrednot trajnostnosti“,
- 2) „sprejemanje kompleksnosti v trajnostnosti“,
- 3) „ zamišljanje trajnostnih prihodnosti“ in
- 4) „ukrepanje za trajnostnost“.

Slika 1: Naslovnica dokumenta ESCF
Vir: Evropski okvir kompetenc za trajnostnost. 2022. Luxembourg: Urad za publikacije Evropske unije.

Njegov cilj je, da se zagotovi soglasna opredelitev tega, kaj pomeni trajnostnost kot kompetenca, saj želi biti podpora programom izobraževanja in usposabljanja za vseživljenjsko učenje (ESCF, 2022).

Okvir (imenovan tudi *GreenComp)* je sestavljen iz 12 kompetenc, razvrščenih v 4 področja:

1) Poosebljanje vrednot trajnostnosti, vključno s kompetencami:

- **vrednotenje trajnostnosti,**
- **podpiranje pravičnosti,**
- **promoviranje narave;**

2) sprejemanje kompleksnosti v trajnostnosti, vključno s kompetencami:

- **sistemsko mišljenje,**
- **kritično mišljenje,**
- **formuliranje problema;**

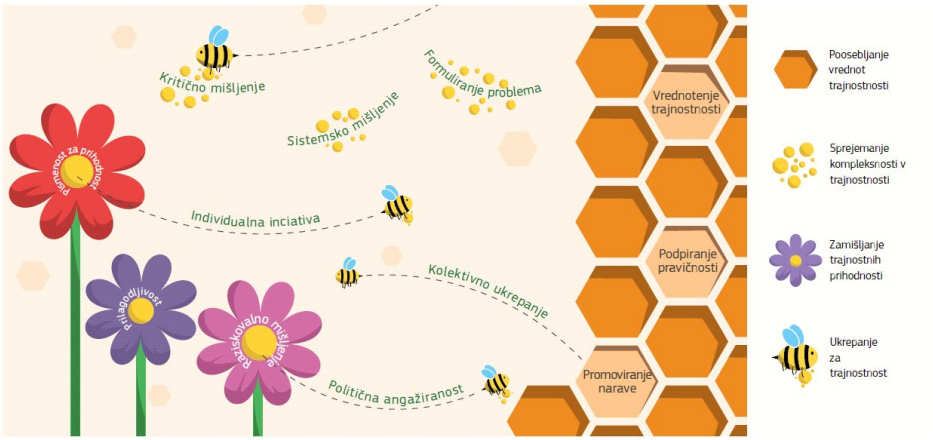
3) zamišljanje trajnostnih prihodnosti, vključno s kompetencami:

- **pismenost za prihodnost,**
- **prilagodljivost,**
- **raziskovalno mišljenje;**

4) ukrepanje za trajnostnost, vključno s kompetencami:

- **politična angažiranost,**
- **kolektivno ukrepanje,**
- **individualna iniciativa** (ESCF, 2022).

Štiri področja kompetenc so tesno povezana: trajnostnost kot kompetenca zajema vsa štiri področja kot celoto, okvir pa je namenjen vsem ravnem in oblikam izobraževanja, v tem prispevku pa se osredinjamo na visokošolsko izobraževanje.



Vizualni prikaz okvira *GreenComp*.

Slika 2: Vizualni prikat okvira Green Comp

Vir: Evropski okvir kompetenc za trajnostnost. 2022. Luxembourg: Urad za publikacije Evropske unije.

Okvir *GreenComp* se kot referenčno orodje lahko uporabi za številne namene, med drugim za pregled učnih načrtov, oblikovanje programov izobraževanja učiteljev, (samo)ocenjevanje/refleksijo, razvoj politik, certificiranje, ocenjevanje, spremljanje in vrednotenje, avtorji pa izpostavljajo, da je njegova dodana vrednost, da zagotavlja:

- model področij kompetenc in kompetenc na področju trajnostnosti;
- skupno podlago, ki jo lahko vsi, ki delujejo na področju vzgoje in izobraževanja za okoljsko trajnostnost, uporabijo, delijo ter se nanjo sklicujejo;
- osnoven seznam elementov kompetenc, in sicer znanja, spretnosti in odnosov, kot primere, kako kompetence uporabiti v praksi;
- skupno referenčno podlago za dialog, izmenjavo praks in vzajemno učenje med izobraževalci, dejavnimi na področju vseživljenjskega učenja v vsej EU;
- prispevek, ki pripomore k temu, da bodo kompetence prenosljive in da bodo spodbujale mobilnost v EU za popolno sodelovanje v evropski družbi (ESCF, 2022).

Dokument je rezultat soglasja posvetovanj z raznoliko skupino približno 75 strokovnjakov in deležnikov (strokovnjaki za izobraževanje o trajnostnosti in za vseživljenjsko učenje iz akademskih in raziskovalnih ustanov, predstavniki mladih,

izobraževalcev, predstavniki politike iz držav članic EU in NVO) (ESCF, 2022). V njem je med drugim zapisano: „Namen izobraževanja o trajnostnosti je učečim se zagotoviti kompetence za trajnostnost, da bi lahko razmislili o trajnostnosti in jo sprejeli v vsakdanjem življenju v vlogi učečih se, potrošnikov, proizvajalcev, strokovnjakov, aktivistov, oblikovalcev politike, sosedov, delodajalcev, učiteljev in izvajalcev usposabljanja, organizacij, skupnosti in družbe na splošno.“ (vir: Evropski okvir kompetenc za trajnostnost, 2022, str. 13).

Okvir ponuja različne primere pedagoških praks, ki so lahko učinkovite pri razvoju kompetenc za trajnostnost, med drugim aktivno učenje; učenje, ki je osredotočeno na učeče se, projektno učenje, transformativno (situacijsko) učenje; igrifikacija; igranje vlog, eksperimentalne igre in simulacije; analiza študij primerov v resničnem svetu, vzetih iz lokalnega konteksta; kombinirano in spletno učenje; pristopi pouka na prostem ter sodelovalni pristopi (sodelovanje z zunanjimi partnerji) (ESCF, 2022, str. 30). V našem prispevku želimo osvetliti pomen projektnega učenja in sodelovanja z okoljem skozi projektno delo.

3 Sodelovanje z okoljem in projektno učenje

Pridobivanje trajnostnih kompetenc s projektnim učenjem in sodelovanjem z okoljem je učinkovit način, kako spodbuditi študente, da razvijejo razumevanje in veščine, potrebne za trajnostno razmišljanje in delovanje (Granado-Alcón et al., 2020). Avtorji Granado-Alcón et al. (2020) poudarjajo, da gre za pedagoški pristop, ki poudarja aktivno učenje prek praktičnih projektov v resničnem svetu, kar spodbuja meddisciplinarno sodelovanje in omogoča študentom, da uporabijo znanje, pridobljeno v učilnicah, v resničnih situacijah. Študentom takšno sodelovanje omogoča delo na pristnih projektih, ki pogosto vključujejo reševanje kompleksnih praktičnih problemov, kar krepi kritično razmišljanje, reševanje problemov in komunikacijske veščine. Poleg tega projektno delo spodbuja globje razumevanje snovi in spodbuja študente, da prevzamejo odgovornost za svoje učenje, kar je nujno za pripravo študentov na zahteve sodobnega delovnega trga, kjer so praktične veščine in sposobnost prilagajanja ter uporabe znanja ključne (Granado-Alcón et al., 2020).

Velja poudariti, da projektnega učenja ne smemo enačiti s problemskim učenjem – pri prvem so poleg iskanja inovativnih rešitev izjemno pomembni organizacija, vodenje časovnic in pisanje poročil, pri drugem, tj. problemskem učenju, ki je prav tako aktivna strategija poučevanja, ki študentu ali skupini študentov omogoča, da prevzamejo pobudo in so sami odgovorni za proces učenja (Silva idr., 2018), ta organizacijski vidik ni v ospredju, pomembna je rešitev problema, ne pa na primer natančno vodenje evidenc in poročanje. DeFillippi (2001, 1), ki sicer povzema Smitha in Doddsa (1997), pravi, da se »projektno učenje nanaša na teorijo in prakso uporabe realnih delovnih nalog v časovno omejenih projektih, in sicer z namenom doseganja zastavljenih ciljev ter s spodbujanjem individualnega in skupinskega učenja«. Kokotsaki in sodelavci (2016) pa pri projektnem učenju izpostavljajo osredotočenost na študenta, ki je gotovo pomembna tudi pri študentskih inovativnih projektih za družbeno korist.

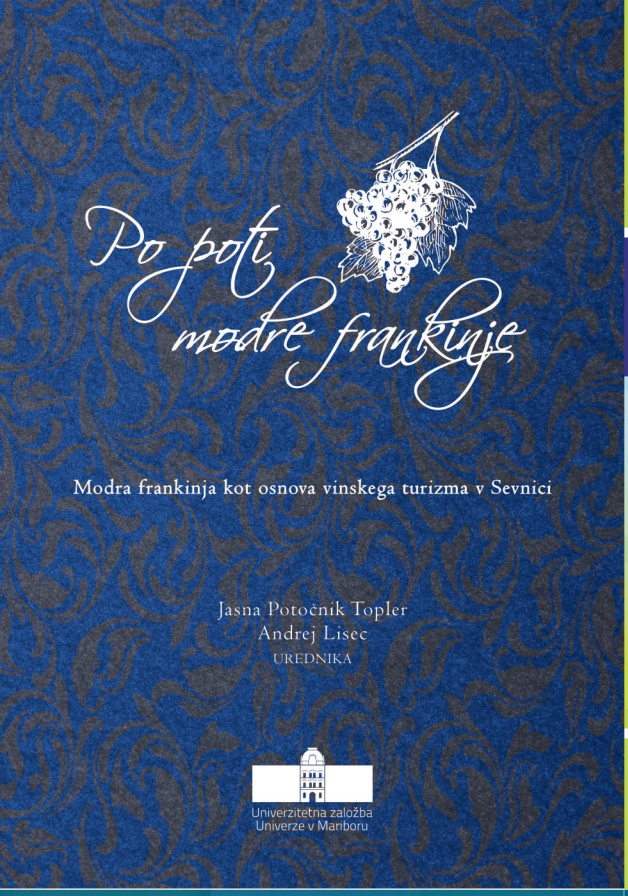
Na osnovi lastnega dela s študenti v okviru različnih študentskih projektov, kot sta projektni iniciativi Po kreativni poti do znanja (PKP) in študentski inovativni projekti za družbeno korist (ŠIPK), financirani s strani Evropske unije in Ministrstva za izobraževanje, znanost in šport, ugotavljamo, da ima tovrstno učenje več koristi. Po sodelovanju v projektih oziroma pri njihovem snovanju, vodenju in mentoriranju študentov v projektih Kakovostna lokalna hrana za večji turizem (PKP), Na lov za sevniškim krožnikom: lokalna kulinarična dediščina kot gonilo trajnostnega turizma v Občini Sevnica (Sevniški krožnik) (PKP), Spoznavanje sevniške kulture in kulinarike s kolesom (ŠIPK), Po sledeh Antona Martina Slomška v občini Brežice (SLOMŠKOVA DEDIŠČINA) (ŠIPK), Po poti modre frankinje: modra frankinja kot osnova vinskega turizma v Sevnici (MODRA POT) (ŠIPK), Lokalno pridelana hrana za večje zdravje prebivalstva (PKP) in Slomškov literarni festival (SLOMŠEK FEST) (ŠIPK) lahko sklenemo, da se dodana vrednost in koristi projektnega dela kažejo vsaj v naslednjih 10 točkah:

- Praktična izkušnja: Študenti se neposredno soočijo z resničnimi problemi in izzivi, kar jim omogoča pridobivanje praktičnih veščin in izkušenj, ki jih bodo lahko uporabili pri prihodnjem delu in razvoju svoje kariere.
- Sodelovanje in timsko delo: Študenti se učijo sodelovati in delati v ekipah, kar je ključna veščina v sodobnem dinamičnem delovnem okolju.

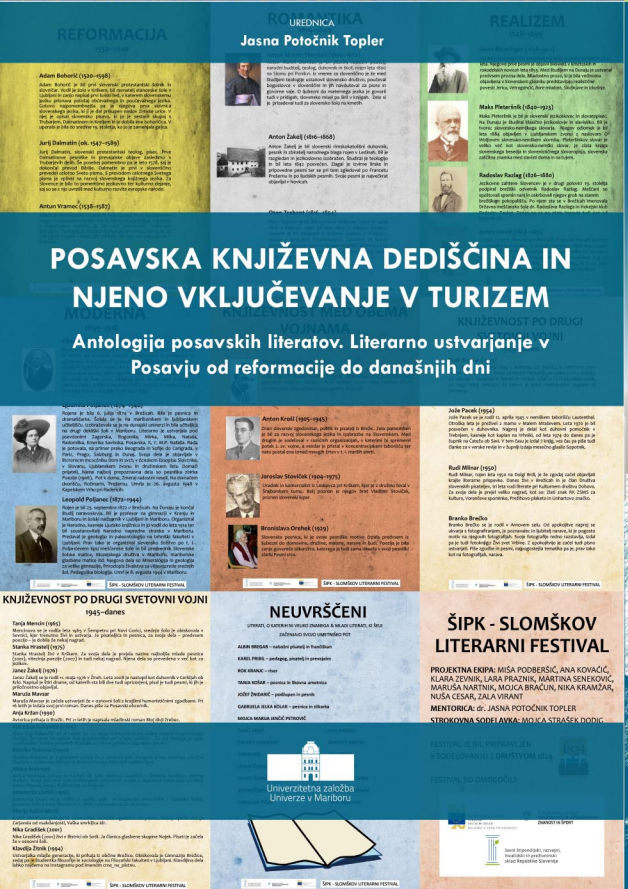
- Povezava teorije in prakse: Projektno delo omogoča študentom, da uporabijo teoretično znanje, pridobljeno v predavalnici, v realnem kontekstu, kar povečuje razumevanje ter povezavo med teorijo in prakso.
- Organiziranje časa: Študenti krepijo svoje organizacijske sposobnosti, načrtovanje in razporejanje.
- Razvoj komunikacijskih veščin: Študenti se naučijo jasno ustno in pisno komunicirati svoje ideje in rešitve, izpolnjevati časovnice in poročila ter pripravljati in izvajati predstavitve.
- Osebni razvoj: Projektno delo spodbuja samozavest, samodisciplino, odgovornost in samostojno učenje.
- Povezava z industrijo in skupnostjo: Sodelovanje s podjetji, neprofitnimi organizacijami, društvi ali lokalnimi skupnostmi omogoča študentom, da vzpostavijo stike v industriji in prispevajo k reševanju dejanskih izzivov v skupnosti.
- Pridobivanje realnih rezultatov: Projekti pogosto vodijo do konkretnih rezultatov, kot so izdelki ali rešitve, ki lahko koristijo skupnosti, zavodom, društvom ali podjetjem.
- Kritično razmišljanje: Projektno delo spodbuja kritično razmišljanje in reševanje problemov, saj študenti iščejo rešitve za kompleksne izzive in se učijo razmišljati kreativno.
- Priprava za zaposlitev: Študenti, ki so sodelovali pri projektih, imajo pogosto prednost pri iskanju zaposlitve, saj imajo dokazano praktično izkušnjo.

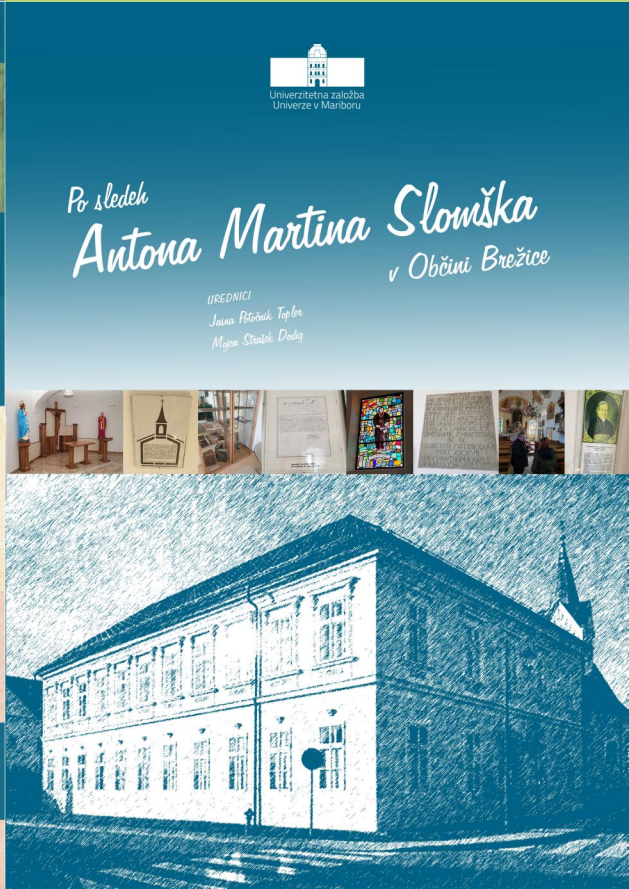
Projektno delo s študenti lahko tako izboljša njihovo izobraževanje in jih pripravi na uspešno vključitev v delovno okolje po končanem študiju.

Slika 3: Naslovnica publikacije Po poti modre frankinje, nastale v okviru istoimenskega projekta
Vir: https://press.um.si/index.php/ump/catalog/book/439
Slika 4: Naslovnica publikacije Spoznavanje sevniške kulture in kulinarike s kolesom, nastale v okviru istoimenskega projekta
Vir: https://press.um.si/index.php/ump/catalog/book/311
Slika 5: Naslovnica publikacije Posavska književna dediščina in njeno vključevanje v turizem, nastale v okviru istoimenskega projekta
Vir: https://press.um.si/index.php/ump/catalog/book/557
Slika 6: Naslovnica publikacije Po sledeh Antona Martina Slomška v Občini Brežice, nastale v okviru istoimenskega projekta
Vir: https://press.um.si/index.php/ump/catalog/book/551


Po poti modre frankinje
Modra frankinja kot osnova vinskega turizma v Sevnici
Jasna Potočnik Topler
Andrej Lisec
UREDNIKA
Univerzitetna založba
Univerze v Mariboru


SPOZNAVANJE SEVNIŠKE KULTURE IN KULINARIKE s hodesom
DR. JASNA POTOČNIK TOPLER
DR. ANDREJ LISEC
UREDNIKA
Univerzitetna založba
Univerze v Mariboru


UREDNICA
Jasna Potočnik Topler
POSAVSKA KNJIŽEVNA DEDIŠČINA IN NJENO VKLJUČEVANJE V TURIZEM
Antologija posavskih literatov. Literarno ustvarjanje v Posavju od reformacije do današnjih dni
KNJIŽEVNOST PO DRUGI SVETOVNI VOJNI
1945–danes
NEUVRŠČENI
ŠIPK - SLOMŠKOV LITERARNI FESTIVAL
Univerzitetna založba
Univerze v Mariboru


Univerzitetna založba
Univerze v Mariboru
Po sledeh
Antona Martina Slomška
v Občini Brežice
UREDNICI
Jasna Potočnik Topler
Mojca Stanšek Dodig

Glavni cilj programa Po kreativni poti do znanja je bil omogočiti povezovanje visokošolskih zavodov z (ne)gospodarstvom in tako dati možnost študentom za pridobitev praktičnih izkušenj, dodatnih znanj in veščin. V času izvajanja omenjenega programa je bilo izplačanih 10.767.172,50 EUR, in sicer za sofinanciranje kar 630 projektov, v katerih je sodelovalo 4243 študentov, 1130 pedagoških mentorjev oziroma koordinatorjev ter 810 predstavnikov gospodarstva ali družbenega okolja (www.srips-rs.si/razvoj-kadrov/po-kreativni-poti-do-znanja-pkp). Tudi cilj programa ŠIPK je bil spodbujanje timskega dela, spodbujanje kreativnosti mladih, razmišljanja izven okvirjev in omogočanje možnosti, da lahko študenti uresničijo svoje ideje ter tako dobijo tudi priložnost, da na trg dela vstopijo čim bolj opremljeni z delovnimi izkušnjami, znanji in praktičnimi veščinami. V času izvajanja programa Študentski inovativni projekti za družbeno korist je bilo izplačanih 6.447.034,00 EUR, in sicer za sofinanciranje 413 projektov, v katerih je sodelovalo 3379 študentov, 467 pedagoških mentorjev, 423 strokovnih sodelavcev in 171 članov podpornega strokovnega osebja (www.srips-rs.si/razvoj-kadrov/studentski-inovativni-projekti-za-druzbeno-korist-sipk).

Slika 7: Javna predstavitev projektnih rezultatov v Sevnici
Vir: Jasna Potočnik Topler, zasebni arhiv

4 Zaključek

Projektno delo s študenti je učinkovita metoda za pridobivanje trajnostnih kompetenc, ki jih predlaga Evropska unija, z orodjem oziroma kompetenčnim okvirjem, imenovanim Evropski okvir kompetenc za trajnost. Projektno delo ima številne prednosti in prinaša mnoge koristi, med drugim spodbuja praktično izkušnjo, razvoj kritičnega razmišljanja, sodelovanje in timsko delo ter eno od ključnih zadev - povezavo teorije in prakse. Prav tako pomaga študentom razvijati komunikacijske veščine, osebni razvoj in pripravo na zaposlitev oziroma nadaljnji razvoj kariere. Projektni iniciativi Po kreativni poti do znanja (PKP) in Študentski inovativni projekti za družbeno korist (ŠIPK) predstavljata uspešna slovenska primera, kako se s projektom v visokošolsko izobraževanje vključuje trajnostne kompetence. S praktičnim pristopom in sodelovanjem z različnimi deležniki tovrstni projekti vključujejo študente v reševanje dejanskih izzivov, kar krepi njihovo usposobljenost za trajnostno delovanje. Treba je namreč poudariti, da je razvoj trajnostnih kompetenc v visokošolskem izobraževanju ključnega pomena za prihodnost, saj študentom omogoča, da postanejo aktivni udeleženci pri oblikovanju bolj trajnostnega sveta. Projektno delo je ena izmed učinkovitih poti za doseganje tega cilja.

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O avtorici

Dr. Jasna Potočnik Topler je izredna profesorica za področje turizma in lektorica za angleški jezik. Njeno raziskovanje je večdisciplinarno in vključuje turizem, kulturni turizem s svojimi podvrstami, komuniciranje v turizmu in izobraževanje za turizem. Je avtorica več knjig, znanstvenih člankov, gostujočih predavanj na tujih univerzah (npr. Plymouth, Videm, Perugia, Zagreb itd.) in na konferencah ter članica uredniških odborov različnih znanstvenih in strokovnih revij. Vključena je v različne domače in mednarodne raziskovalne in aplikativne projekte, ki jih vodi ali v njih sodeluje. Pravkar je zaključila dva mednarodna projekta, sodeluje pa v bilateralnem projektu s Hrvaško in v Erasmus+ projektu Edu fit.

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PREOBLIKOVANJE PODEŽELSKIH DOBAVNIH VERIG: IZKORIŠČANJE UMETNE INTELIGENCE ZA OPTIMIZACIJO AGROŽIVILSKE LOGISTIKE

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Podeželske dobavne verige in njihovi ključni deležniki, kmetje, imajo v svetu nemalokrat prezrto vlogo, kljub temu da skrbijo za človekov obstoj s proizvodnjo hrane in ostalih esencialnih dobrin. Prav tako zaradi svoje tradicionalne dejavnosti mnogokrat ne dohitevajo tehnoloških napredkov in rešitev, ki bi jih lahko s pridom izkoriščali za izboljšanje delovanja njihovega sistema. Ena izmed hitreje rastočih tehnologij, ki bo z veliko verjetnostjo spreminjala prihodnost kmetijske in agroživilske panoge, predvsem v povezavi s proizvodnimi in logističnimi dejavnostmi, je umetna inteligenca. Naša raziskava na osnovi sekundarnih virov preučuje trenutno stanje na trgu aplikacij umetne inteligence v agroživilski in kmetijski logistiki z namenom širjenja pomena omenjene tehnologije znotraj ene bolj tradicionalnih človeških panog. Ugotovitve raziskave se navezujejo na tipične vrste aplikacij umetne inteligence v agroživilski in kmetijski logistiki ter na glavne cilje, ki jih aplikacije omenjene tehnologije poskušajo pri tem doseči.

Ključne besede:
umetna inteligenca,
optimizacija agroživilske logistike,
kmetijska logistika,
podeželske dobavne verige,
UI gnano kmetijstvo

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1 Uvod

V dobi, zaznamovani z neprimerljivimi tehničnimi in tehnološkimi napredki, stoji agroživilska industrija na pragu preobrazbe. Naraščajoče svetovno prebivalstvo (Remondino & Zanin, 2022; Taneja et al., 2023; Subeesh & Mehta, 2021), skupaj z večanjem povpraševanja po trajnostno pridelani hrani, povzroča ogromen pritisk na podeželske dobavne verige, da se razvijajo in prilagajajo (Di Vaio et al., 2020). V želji, da bi se spopadli s temi izzivi in odprli vrata novi dobi učinkovitosti in trajnosti, se mnogi deležniki agroživilske industrije obračajo k moči umetne inteligence (v nadaljevanju UI) (Rose & Chilvers, 2018).

Podeželske dobavne verige, pogosto označene s svojo kompleksnostjo, razdrobljenostjo in ranljivostjo, so življenjski vir naših prehrambnih sistemov. Raztezajo se po obsežnih geografskih območjih, zajemajo različne deležnike in so dovzetne za različne vrste motenj, od vremenskih katastrof do nihanj na trgu (Subeesh & Mehta, 2021). Ti izzivi lahko privedejo do neučinkovitosti, izgub hrane in okoljskih vplivov, ki segajo daleč onkraj podeželskih skupnosti, ki jih oskrbujejo (Taneja et al., 2023).

Članek vključuje nekatere teoretične zasnove, povezane z agroživilsko logistiko, digitalizacijo omenjenega sektorja in analizo preoblikovalnega potenciala UI v agroživilski logistiki. Poglobili se bomo v obstoječe študije, tehnologije najnovejše generacije in inovativne aplikacije UI, katere prikazujejo konkretno prednost omenjene tehnologije, ki jo ta prinaša s seboj.

2 Teoretičen pregled

2.1 Vloga agroživilske logistike in dobavnih verig

Agroživilska logistika je širok pojem, ki zajema v svoji definiciji organiziranje, usklajevanje ter nadzorovanje različnih tipov logističnih tokov od mesta proizvodnje preko vmesnih vozlišč vse do končnega potrošnika. Pri tem gre za pomemben gospodarski sistem, ki posamezne deležnike v dobavnih verigah med seboj povezuje v integrirano in koherentno celoto, s ciljem zadovoljevanja potrošnikovih potreb po oskrbi z živilskimi in neživilskimi izdelki (Wajszczuk, 2016). Podobno kot pri splošni obravnavi logistike se tako agroživilska logistika kot tudi z njo povezane dobavne

verige navezuje na pristop »7 P-jev« (angl. »7R«) (Wang, 2016), vendar se pri slednji veliko večji poudarek daje na poseben aspekt, ki pristopu »7 P-jev« kot pomemben cilj doda trajnostno naravnanost agroživilske logistike v povezavi z okoljem in vsem živim okoli nas.

Po podatkih evropskega statističnega organa Eurostat je bilo na območju Evropske unije (v nadaljevanju EU) v letu 2019 znotraj sektorja prehrambnih dobavnih verig zaposlenih 15,9 milijonov ljudi, kar predstavlja 8 % vseh zaposlenih. Pomembno vlogo v omenjenih dobavnih verigah ima pri tem agroživilska logistika, saj so prehrambne dobavne verige specifičen gospodarski sektor, ki ima opravka tako z živimi organizmi kot tudi s proizvodi krajših rokov uporabnosti in nenazadnje z različnimi kulturno-etičnimi pomisleki, ki zahtevajo višji nivo transparentnosti in trajnosti prehrambnih dobavnih verig (Wajszczuk, 2016).

Kljub zgoraj omenjenim dejstvom je logistika, sploh specializirana agroživilska, še vedno v določenih segmentih dokaj nov pojem, ki se razvija, a obenem kaže svoj potencial, ki ga prinaša v različne sisteme. Ukrajinska študija Slavkova & Solovey (2016) kot ključne prednosti, ki jih agroživilska logistika prinaša v kmetijsko proizvodne sisteme, navaja:

- optimizacijo strukture tokov med sektorji in posameznimi podjetji,
- optimizacijo upravljanja z viri v proizvodnji in porabi znotraj vsakega dela infrastrukture,
- usklajevanje vodenja procesov dobave in transporta,
- ustvarjanje sistemov racionalne uporabe skladišč različnih področij premoženja na principih sodelovanja,
- optimiziranje skupnih stroškov gibanja izdelkov in
- optimalno porazdelitev funkcij vodenja pretočnih procesov.

2.2 Izziv digitalizacije v dobavnih verigah na podeželju

Zaradi vsesplošne rasti števila populacije, znatno povečane stopnje povpraševanja in posledično pospešenega vpliva globalizacije na dobavne verige so te primorane svoje procese optimizirati in prilagoditi na način, da so ti v skladu z globalnimi trendi (Remondino & Zanin, 2022). V nasprotnem primeru so členi dobavnih verig lahko

nekonkurenčni večjim pridelovalcem in proizvajalcem ter ponudnikom na trgu. Eli-Chukwu (2019) v svoji študiji izpostavlja, da bodo inovativni pristopi predvsem v kmetijskem sektorju ključni za ohranjanje in izboljšanje omenjene dejavnosti. Druge primerjalne študije iz preteklosti pa so po drugi strani pokazale, da imajo kmetijska podjetja, ki so sicer ključni členi dobavnih verig, nasproti podjetjem iz drugih panog z naskokom najvišje logistične stroške, povezane s fizičnim pretokom surovin, materialov in blaga. Tovrsten podatek ne bi bil tako zaskrbljujoč, če ne bi ti stroški predstavljali skoraj 90 % vseh agroživilskih logističnih stroškov kmetijskih podjetij (glej Tabelo 1), medtem ko so agroživilski stroški podjetij drugih panog bili občutno bolj enakomerno razporejeni (Wajszczuk, 2016).

Tabela 1: Delež logističnih stroškov v kmetijskih podjetjih v primerjavi s podjetji drugih panog

Tip logističnih stroškov	Delež osnovnih komponent logističnih stroškov in skupnih logističnih stroškov (%)		
	Kmetijska podjetja	Podjetja drugih panog (Poljska)	Podjetja drugih panog (svet)
Stroški fizičnega toka surovin, materialov in blaga	86,5	44,2	31,5
Stroški zalog	12,2	34,3	39,7
Stroški informacijskih procesov	1,3	14,2	19,5

Vir: Wajszczuk, 2016

Dupaľ et al. (2019) v svoji študiji navajajo, da na podeželju velikokrat največ težav predstavlja digitalizacija, ki bi lahko poenostavila mnoge procese in podeželske dobavne verige pospešila ter naredila bolj učinkovite. Prav tako bi bilo sodelovanje z globalnimi verigami lahko poenostavljeno zaradi vpeljave višjega nivoja nadzora in sledljivosti ter zaradi enostavnejše povezljivosti v sistem digitalnih globalnih dobavnih verig (Slavkova & Solovey, 2016). Tudi druge študije že ugotavljajo, da lahko digitalne tehnologije pomagajo pri povečanju produktivnosti, zmanjšanju proizvodnih stroškov in emisij, zmanjšanju intenzivnost virov proizvodnega procesa ter pri izboljšanju korespondence na trgih (Di Vaio et al., 2020). Pri tem je vzpodbudno dejstvo, da so nedavne raziskave že pokazale zavedanje lastnikov kmetijskih podjetij o trendu digitalizacije in potrebi po vpeljavi le-te v njihove sisteme. Dupaľ et al. (2019) so namreč v študiji, izvedeni na Slovaškem, ugotovili, da 82,09 % vprašanih kmetijskih podjetij kot trend v podjetniški logistiki opredeljuje

digitalizacijo logističnih procesov. In ravno digitalizacija je glavna tema, ki je obravnavana znotraj industrije 4.0 in logistike 4.0. V povezavi s podeželskim razvojem ter spremembami v kmetijski panogi poznamo sicer specifično poimenovana pristopa Kmetijstvo 4.0 (angl. Agriculture 4.0) in AgriTech (Rose & Chilvers, 2018). Omenjena pristopa se osredotočata na posodabljanje procesov, tehnologij in sistemov, obenem pa sta usmerjena k učinkovitejšim načinom kmetovanja ter zagotavljanju trajnostnih in okolju prijaznih rešitev za hrano (Remondino & Zanin, 2022).

Zelo pomemben koncept, katerega se velikokrat uporablja v povezavi z digitalizacijo, je informatizacija oziroma konkretneje informacijska tehnologija (v nadaljevanju IT). Slednjo je Attaran (2003) definiral kot *»zmožnosti, ki jih organizacijam ponujajo računalniki, programske aplikacije in telekomunikacije za dostavo podatkov, informacij ter znanja posameznikom in procesom«*. Informacijska tehnologija omogoča shranjevanje, obdelavo in prenos digitalnih podatkov ter posledično avtomatizacijo procesov, ki so potrebni za digitalizacijo. Na drugi strani pa digitalizacija ustvarja velike količine digitalnih podatkov, ki jih je treba učinkovito upravljati in varovati, kar zahteva informacijsko tehnologijo (OpenAI, 2023). Torej digitalizacija ni zares mogoča brez vpeljave IT podpore in odpira vrata spremembam posameznih poslovnih procesov organizacij, bodisi v urbanih ali bolj ruralnih območjih. Integracije med kmetijstvom in novimi tehnologijami, predvsem iz IT industrije, se lahko enotno poimenuje – pametno kmetijstvo (Cvijanović et al., 2022; Poljoprivredni fakultet Beograd, 2021).

Vsesplošna težnja po digitalizaciji in vpeljavi informacijske tehnologije v različne sisteme je opazna tudi v uradnih dokumentih na ravneh držav in večjih entitet, kot je na primer Evropska unija. Nezamova & Olentsova (2022) ugotavljata, da je bilo vprašanje digitalizacije in načina vzpostavljanja le-te na območju Ruske federacije že obravnavano v različnih vladnih dokumentih, ki se osredotočajo na strateške cilje prej omenjene državne tvorbe. V svojem pokoronskem obnovitvenem načrtu, imenovanem NextGenerationEU, je EU prav tako kot eno glavnih fokusnih točk poudarila digitalizacijo EU-27 območja, pri čemer kot glavne cilje izpostavljajo (Evropska Unija, 2021):

- masovno omogočanje 5G širokopasovnega omrežja za potrebe hitrega povezovanja,

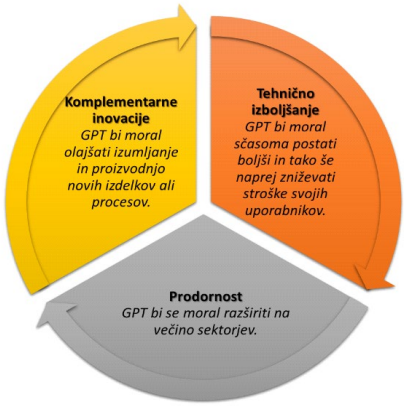
- kreacije digitalne identitete (eID) za potrebe povišane varnosti in nadzore nad osebnimi podatki,
- pametnejša in učinkovitejša mesta,
- bolj varno spletno nakupovanje in
- uporabo UI za potrebe izboljšanja zdravstva, izobraževanja in transporta.

2.3 Umetna inteligenca, njene oblike in postopki integracije v sisteme

Del najnovejšega EU načrta za digitalizacijo je med drugim tudi uporaba umetne inteligence, kar potrjujejo različni pravni akti EU. UI je sicer predvsem v času po lansiranju produkta ChatGPT s strani ameriškega podjetja OpenAI postala veliko bolj prepoznavna tudi med splošno populacijo oziroma izven strokovnih krogov. A vendar, specializiran pogovorni robot ne predstavlja širokega spektra, ki ga zajema UI tehnologija.

UI lahko definiramo na več načinov, najbolj pogosta definicija pa govori o tem, da je UI tehnologija, ki s pomočjo računalniške tehnologije posnema zgolj nekatere (kasneje v razvoju pa vse) zapletenejše človeške veščine. UI je torej multidisciplinarna tehnologija, z zmožnostjo integracije kognicije, strojnega učenja, prepoznavanja čustev, interakcije med človekom in računalnikom, shranjevanja podatkov in odločanja (Zhang & Lu, 2021; Lu, 2019). Kljub temu, da je UI še na različnih aplikativnih področjih v začetnih fazah, kjer je še vedno z malo verjetnosti mogoče določati končno obliko, ji lahko pripišemo oznako sistemske tehnologije, pri čemer se izraz sistem nanaša na številne tehnologije, ki so povezane ali vključene v UI in posledično na različne načine vplivajo na družbo (Sheikh et al., 2023). Velik pomen tehnologiji daje tudi dejstvo, da je glede na teorijo treh meril za določanje tehnologij za splošno uporabo (angl. general purpose technology – GPT) (Bresnahan & Trajtenberg, 1995; Jovanovic & Rousseau, 2005) UI »lahko« umeščena mednje. Na podlagi tega, da je UI že dandanes prisotna v mnogih različnih sektorjih in izdelkih, kot so na primer predelovalne dejavnosti, medicina, javni sektor, zabava, finančne storitve in kmetijstvo (Sheikh et al., 2023), ji definitivno lahko pripišemo doseganje merila prodornosti. Glede na Moorov zakon o podvojevanju računalniške moči vsaki 2 leti in nekatere uspehe podjetij, ki razvijajo UI aplikacije (na primer OpenAI), lahko potrdimo tudi merilo potenciala tehnologije UI za tehnične izboljšave. Veliko vprašanje nastane pri tretjem merilu teorije GPT (glej Slika 1), ko govorimo o komplementarnih inovacijah, pri čemer pa Sheikh et al. (2023)

izpostavljajo, da *»je že mogoče zaznati številne znake pozitivnega vpliva na splošno produktivnost, vendar je umetna inteligenca preprosto premlada tehnologije, da bi lahko dokončno dokazali obstoj komplementarnih inovacij«*. Horowitz et al. (2018) so med drugim v prispevku o UI zapisali, da gre za tehnologijo, podobno tehnologijam splošnega namena, kot sta elektrika in motor z notranjim zgorevanjem, medtem ko Googlov izvršni direktor Sundar Pichai tehnologijo UI primerja celo z ognjem in njegovim pomenom za človeštvo.



Slika 1: Merila določanja tehnologij za splošno uporabo
Vir: Heikkilä et al., 2023

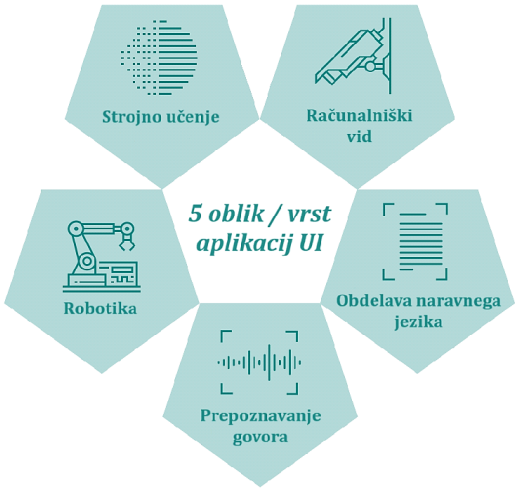
Specializirana skupina strokovnjakov na nivoju Evropske komisije je sicer leta 2023 v svojem aktu, usmerjenim v UI, podala razlago, kjer naj bi ta zajemala *»Sisteme, ki prikazujejo inteligentno vedenje z analizo svojega okolja in ukrepanjem – z določeno stopnjo avtonomije – za doseganje določene ciljev«* (European Commission, 2023). Za delovanje tovrstnih inteligentnih sistemov torej potrebujemo podatke, ki so lahko sistemu posredovani s strani človeka ali pa jih sistem sam zajema iz okolja preko drugih tehnološko naprednih rešitev. Pridobljene podatke nato UI sistemi lahko na različne načine analizirajo in obdelujejo. Na tej točki pa postane UI neposredno povezana z dandanes že zelo razširjenima pojmoma, strojno in globoko učenje (angl. machine and deep learning – ML and DL). Predvsem zaradi nedavnega razvoja omenjenih pojmov so UI sistemi postali veliko bolj sposobni, saj so lahko do neke mere samoučeči sistemi, ki svoje algoritme glede na vhodne podatke prilagajajo in spreminjajo. Tako so UI sistemi prešli fazo logične ali simbolne UI, kjer vhod X prinese vnaprej točno določen izhod Y, in prešli v fazo nevronske zasnove UI, kjer

ta posnema človeške nevrone, ki iz vhodnih podatkov poskušajo izluščiti vzorce, v okviru katerih pravila X vhod je Y izhod, ne obstajajo več (Sheikh et al., 2023).

2.3.1 Oblike UI aplikacij

Dandanes poznamo več različnih oblik oziroma vrst aplikacij UI (glej Slika 2), ki jih lahko delimo na aplikacije (Sheikh et al., 2023):

- za napovedno analizo (strojno učenje),
- za obdelavo slik (računalniški vid),
- za jezik (obdelava naravnega jezika),
- za govor (prepoznavanje govora) ter
- za izvajanje fizičnih nalog (robotika).



Slika 2: Vrste UI aplikacij
Vir: Sheikh et al., 2023

Kljub temu mnoge rešitve delujejo na podlagi povezovanja dveh ali več zgoraj omenjenih vrst aplikacij UI, pri čemer kot rezultat dobimo bolj dovršeno končno podobo aplikacije UI (Sheikh et al., 2023). Pri tem je v mnogih situacijah potrebna tudi določena količina podpornih aplikacij ali tehnologij, ki nekaterim UI tehnologijam dajejo pomen, jih izboljšujejo ali celo omogočajo njihov obstoj.

Integracija UI aplikacij v kmetijstvu bo oziroma je podprta z določenimi tehnološkimi inovacijami, kot so analiza obsežnih podatkov, povezane naprave oziroma internet stvari (angl. Internet of Things - IoT), industrijski internet stvari (IIoT), uporaba robotike, cenovna dostopnost različnih senzorjev in kamer, dronov in drugih majhnih zračnih plovil ter široko dostopen internet na raznolikih geografskih območjih kmetijskih površin (Eli-Chukwu, 2019). Kot verjetno najpomembnejša podporna sistema pa lahko posebej izpostavimo internet stvari (IoT) in velike podatkovne baze (angl. Big Data/-sets), pri čemer oba sistema skrbita za razpoložljivost podatkov, ki so kasneje lahko uporabljeni, analizirani, transformirani in distribuirani s strani aplikacij UI. Batty (2016) v svoji raziskavi podpira idejo, da je povečana stopnja povezovanja, tudi s pomočjo IoT, omogočila zajemanje enormnih količin podatkov, ki pa so uporabni na različnih področjih življenja. Razpoložljivost podatkov s tem dokazuje, da so lahko ti koristni pri raznoraznih oblikah optimizacije ob sprejemanju premišljenih odločitev, s pomočjo umetne (ali človeške) inteligence (Alam et al., 2014; Allam & Dhunny, 2019).

2.3.2 Postopki integracije UI aplikacij v različne sisteme

Kot vsaka naprednejša tehnologija, ki je v neki točki novost na trgu in predstavlja organizacijam, podjetjem in drugim potencialno konkurenčno prednost, ima tudi UI svoje zakonitosti, ki jih je potrebno upoštevati, kadar se odločamo za implementacijo le-te v določen sistem. Pri tem je UI v nekaterih pogledih drugačna od drugih tehnologij, saj je lahko s strani organizacij, ki želijo izkoristiti njene prednosti, tudi nerazumljena, obenem pa gre za tehnologijo, ki se jo v obdobju pisanja prispevka poskuša tudi pravno regulirati za namene doseganja višje stopnje varnosti. V tem delu pravne regulacije oziroma postavitve pravne podlage za tehnologijo sta trenutno EU in Amerika še najbolj v koraku s časom, kar dokazujejo njuni izdani in predloženi pravni akti (Floridi, 2021).

Sheikh et al. (2023) proces vpeljave UI iz laboratorijev v realen svet / družbo opredeljujejo s petimi ključnimi komponentami oziroma koraki, ki si sledijo v razmeroma konstantnem sosledju. Ti koraki so:

- **Demistifikacija**, ki se nanaša na razumevanje tehnologije UI in konkretno obravnava vprašanje »Kaj sploh predstavlja UI?«.

- **Kontekstualizacija**, ki se navezuje na umeščanje UI v kontekst / situacijo. V tem delu nas zanima odgovor na vprašanje »Kako naj bi rešitev delovala?«.
- **Vključevanje**, ki se navezuje na vprašanja, povezana z umestitvijo družbe v kontekstu z UI. Vprašanje, ki si ga postavljamo tu, se glasi »Kdo bi moral sodelovati oziroma biti vključen?«.
- **Regulacija**, ki deluje na ravni družbe kot celote, pri čemer se osredotoča na vprašanje »Katera pravila so potrebna?«.
- **Pozicioniranje**, ki se navezuje na umestitev in določanje odnosa v mednarodnem kontekstu, torej »Kakšen odnos imamo do drugih subjektov, držav, itd.«.

3 Metodologija

Metodologija, sprejeta za oblikovanje prvega dela tega prispevka, se osredotoča izključno na pristop pregleda že obstoječih raziskav, ki služijo kot trden temelj raziskovanja preoblikovalnega potenciala vključevanja UI za optimizacijo agroživilske logistike v podeželskih dobavnih verigah. Ta pristop omogoča natančen pregled literature, znanstvenih člankov, poročil ter ostalih sekundarno pridobljenih podatkov, ki se nanašajo na kmetijsko logistiko, dobavne verige na podeželju in vlogo UI pri izboljšanju agroživilske logistike. Izvedena sta bila sistematično iskanje in analiza ustrezne literature, da so se izluščili ključni teoretični koncepti, načela in spoznanja v zvezi s podeželskimi dobavnimi verigami in potencialnim vplivom optimizacije, ki jo poganja UI. Postopek analize podatkov v temeljnih raziskavah je vključeval natančen pregled pridobljenih teoretičnih konceptov, na podlagi katerih je bila izvedena sinteza informacij iz različnih virov, kategorizacija ključnih načel in vzpostavitev robustnega teoretičnega okvira, ki pojasnjuje zapletenost dinamike dobavne verige na podeželju in teoretične temelje integracije UI. S temeljitim razčlenjevanjem obstoječe literature in sintetiziranjem temeljnih konceptov je cilj prvega dela prispevka zagotoviti celovito in pronicljivo razumevanje medsebojnega vplivanja med kmetijsko logistiko, podeželskimi dobavnimi verigami in preoblikovalnim potencialom aplikacij agroživilske logistike, ki jo poganjajo aplikacije UI. Drugi del prispevka je bil oblikovan na podlagi pregleda znanstvene literature aplikativnih UI sistemov, med katerimi so bili izbrane najbolj relevantne UI rešitve s področja agroživilske in kmetijske logistike. S tem smo predstavili nekatere UI koncepte, ki bodo v bližnji prihodnosti krojili kmetijsko in agroživilsko panogo.

4 UI v agroživilski in kmetijski logistiki

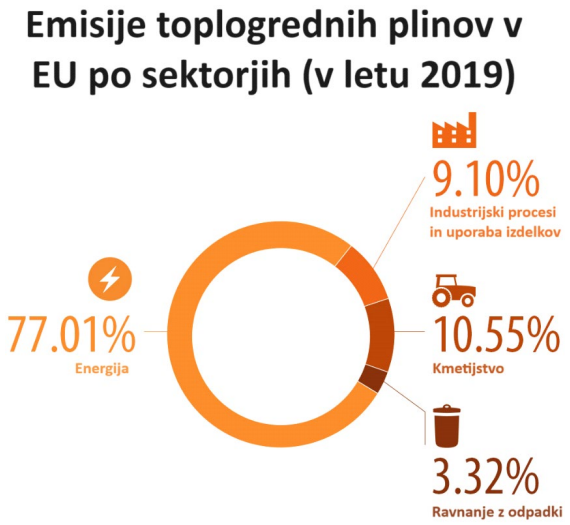
Sodobna agroživilska logistika je in bo čedalje bolj prepletena z različnimi oblikami digitalnih tehnologij, na kar nakazujejo tako spodbude vlad in organizacij (Nezamova & Olentsova, 2022; Evropska Unija, 2021) kot tudi raziskave, omenjene v prejšnjih poglavjih, ter nekateri pristopi znotraj panog, ki jih agroživilska logistika zajema, kot sta na primer AgroTech in Kmetijstvo 4.0 (Rose & Chilvers, 2018). Digitalizacija in digitalna tehnologija pa s seboj v svet agroživilske logistike prinašata predvsem boljšo logistično konkurenčnost zaradi enostavnejšega povezovanja deležnikov, kar spodbuja bolj trajnostne pristope k opravljanju in učinkovitejšo rabo virov (Remondino & Zanin, 2022). Medtem širši kmetijski sektor s pomočjo digitalizacije predvsem zagotavlja kakovost in zanesljivost proizvodnje (Ruiz-Real et al., 2020). Z doseženo zadostno stopnjo splošne digitalizacije v neimenovanem XY kmetijskem sistemu je proces integracije UI aplikacij enostavneje dosežen, rezultati integracije pa postanejo optimalni, saj so lahko prilagojeni konkretnemu XY sistemu, ki s pomočjo različnih senzorično-zaznavnih naprav zajema realne podatke v realnem času, primerne za obdelavo znotraj UI aplikacij (Lu, 2019). UI sistemi so sposobni v tem primeru do določene mere prilagoditi svoje vedenje z analizo učinkov prejšnjih dejanj in delovati avtonomno (European Parliament News, 2023b).

4.1 Evropske zelene strategije v kombinaciji z aplikacijami UI

Objava uradne spletne strani European Parliament News (2023b) omenja UI kot prihodnost trajnostnih prehrambnih sistemov, kjer se za vzgajanje hrane v kmetijski panogi uporablja optimalna količina gnojil, pesticidov in namakanja, kar povečuje produktivnost in zmanjšuje vpliv na okolje kmetijske panoge.

S pomočjo UI imajo kmetje, agroživilska logistika in celotna dobavna veriga hrane priložnost za doseganje EU strategije, imenovane *»Od vil do vilic«*, ki se osredotoča na ustvarjanje trajnostnih prehrambnih verig in obenem spodbuja digitalizacijo, inovacije in raziskave na področju pridelave, predelave, hrambe, distribucije ter vseh ostalih področij, vključenih v sistem prehrambnih verig na območju EU (European Commission, 2020a; Monteiro & Barata, 2021). Bolj trajnostni pristopi, ki vključujejo uporabo UI, pa so med drugim tudi nujni, saj je po podatkih poročila o zavrženi hrani v EU iz leta 2016 kar 20 % hrane, proizvedene na območju EU-28, kasneje zavržene (Stenmarck et al., 2016). Kmetijski sektor na tem območju prav

tako proizvaja okoli 10 % vseh emisij toplogrednih plinov (v nadaljevanju TPG) (glej Slika 3) in je skupaj s proizvodnjo, predelavo, pakiranjem in transportom, ki sestavljajo širši živilski sektor, eden glavnih vzpodbujevalcev podnebnih sprememb (European Parliament News, 2023a). Pozitivno pa je opaženo dejstvo v European Parliament News (2023b), da je že mogoče zaslediti kmetije po EU, ki s pomočjo UI skozi celoten dan aktivno spremljajo gibanje, temperaturo in porabo krme svojih živali.



Slika 3: Emisije TPG v EU po sektorjih (v letu 2019)
Vir: European Parliament News (2023a)

Vse že naštete priložnosti, ki jih prinaša integracija UI, je potrebno jemati resno, a vendar pri tem biti zmerno konservativen. Tako kot lahko prihaja do težav pri premajhni in prepočasni umestitvi UI aplikacij, lahko problem nastane pri drugi skrajnosti, preveliki in prenagljeni uporabi UI v sistemu. Prva skrajnost prinaša s seboj na nivoju EU grožnjo neizpolnjevanja *»Evropskega zelenega dogovora«* (European Green Deal), izgubo konkurenčne prednosti napram tujim trgom (ali ponudnikom na trgu), gospodarsko (ali podjetniško) stagnacijo in vsesplošno slabše možnosti za ljudi. Pri tem European Parliament News (2020) izpostavlja, da bi do nezadostne uporabe lahko prišlo zaradi nezaupanja ljudi, slabe infrastrukture, pomanjkanja pobud ali pomanjkanja splošnega nivoja digitalizacije ter manka podatkov. Je pa v povezavi s tem vzpodbudno mnenje Di Vaio et al. (2020), da podjetja predvsem

zaradi vse večjega zanimanja za trajnostno poslovanje, ki zajema tri ključne razsežnosti (ekonomsko, okoljsko in družbeno), ustvarjajo rešitve za agroživilske sisteme, ki temeljijo na UI, katere lahko razrešijo več problemov in prihranijo dragocene vire z zmanjšanjem okoljske škode. V drugem scenariju, ki pa je sicer manj verjeten, a vseeno mogoč, in govori o pretirani uporabi UI aplikacij, pa naj bi prihajalo do nepotrebnega vlaganja v aplikacije, ki ne dodajajo vrednosti in so neuporabne ter ne rešujejo konkretno niti enega problema sistema, v katerega bi bile aplikacije integrirane.

4.2 Konkretni primeri uporabe aplikacij UI v kmetijski in agroživilski logistiki

Kmetijska panoga se na dnevni, tedenski, mesečni ter letni bazi sooča z mnogimi dejavniki, ki so s povečevanjem časovnega obdobja čedalje bolj nepredvidljivi. Nestanovitne vremenske razmere, spreminjajoče cene surovin na tržišču in dolgoročne podnebne spremembe so le nekateri izmed njih. Tehnološki napredek je kmetom dandanes omogočil, da tovrstne dejavnike uspešneje premagujejo in posledično analiziranim vplivom prilagajajo kmetijsko dejavnost. Obenem je tehnologija kmetom omogočila vpogled in analizo nekaterih dejavnikov, ki so sicer zelo predvidljivi, a jih v preteklosti niso mogli uspešno analizirati. Pri tem imamo v mislih raznorazne cenovno dostopne analize tal ter spremljanje nastajanja škodljivcev in bolezni, ki jih ti s seboj prinašajo (Eli-Chukwu, 2019; Di Vaio et al., 2020).

UI je torej vedno bolj vključena v številne proizvodno-pridelovalne obrate, kjer lahko dela skupaj z ljudmi pri izvajanju več operacij različnih kompleksnosti. Vzpodbudne so tudi ugotovitve Litskevich (2022), ki nakazujejo na znatnejšo zmanjšanje cene razvoja in posledično dostopnosti UI aplikacij, kar odpira vrata za uporabo UI tudi srednjim in manjšim subjektom (srednje velikemu kmetu). Potencial umetne inteligence je tako že mogoče opaziti v uspešnih implementacijah v resničnem svetu s strani določenih organizacij z jasno evidentiranimi koristmi (Eager et al., 2020).

Tabela 1 prikazuje nekatere že obstoječe aplikacije UI, ki so primarno bolj vezane na aspekt kmetijstva, a imajo zaradi svojih pozitivnih učinkov posledično vpliv tudi na logistične procese med, pred ali po procesu, ki ga izvajajo aplikacije. SVN in KNN

algoritma sta primera UI aplikacij, ki lahko ob pravilni integraciji bistveno spremenita potek nabave in planiranja sredstev za preprečevanje nastajanja bolezni ali za zdravljenje posameznih rastlinskih vrst. Dron eBee X po drugi strani lahko s svojim rezultatom preleta večjih kmetijskih površin in ustvarjanja različnih tipov map poskrbi za spremenjen proces planiranja poti posamezni skupini kmetijske mehanizacije oziroma podatke posreduje drugim UI aplikacijam (različnim avtonomnim vozilom), ki lahko te podatke koristijo pri svojih procesih. Na dolgi rok cilj aplikacij UI v kmetijski ter logistični panogi ne bi smel biti ustvarjanje samostojnih avtonomnih sistemov, temveč iskanje čim višje stopnje povezovanja med njimi, saj s tem prihaja do povečevanje zmogljivosti posameznih aplikacij v sinhronem sistemu. Učinkovito delovanje kombinacije umetne inteligence, logistike in kmetijstva je tako vzpostavljeno na podlagi skupnih sistemov, pogojenih s poenotenimi standardi in protokoli (Zhang, 2019).

Tabela 1: Karakteristike UI aplikacij, primernih za kmetijsko pridelovalno panogo

UI rešitev /sistem /produkt	Vrsta UI aplikacije	Opis UI aplikacije	Prednosti aplikacije	Omejitve in slabosti aplikacije
AgXeed AgBot 5.115T2 (CLAAS Group, n.d.; AgXeed, 2023)	Računalniški vid, strojno učenje in robotika.	Avtomatizirani robot za pripravo prsti, setvenih gredic, sajenja in odstranjevanja pleveli.	Avtonomnost robota, ki je podprt z aplikacijo proizvajalca za upravljanja in nadzorovanje potencialne flote vozil. Časovni prihranek. Optimizacija dela glede na realne podatke – personalizacija.	Visoka začetna investicija in stroški vzdrževanja. Omejitve glede servisnih možnosti. Vprašanje zbiranja podatkov s strani podjetja AgXeed.
AgXeed AgBot 2.055W4 (AgXeed, 2023)	Računalniški vid, strojno učenje in robotika.	Avtomatizirani robot za vzdrževanje travnatih površin, pripravo prsti in setvenih gredic, sajenje, nego in nadzor pridelka ter košnjo lucerne.	Avtonomnost robota, ki je podprt z aplikacijo proizvajalca za upravljanja in nadzorovanje potencialne flote vozil. Časovni prihranek. Optimizacija dela glede na realne podatke – personalizacija.	Visoka začetna investicija in stroški vzdrževanja. Omejitve glede servisnih možnosti. Vprašanje zbiranja podatkov s strani podjetja AgXeed.
AgXeed AgBot 2.055W3	Računalniški vid, strojno	Avtomatizirani robot za košnjo z	Avtonomnost robota, ki je podprt z aplikacijo proizvajalca	Visoka začetna investicija in stroški

UI rešitev /sistem /produkt	Vrsta UI aplikacije	Opis UI aplikacije	Prednosti aplikacije	Omejitve in slabosti aplikacije
(AgXeed, 2023)	učenje in robotika.	mlatilnico in nego pridelkov.	za upravljanja in nadzorovanje potencialne flote vozil. Časovni prihranek. Optimizacija dela glede na realne podatke – personalizacija.	vzdrževanja. Omejitve glede servisnih možnosti. Vprašanje zbiranja podatkov s strani podjetja AgXeed.
UI sistem »Demeter« (Pilarski et al., 2002)	Računalniški vid in robotika.	Avtomatizirana žetev (načrtovanje in izvajanje žetve ter zaznavanje nepričakovanih ovir).	Višji izkoristek zmogljivosti žetvenih strojev (hitrejša žetev). Izboljšana natančnost žetve pri daljših časovnih intervalih.	Razmeroma drag, saj porabi veliko goriva.
eBee X drone (Elbasi et al., 2023)	Računalniški vid in robotika.	Ultra lahko plovilo za zajemanje slikovnega materiala večjih površin.	Preprosto izvajanje, certificirano v EU (in drugod), omogoča nadaljnje kreiranje različnih tipov map glede na pridobljen slikovni material.	Potrebnega razmeroma veliko prostora za vzlet in pristajanje plovila. Možne poškodbe rastja ob pristanku.
Carbon Robotics LaserWeeder (Future Farming, 2023)	Računalniški vid, strojno učenje in robotika.	Avtonomni robot za lasersko odstranjevanje pleveli.	Odstranjevanje pleveli brez kemikalij. Povečan pridelek in njegova kakovost.	Visoki stroški nakupa in vzdrževanja. Visoka poraba energije. Slabše delovanje pri nekaterih vrstah pleveli.
Podporni vektorski trojni algoritev (SVN) (Elbasi et al., 2023)	Strojno učenje.	Eden najboljših algoritmov za razvrščanje (klasifikacija) in odkrivanje bolezni pri nekaterih rastlinah.	Stopnje natančnosti med 90 in 97 %. Zgodnje odkrivanje bolezni. Bolj trajnostno delovanje z vidika porabe sredstev za preprečevanje bolezni.	Potrebna zadostna količina podatkov in nadzorovanega učenja na podatkih. Potreba po podpornih sistemih za zajemanje slik.
Algoritem »K-najbližji sosed« (KNN) (Elbasi et al., 2023)	Strojno učenje.	Eden najboljših algoritmov za razvrščanje (klasifikacija) in odkrivanje bolezni pri	Stopnje natančnosti do 92 %. Zgodnje odkrivanje bolezni. Bolj trajnostno delovanje z vidika porabe sredstev za preprečevanje bolezni.	Potrebna zadostna količina podatkov in nadzorovanega učenja na podatkih.

UI rešitev /sistem /produkt	Vrsta UI aplikacije	Opis UI aplikacije	Prednosti aplikacije	Omejitve in slabosti aplikacije
		nekaterih rastlinah.		Potreba po podpornih sistemih za zajemanje slik.
Konvolucijske nevronske mreže (CNN) (Keswani et al., 2018)	Strojno učenje.	Kategorija algoritmov, ki načeloma delujejo v kombinaciji z računalniškim vidom in robotiko.	Optimizacija delovanja avtomatiziranih robotov ali zmanjšanje izgub pri obiranju sadja z avtomatskimi roboti (Elbasi et al., 2023).	Potrebna zadostna količina podatkov. Smiselnost implementacije zgolj v kombinaciji z računalniškim vidom.
Robotiziran avtonomni razpršilec (Gonzalez-de-Soto et al., 2016)	Računalniški vid, strojno učenje in robotika.	Robotiziran škropilni sistem, ki je primarno namenjen uporabi učinkovitega doziranja herbicidov.	Sposoben delati v skupinah ali flotah avtonomnih robotov. 99,5 % natančnost pri odkrivanju pleveli. Prihranek herbicidov in zmanjšanje onesnaževanja tal. Avtonomija dela.	Znižana učinkovitost ob uporabi na pleveli podobnih sadikah.
DJI Agras T30 (DJI Technology Co., n.d.)	Računalniški vid, strojno učenje in robotika.	Brezpilotno letalo za digitalno kmetijstvo (primarno škropljenje).	V eni uri obdela do 40 arov površin. Zaznava okolico in ovire s pomočjo različnih senzorjev in dveh aktivnih kamer. Sposoben zajeti in delovati z do 30 litrov tekočin v enem vzletu. Življenjska doba enega cikla baterije je 2 uri.	Razmeroma drag dron. Lahko prihaja do težav z upravljanjem ob močnejših vetrovnih pogojih. Zaradi velikosti ni primeren za območja z veliko ovirami, kot so drevesa.

Vir: Lasten vir

Iz Tabele 1 lahko razberemo, da gre pri večini aplikacij UI predvsem za optimizacijo posameznih ali več korakov procesa pridelave živil, pri čemer te aplikacije poskušajo ustvariti določeno stopnjo avtonomije, ki ne bi potrebovala človeške pomoči. Ramin Shamshiri et al. (2018) so za tovrstne tipe aplikacij izpostavili, da so po hitrosti in natančnosti v veliki večini že prehitele človeka in njegove sposobnosti, katere so tudi sicer ena večjih omejitev kmetijstva. Obenem pa ta ista raziskava poudarja, da je integracija tovrstnih aplikacij UI lahko vprašljiva v zelo spreminjajočih se in nestrukturiranih kmetijskih okoljih.

So pa poleg zgoraj omenjenih na trgu tudi že aplikacije UI, ki so neposredno povezane z logističnim aspektom kmetijstva. Študija Eager et al. (2020) nakazuje na dejstvo, da je bila UI že do leta 2020 močno vpeta v logistično in transportno panogo, del katere je tudi kmetijska in agroživilska logistika. Tabela 2 tako prikazuje obstoječe aplikacije UI, ki so neposredno povezane z različnimi logističnimi procesi kmetijstva in agroživilskih dobavnih verig.

Tabela 2: Karakteristike UI aplikacij v agroživilski logistiki

UI rešitev /sistem /produkt	Vrsta UI aplikacije	Opis UI aplikacije	Prednosti aplikacije	Omejitve aplikacije
Biometrična veriga blokov (BBC) (Xu et al., 2019)	Računalniški vid, strojno učenje.	Tehnologija veriženja blokov, povezana z biometričnim potrjevanjem odgovornih posameznikov na posameznem koraku.	Enostavno določimo odgovorno osebo pri vsakem koraku in naredimo upravljanje bolj pregledno, nadzorovano in varnejše. Robustnost prehrambne verige za napade zaradi aspekta tehnologije verige blokov.	Občutljivost zasebnosti zaradi vključevanja biometričnih podatkov.
Hevristični UI algoritmi za razreševanje problemov usmerjanja vozil (angl. Vehicle routing problem – VRP) (Bocewicz et al., 2017)	Strojno učenje.	Različne oblike aproksimiranih /približnih algoritmov za razreševanje kompleksnih VRP problemov.	Hitro razreševanje zapletenih VRP situacij. Prilagodljivost glede na situacijo. Praktičnost algoritmov zaradi ravnotežje med ustreznostjo rešitve in časovno komponento.	Ob enormno veliki floti vozil ali parametrov se lahko končna rešitev preveč oddalji od optimalne.
Nevronska mreža GRU (angl. gated recurrent unit) (Basljan et al., 2021)	Strojno učenje.	Metodologija za napovedovanje povpraševanja po pokvarljivih izdelkih.	Izboljšuje načrtovanje proizvodnih urnikov. Zmanjšuje izgube dobička zaradi presežkov ali primanjkljajev. Več kot 80 % zanesljivost napovedi za do 10 dostavnih točk v sistemu.	Zanesljivo zgolj pri kratkoročnih predikcijah. Lahko prihaja do zmanjševanja uspešnosti modela ob zapletenih vhodnih podatkih.
TrackoBit (Agarwal, 2023)	Računalniški vid, strojno učenje.	Telematska programska oprema za upravljanje	Oddaljena diagnostika vozil. Ustvarjanje avtomatiziranih	Dražja rešitev v primerjavi s sistemi brez UI aplikacij.

UI rešitev /sistem /produkt	Vrsta UI aplikacije	Opis UI aplikacije	Prednosti aplikacije	Omejitve aplikacije
		voznega parka ter oddaljeno vzdrževanje vozil.	analitičnih poročil o vozilu in vožnji. Celostna rešitev zajema tudi ADAS in DMS.	Nevarnost kibernetskega napada.
Advance Driver Assistance System (ADAS) (Agarwal, 2023)	Računalniški vid, strojno učenje.	Sistem za opazovanje voznikove vožnje in upoštevanje pravil.	Spremljanje upoštevanja varnostnih pravil voznika in zaznavanje le-teh. Pošiljanje opozoril voznikom, tudi pred trkom.	V določenih situacijah je lahko infrastruktura razlog za slabše delovanje sistema. Draga popravila sistema (Pandey, 2023).
Driver monitoring system (DMS) (Agarwal, 2023)	Računalniški vid, strojno učenje.	Sistem za zaznavanje voznikovega vedenja na podlagi analize obraza.	Možnost oddaljenega nadzora nad dejanji in splošnim stanjem voznikov.	Razmeroma drag sistem. Lahko ima težave pri analizi stanja obrazne mimike voznika, kar lahko povzroča težave pri vožnji voznika.
Mercedes-Benz Vision Van (Mercedes-Benz Group, 2016)	Računalniški vid, strojno učenje, robotika.	Specializiran logističen avtomobil, opremljen z dvema dronoma za dostavo blaga.	Samodejna optimizacija poti glede na vsebino celotnega tovora in lokacij. Popolnoma samodejni sistem za nakladanje tovora v vozilo (do 93,5 % časovnega prihranka pri nakladanju).	Nizek domet električnega vozila (od 80 do 250 km).
Mecalux shuttle sistemi (Mecalux, n.d.)	Robotika.	Avtomatizirane rešitve za shranjevanje palet, zabojev in majhnih izdelkov.	Časovni prihranek. Avtomatizacija procesa nalaganja in razlaganja tovora v skladiščne regale / mesta. Optimizacija FIFO in LIFO sistema.	Smiselnost integracije sistema v primeru večjega skladišča. Primerno za določene tipe tovornih enot.

Vir: Lasten vir

Ugotovljeno je bilo, da z umeščanjem UI aplikacij v agroživilske sisteme po večini spreminjamo enega (ali več) od treh ključnih vidikov uspešnosti poslovanja omenjenih gospodarskih subjektov. Ti ključni vidiki so:

- **Izboljševanje učinkovitosti**, kot to poskušajo pri podjetju Mercedez-Benz s svojo rešitvijo specializiranega logističnega vozila, ki poleg avtomatiziranega nakladanja omogoča tudi dostavo na zadnjem kilometru s pomočjo enega izmed dveh dronov, katera ima Vision Van integrirana, kot del celotnega sistema (Mercedes-Benz Group, 2016). Izboljšanje učinkovitosti procesov pa s svojimi shuttle sistemi ponujajo tudi pri podjetju Mecalux. V tem primeru gre za aplikacijo UI, ki zajema zgolj aspekt robotike, a vendar prinaša v skladiščne sisteme pospešitev procesov nalaganja in razlaganja ter obenem skrbi za povišano stopnjo ergonomije dela (Mecalux, n.d.).
- **Izboljševanje nadzora in transparentnosti**, kot prikazujejo primeri Advance Driver Assistance System (ADAS), Driver monitoring system (DMS) (Agarwal, 2023) in sistem biometrične verige blokov (BBC). Slednja aplikacija UI poleg izboljšanega nadzora tudi zmanjšuje verjetnost za nastanek nepredvidenih situacij, saj so členi, ki so del dobavne verige, na vsakem koraku zelo jasno zapisani v elektronskem sistemu verižnih blokov (Xu et al., 2019).
- **Omogočanje predvidljivosti in zmanjševanje nepričakovanih situacij**, kot to počneta aplikaciji UI hevrističnih algoritmov pri razreševanju VRP problemov (Bocewicz et al., 2017), ter nevronska mreža GRU, s pomočjo katere je mogoče v smiselnem obdobju zanesljivo napovedovati povpraševanje po pokvarljivih izdelkih (Basljan et al., 2021).

Se pa aplikacije UI razvijajo tudi za večje sisteme, kot so na primer skladišča. Pri tem izraz 'večji sistem' opisuje bolj zapletene sisteme, ki posledično prinašajo kot enotno rešitev kombinacijo različnih principov in aspektov tehnologije UI. Za upravljanje skladišča lahko uporabljajo tovrstne aplikacije različne kamere, senzorje temperature in vlage ter senzorje plesni za pridobivanje podatkov o skladišču, pri čemer se poskušajo predvsem zagotavljati informacije skrbnikom ali ostalim tehnologijam znotraj skladišča v realnem času. To pa omogoča med drugim tudi analiziranje zgodovinskih podatkov o skladišču, kar zagotovi delovanje in varnost skladišča (Lu, 2019).

5 Zaključek in diskusija

Skozi raziskavo je bilo ugotovljeno, da ima umetna inteligenca (UI) velik potencial za optimizacijo in trajnostno preoblikovanje kmetijske in agroživilske logistike. Aplikacije UI se dandanes že uporabljajo v kmetijsko pridelovalni panogi za različne namene, kot so izdelovanje raznoraznih napovedi, izboljšanje nadzora nad rastlinami in živalmi, avtomatizacija procesov in optimizacija materialnih tokov, medtem ko se UI v agroživilski logistiki uporablja predvsem za optimizacija prevozov, omogočanje sledljivosti blaga, zagotavljanje kakovosti in varnosti ter izboljšanje učinkovitosti in konkurenčnosti. Z naskokom najbolj aplikativni vrsti UI v kmetijski in agroživilski logistiki sta bili strojno učenje in računalniški vid, pri čemer je celotno UI rešitev v več primerih povezovala tudi robotika. Obdelava naravnega jezika in prepoznava govora sta zaenkrat vrsti UI, ki ju ni bilo mogoče zaslediti med rešitvami v omenjenih panogah. V okviru raziskave je bila izpostavljena prav tako glavna problematika integracije UI rešitev, digitalizacija. V povezavi s tem je vsaj zaenkrat s strani EU v zadnjem času bilo podanih nekaj finančnih in nefinančnih usmeritev, katere je bilo in tudi bo v bližnji prihodnosti smiselno izkoriščati, saj bo s tem prehod na bolj avtonomne, ergonomske in UI-gnane agroživilske sisteme veliko lažji.

V bodoče bi bilo smiselno poskušati doseči še večje povezovanje med razvijalci aplikacij UI ter gospodarstvom za namene lansiranja uporabnikom bolj prijaznih in enostavnih UI rešitev, ki bi obenem bile specializirane in prilagojene za posamezne aspekte poslovanja znotraj agroživilskih sistemov. Prav tako je bilo ugotovljeno, da je na trgu ponudbe UI še vedno malo cenovno dostopnih aplikacij, katere bi lahko v svoje poslovanje integrirali manjši in finančno manj sposobni deležniki agroživilskih oskrbovalnih verig.

Bodoče raziskave s tega področja bi lahko proučevale realne učinke in kakovost aplikacij za bolj transparenten vpogled v integracijo aplikacij UI znotraj omenjenega agroživilskega sektorja. Prav tako bi lahko bile izvedene primerjalne študije med seboj podobnimi aplikacijami UI, ki bi le-te razvrščale po različnih kriterijih. S tem bi tovrstne raziskave prinašale bolj jasne pokazatelje kakovosti posameznih aplikacij UI.

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SAMOREFLEKSIJA DRUŽINSKIH KMETIJ NA LASTNO DEJAVNOST

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Družinske kmetije imajo v Sloveniji pomembno vlogo, saj so prevladujoč model kmetovanja in pomembne za ohranitev ter razvoj podeželja. Skrbijo, da so na trgovskih policah vsakodnevno zdravi pridelki in živila, zato je pomembno spoštovanje in spodbujanje družinskih kmetij ter zavedanje, da kupujemo lokalno ter s tem omogočimo ohranjanje kmetijstva. V raziskavi, kjer so sodelovale družinske kmetije iz Osrednjeslovenske regije, smo se osredotočili na pomen družinskih kmetij, saj smo želeli izvedeti, kako se te ocenjujejo, samoreflektirajo, kakšno vizijo imajo in kako se s svojimi produkti uveljavljajo na trgu. Družinske kmetije naraščajo, zavedajo se pomena nasledstva in želijo, da se njihovi nasledniki usmerjajo v nadaljevanje tradicije. Velik pomen dajejo izobraževanju, kar jim pripomore k iskanju novih rešitev in uvajanju tehnologij za lažjo izvedbo dela. Velik preobrat v kmetijstvu povzročajo podnebne spremembe, kar je povezano z izpadom prihodka in preskrbe s hrano. Namen prispevka je vzpodbuditi družinske kmetije, da vztrajajo pri kmetovanju ter svoje znanje in izkušnje prenesejo na mlade naslednike, hkrati pa tudi animirati k samooskrbi in nakupu lokalnih produktov, saj bomo tako pripomogli k ohranjanju kmetijstva.

Ključne besede:
družinske kmetije,
nasledniki kmetije,
razširitev dejavnosti,
podnebne spremembe,
blagovna znamka

Univerzitetna založba Univerze v Mariboru

1 Uvod

Hrana je naravna nuja za ohranitev življenja vsakega izmed nas. Vedno več ljudi je tudi na osnovi različnih projektov in promocijskih aktivnosti ozaveščenih o kakovosti lokalnih pridelkov, kar odraža pozitiven učinek odnosa državljanov Slovenije, da je domače oziroma lokalno najboljše. Potrošniki iščejo kakovost produktov z neposrednim stikom s kmetijami v regiji, na tržnicah, pa tudi v velikih prehranjevalnih verigah. Danes mnogim potrošnikom cena produkta ni ovira, saj kakovost in zdravje postavijo na prvo mesto. Težava nastane le pri tem, da izdelki malih družinskih kmetij pogosto stežka pridejo od stojnice do odjemalca, morda zaradi slabe promocije kmetije ali konkurence.

Potrošniki se moramo zavedati pomena lokalno pridelane hrane s kratkimi distribucijskimi potmi. Da bi ohranili slovensko kmetijstvo, je potrebno ozaveščati odjemalce o pomenu nakupa lokalno pridelane hrane s trgovskih polic, tržnic ali neposredno na kmetijah, saj bomo tako omogočili možnost kmetovanja tudi prihodnjim generacijam oziroma mladim naslednikom kmetij ter s tem zagotovili hrano bodočim generacijam. Pomemben je tudi pristop države z različnimi oblikami finančnih spodbud, ki omogoča pridobitev sredstev za razvoj kmetij. S stališča kmeta je pomembno, da ta s kmetijsko zemljo, ki jo obdeluje, ravna gospodarno in racionalno ter da znanje, dolgoletne prakse ter kakovostno zemljo prenese na mlade naslednike, da bodo lahko uspešno nadaljevali tradicijo in v prihodnosti skrbeli za samooskrbo Slovenije.

Velik izziv v Sloveniji v zadnjem obdobju predstavljajo podnebne spremembe. Trenutne poplavne razmere v Sloveniji v letu 2023 so povzročile ogromno škodo v kmetijstvu. Maja 2023 so se zgodile poplave, julija neurja s točo, v avgustu pa je zopet poplavljalo. Najbolj prizadeta območja so bila Črna na Koroškem, Mežica, Mozirje, Solčava, Luče in Ljubno ob Savinji. Narasle vode in zemeljski plazovi so odnašali cele kmetije, hleve, bale, ostalo krmo, kmetijske stroje, umirale so živali, poplavljene so ostale kmetijske površine. Marsikje bo pridelek popolnoma uničen in neprimeren za prodajo. Velika bo škoda tudi v zelenjadarstvu, saj zaradi razmočenosti tal ne bo mogoče izvesti tehnoloških ukrepov za zaščito pred boleznimi in gnitjem (Videmšek, 2023).

Zaradi vseh vremenskih ekstremov v zadnjih letih se zdi, da je Slovenija zaspala, saj bi bilo potrebno že na samem začetku odvijanj podnebnih sprememb ukrepati, spremeniti oziroma prilagoditi nekatere vsakodnevne življenjske običaje, navade. Trenutni državni sekretar Uroš Vajgl pojasnjuje, da je v procesu nov zakon o podnebnih spremembah, kjer bodo navedeni cilji, načini možne udeležbe civilne družbe in strokovnih služb (Mulec, 2023). Da pa bomo omilili podnebne spremembe, si morajo nasproti stopiti deležniki z različnih področij - kmetijstva, gozdarstva, gospodarstva, turizma, gradbeništva ter zdravstva zavoljo nas in za naše zanamce.

2 Hipoteze in metodologija

2.1 Hipoteze

Hipoteza 1: Kmetije iz Osrednjeslovenske regije vidijo dan odprtih vrat kot priložnost pri promociji kmetije.

Hipoteza 2: V Osrednjeslovenski regiji se bo kmetijska panoga ohranila.

Hipoteza 3: Trgovske verige predstavljajo za anketirance najpomembnejšo prodajno pot.

2.2 Metodologija

Za pridobivanje odgovorov in podatkov smo se odločili za metodo ankete. Izdelali smo anketni vprašalnik in ga poslali kmetijam na območju Osrednje Slovenije. Bolj natančno smo dobili odgovore iz naslednjih občin, in sicer so to Borovnica, Brezovica, Dobrepolje, Dobrova-Polhov Gradec, Dol pri Ljubljani, Grosuplje, Horjul, Ig, Ivančna Gorica, Komenda, Ljubljana, Log- Dragomer, Logatec, Lukovica, Medvode, Mengeš, Moravče, Škofljica, Šmartno pri Litiji, Trzin, Velike Lašče in Vrhnika. Kontakte in naslove kmetij smo poiskali na portalu Nakup pri kmetu na spletu. Portal Nakup pri kmetu je bil vzpostavljen z namenom, da se ustvari mreža kmetij in njihovih potrošnikov, ki bi nudila potrošnikom kakovostne izdelke, kmetijam pa večji dobiček (Pridobljeno na https://pri-kmetu.si/o_portalu.php). Najprej smo kmetije telefonsko seznanili z vsebino, na kateri temelji raziskava, in vprašali, ali bi želeli sodelovati, ter zaprosili za odzivni

kontakt. Na osnovi pridobljenih kontaktov smo nato kmetijam poslali spletno anketo s 14 vprašanji. Anketa je bila poslana 51 kmetijam, od tega je bilo 31 povratnih odgovorov. Anketiranje je potekalo od 22. 7. 2023 do 19. 8. 2023. Nekatere kmetije z območja Osrednje Slovenije, iz naselij, kot so Kamnik, Vodice in Domžale, niso želele sodelovati zaradi trenutnih poplavnih razmer, ki so prizadele Slovenijo v času izvedbe te raziskave.

3 Teoretične osnove

3.1 Kmetija kot primarna dejavnost

Kmetija je v Slovarju slovenskega knjižnega jezika opredeljena kot zemljišče s hišo in gospodarskimi poslopji. V 2. členu Zakona o spremembah in dopolnitvah Zakona o kmetijstvu (Zkme-1B) je kmetija opredeljena kot oblika kmetijskega gospodarstva, kjer se nosilec in člani ali članice kmetije ter zaposleni ukvarjajo s kmetijsko dejavnostjo (Uradni list RS št. 26/14, 2014). »Člani in članice kmetije so fizične osebe, ki so člani gospodinjstva po predpisih o prijavi prebivališča in so starejši od 15 let. Nosilca kmetije in njegovega namestnika določijo člani kmetije, ki so hkrati lastniki oziroma solastniki kmetije, z vpisom v register kmetijskih gospodarstev pri pristojnem organu. Nosilec kmetije prevzema vse pravice in obveznosti iz naslova ukrepov kmetijske politike« (Perša, 2013). Kmetijstvo je primarna dejavnost, ki zajema izkoriščanje rastlinskih in živalskih virov. Perša (2013) navaja, da kmetija kot proizvodni obrat v prvi vrsti služi pridobivanju dohodka, zagotavlja samooskrbo gospodinjstva, omogoča zaposlitev družinskim članom in hkrati ustvarja premoženje družine ter omogoča njen obstoj. Kmetijstvo ohranja videz podeželja in s tem kulturno pokrajino, kar je temelj za turistični razvoj.

3.2 Družinske kmetije

Nosilci družinskih kmetij (Slika 1) pogosto podedujejo zemljo od svojih prednikov. Ta dediščina predstavlja desetletja uspešnega dela prejšnjih generacij in odgovornost, da nasledniki za zemljo skrbijo z enako odločnostjo in natančnostjo, kot so to počeli njihovi predhodniki. Največji izziv v Sloveniji za učinkovito opravljanje kmetijske dejavnosti je zemljiška razdrobljenost, ki vodi v veliko število majhnih kmetij. Posledica tega so dedovanja zemljišč, vendar se kljub temu razdrobljenost zemljišč danes uspešno rešuje s komasacijami.

V Sloveniji kmetije razvrščamo po tipologiji kmetijstva, ki kaže delež dohodka, ki ga člani kmečkega gospodinjstva pridobivajo iz osnovne kmetijske dejavnosti. Kmetije delimo na čiste kmetije, kjer vsi družinski člani delajo na kmetiji, mešane kmetije, kjer se kombinira dohodek iz kmetijske dejavnosti in iz zaposlitve zunaj kmetije, dopolnilne kmetije – aktivni družinski člani so zaposleni zunaj kmetije, in ostarele kmetije, na katerih so vsi člani družine starejši od 65 let (Lampič, 2018, str. 116, 117).

Slika 1: Družinska kmetija Hodej – Senica
Vir: Mlekarna Celeja, 2022

Thiesse (2021) navaja, da trenutno v ZDA družinske kmetije še vedno predstavljajo več kot 86 % kmetijske proizvodnje. V ZDA so družinske kmetije opredeljene po naslednjem kriteriju, po bruto letni prodaji:

- zelo velike družinske kmetije z več kot 500.000 ameriških dolarjev bruto,
- velike družinske kmetije z bruto prihodki med 250.000 in 500.000 ameriških dolarjev,
- male družinske kmetije z bruto zneskom pod 250.000 ameriških dolarjev (USDA National institute of Food and Agriculture, 2023).

3.3 Dejavnosti na kmetiji

3.3.1 Osnovne dejavnosti na kmetiji

Na kmetiji je dopustno opravljati različne osnovne dejavnosti, kot so pridelava poljščin in travinja na kmetijskih zemljiščih, pridelava različnih vrst sadja na zemljiščih, evidentiranih kot intenzivni sadovnjak, pridelava hmelja na zemljiščih, ki

so evidentirana kot hmeljišče, pridelava grozdja na zemljiščih, ki so evidentirana kot vinograd, pridelava oljk in oljčnega olja na zemljiščih, ki so evidentirana kot oljčnik. V osnovno kmetijsko dejavnost sodi tudi živinoreja, vendar le v obsegu od vzreje živali do prodaje živih živali, in sicer za zakol, nadaljnjo rejo ali pleme oziroma razplod (Finančni urad Republike Slovenije, 2023). V okviru osnovne kmetijske dejavnosti se lahko opravlja tudi čebelarstvo, vezano na čebelje panje, ki so evidentirani v registru čebelnjakov. Glede na to se kot čebelarska dejavnost šteje dejavnost pridelave pridelkov, kot so pridelava čebeljega medu, satja, matičnega mlečka, cvetnega prahu, propolisa, čebeljega voska in strupa ter čebeljih matic (Finančni urad Republike Slovenije, 2023).

3.3.2 Dopolnilne dejavnosti na kmetiji

V 99. členu Zakona o kmetijstvu je dopolnilna dejavnost opredeljena kot dejavnost na kmetiji, ki omogoča boljšo rabo proizvodnih zmogljivosti in delovnih moči kmetije ter pridobivanje dodatnega dohodka na kmetiji (Pravno informacijski sistem, 2008). Na kmetiji lahko nosilci opravljajo dopolnilne dejavnosti, kot so: predelava primarnih kmetijskih pridelkov (Slika 2) (sadni sokovi, marmelade, mesni izdelki, predelava vina, mleka, zelenjave), predelava gozdnih lesnih sortimentov, prodaja kmetijskih pridelkov in izdelkov z okoliških kmetij, vzreja in predelava vodnih organizmov (ribogojstvo, predelava sladkovodnih rib), turizem na kmetiji: gostinska dejavnost (izletniška kmetija, vinotoč, kmetija z nastanitvijo) in negostinska dejavnost (strokovno vodeni ogledi kmetije in naravnih znamenitosti na podeželju, ježa živali, turistični prevozi, prikazi tradicionalnih kmečkih opravil), dejavnost, povezana s tradicionalnimi znanji na kmetiji (lončarstvo, tradicionalno krovstvo s slamo, peka kruha v kmečki peči, umetnostno kovaštvo, tradicionalni izdelki iz zelišč in dišavnic, medičarstvo) (Perša, 2013).

Perša pravi, da lahko v okviru dopolnilnih dejavnosti nosilci kmetije predelujejo tudi rastlinske odpadke za proizvodnjo in prodajo energije iz obnovljivih virov (lesna biomasa, izkoriščanje vodnih in sončnih virov), omogočajo storitve s kmetijsko in gozdarsko mehanizacijo in opremo ter ročna dela. Na kmetiji se lahko opravlja tudi svetovanje in usposabljanje v zvezi s kmetijsko, gozdarsko in dopolnilno dejavnostjo - usposabljanje na kmetiji, organiziranje delavnic in tečajev o kmetovanju in kmečkih opravilih (Perša, 2013).

Slika 2: Proizvodi kmetije Jeglič – dopolnilna dejavnost na kmetiji
Vir: Kmetijsko gozdarska zbornica Slovenije, 2022

3.4 Vrste kmetovanja

V Sloveniji je kmetijstvo usmerjeno v intenzivno kmetijstvo, ekološko kmetovanje, integrirano pridelavo in biodinamično kmetovanje, pri čemer je zaslediti porast intenzivnega kmetovanja. Evropska unija usmerja države članice v sonaravno kmetovanje, in sicer v eko kmetijstvo oziroma biokmetijstvo. Slovenija ima za obe vrsti kmetovanja dobre pogoje. Prav tako je tudi prehranska politika Slovenije usmerjena na lokalno pridelano, saj je ta ob nizki stopnji samooskrbe s kmetijskimi izdelki nujna. Tako je omogočeno zmanjšanje odvisnosti od zunanje trgovine, ohranjanje delovnih mest na podeželju, zmanjšanje revščine in družbene neenakost, ohranjanje urejenosti podeželja in varovanje okolja. Da bi zadostili zdravim pridelkom oziroma čim manj posegali s fitofarmacevtskimi sredstvi v pridelke in v okolje ter omogočili dobrobit živalim, se v Sloveniji spodbuja ekološko kmetovanje.

Ekološko kmetijstvo vpliva predvsem na trajnostno gospodarjenje z naravnimi viri ter uveljavlja načela dobrobiti živali oziroma živalskim vrstam in pasmam omogoča prilagojeno rejo. Celostno se dopolnjujeta rastlinska pridelava in reja živali, temelječa na kroženju snovi v naravi. Prav tako ekološko kmetovanje zagotavlja varno hrano, z bogato prehransko vrednostjo in visoko vsebnostjo vitaminov, mineralov in antioksidantov. Ker je uporaba gensko spremenjenih organizmov, mineralno topnih mineralnih gnojil, kemično sintentiziranih fitofarmacevtskih sredstev ter različnih

regulatorjev rasti pri ekološkem kmetovanju prepovedana, ni pričakovati ostankov teh snovi v pridelkih ali živilih in posledično pri potrošnikih (Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2021). Označbo za ekološko kmetovanje (Slika 3) predstavlja Evropski logotip za ekološke proizvode.

Slika 3: Ekološko kmetovanje
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2022

V Sloveniji se spodbuja tudi ohranitveno kmetijstvo (Slika 4), katerega namen je, da spodbuja vzdrževanje trajnega pokrova tal, minimalno obdelavo tal in diverzifikacijo rastlinskih vrst. Povečuje biotsko raznovrstnost in naravne biološke procese nad in pod zemeljsko površino, kar prispeva k večji učinkovitosti rabe vode in hranil ter k boljši in trajni pridelavi poljščin. Je odziv na trajnostno upravljanje zemljišč, varstvo okolja in prilagajanje podnebnim spremembam. Ohranitvena obdelava, stalna pokritost tal in pester kolobar so tri ključne faze za ohranitev kmetijstva (Kmetijsko gozdarska zbornica Slovenije, 2020).

Slika 4: Ohranitveno kmetijstvo
Vir: Ana Kovač/Siol.net, 2019

3.5 Razvoj in pomembnost družinskih kmetij v svetu

Okoli 70 % svetovne sladke vode se porabi v kmetijstvu, naš sedanji sistem proizvodnje hrane je odgovoren za izpust kar 19 do 29 % toplogrednih plinov, tla pa se izčrpavajo do 40-krat hitreje, kot se lahko obnovijo. To so slabi obeti za prihodnost naše proizvodnje hrane, saj kmetijstvo nedvomno obremenjuje vire in prispeva k podnebnim spremembam (Slavikova, 2019). Slavikova meni, da obstajajo rešitve in da so družinske kmetije po vsem svetu izredno pomembne zaradi svojih agroekoloških postopkov. Medtem ko velike kmetije s težkimi stroji še naprej obdelujejo velike površine monokultur s pesticidi in gnojili, milijoni družinskih kmetov uporabljajo agroekološke pristope, da bi omilili te vplive in oživili podeželska območja. Družinske kmetije z nizom kmetijskih praks, kot so medvrstni posevki, pokrovni posevki, zeleno gnojenje ali integrirano zatiranje škodljivcev, dosegajo dolgoročno trajnost in večjo produktivnost kot industrijske kmetije.

Že leta 1999 je Rosset poudarjal, da če želimo pošteno oceniti relativno produktivnost malih in velikih kmetij, ne smemo upoštevati "donosa" kot merilno orodje. Veliki kmetje običajno sadijo monokulture (Slika 5), ker jih je najlažje upravljati s težkimi stroji. Gola zemlja med vrstami posevkov spodbuja širjenje plevela, zaradi te-ga mora kmet vložiti dodatno delo v odstranjevanje plevela ali kapital v herbicide. Po drugi strani pa mali kmetje, zlasti v tretjem svetu, veliko pogosteje sadijo mešanice poljščin, medvrstne posevke. V prazen prostor v niši, kjer bi sicer rasel plevel, zasadijo druge poljščine. Prav tako kombinirajo ali izmenjujejo pridelke in živino, pri čemer gnoj služi dopolnjevanju rodovitnosti tal. Takšni integrirani sistemi kmetovanja proizvedejo veliko več na enoto površine kot monokulture. Skupna proizvodnja na enoto površine, ki je pogosto sestavljena iz več poljščin in različnih živalskih proizvodov, je veliko večja (Rosset, 1999).

Za primerjavo majhnih in velikih kmetij je potrebno uporabiti skupno proizvodnjo in ne pridelka. Medtem ko donos skoraj vedno usmerja rezultate v korist večjih kmetij, skupna proizvodnja omogoča prednost produktivnosti majhnih kmetij. Tudi koristi malih kmetij posegajo v gospodarsko področje. Medtem ko velike industrijske kmetije pri upravljanju z viri uporabljajo zemljo brez zasajenih dreves, ne skrbijo za tla ter uporabljajo oziroma sadijo monokulture, so lahko mali kmetje zelo učinkoviti skrbniki naravnih virov in tal (Rosset, 1999). Rosset tudi poudarja, da »če nas skrbi, kakšna je kakovost proizvodnje hrane, so majhne kmetije bolj produktivne. Če nas

skrbi izguba biotske raznovrstnosti ali trajnost kmetijstva, so majhne kmetije ključni del rešitve«.

Slika 5: Monokultura krompirja
Vir: Wikipedija, Tractors in Potato Field, foto: NightThree, CC-BY, 2002

4 Stanje kmetijskih gospodarstev v Sloveniji

Kmetijsko gospodarstvo je v 2. členu Zakona o spremembah in dopolnitvah Zakona o kmetijstvu (Zkme-1G) opredeljeno kot vse enote, ki se uporabljajo za kmetijske dejavnosti in s katerimi upravlja nosilec ali nosilka kmetijskega gospodarstva ter se nahajajo na ozemlju Republike Slovenije (Uradni list RS št. 44/22, 2022). Statistično gledano pa se kmetijsko gospodarstvo opredeljuje kot skupen pojem za kmetijska podjetja in družinske kmetije, ki se ukvarjajo s pridelavo na kmetijskih zemljiščih in v gozdovih. Bric (2021) navaja, da v Sloveniji trenutno nimamo zakona, ki bi podrobneje opredeljeval družinske kmetije. Na spletu lahko zasledimo energične članke, ki vzpodbujajo k vzpostavitvi zakona o družinskih kmetijah. Ta zakon naj bi natančneje opredelil družinske kmetije, jih zaščitil, omogočil njihov obstoj ne glede na velikost, Slovencem pa zagotovil prehransko varnost.

Družinske kmetije so še vedno prevladujoča oblika kmetijskih gospodarstev v Sloveniji kot tudi drugod po svetu. Po zadnjih trenutno dostopnih najnovejših začasnih podatkih s Statističnega urada Republike Slovenije je bilo leta 2016 v Sloveniji registriranih 69.902 kmetijskih gospodarstev, od tega 69.671 družinskih kmetij in 231 kmetijskih podjetij (Statistični urad RS, podatkovna baza SiStat, 2023).

Tabela 1: Število kmetijskih gospodarstev po statističnih regijah v Sloveniji

	2010	2020
	Število	
Slovenija	**74.646**	**67.915**
Pomurska	8.890	7.084
Podravska	12.318	10.789
Koroška	2.743	2.556
Savinjska	11.004	9.966
Zasavska	1.811	1.715
Posavska	5.657	5.171
Jugovzhodna Slovenija	8.079	7.314
Osrednjeslovenska	7.937	7.522
Gorenjska	4.476	4.132
Primorsko-notranjska	2.881	2.851
Goriška	5.790	5.347
Obalno-kraška	3.060	3.468

Vir: SURS, 2021

*Začasni podatki z dne 13. 10. 2020

Leta 2020 je bil zadnji popis kmetijskih gospodarstev, in sicer je bilo v letu 2020 po začasno objavljenih podatkih z dne 13. 10. 2021 skupno 67.915 registriranih kmetijskih gospodarstev brez razčlenitve na družinske kmetije in kmetijska podjetja. V Osrednjeslovenski regiji je bilo leta 2010 registriranih 7.937 kmetijskih gospodarstev. Zadnji začasni podatki z dne 13. 10. 2020 pa kažejo občutno zmanjšanje kmetijskih gospodarstev v tej regiji, in sicer na kar 7.522 (Krajnc & Šuštar, 2021).

Tabela 1 prikazuje podatke iz leta 2010 in 2020. Iz podatkov je razvidno, da je v 11 slovenskih regijah opaziti upadanje kmetijskih gospodarstev, v Obalno-kraški regiji pa presenetljivo povečanje kmetijskih gospodarstev (Krajnc & Šuštar, 2021). V Pomurski, Podravski, Savinjski in Osrednjeslovenski regiji je registriranih največ kmetijskih gospodarstev. Le-te pridelajo največji delež kmetijskih pridelkov. Vendar trenutne razmere z vremenskimi vplivi in poplavami v teh regijah v letu 2023 morebiti ne bodo doprinesle velikega deleža kmetijske pridelave.

Po skupnem številu kmetijskih gospodarstev se je v razmiku 10 let (2010-2020) število zmanjšalo na kar 67.915. Vendar pa trenutno objavljeno stanje kmetijskih gospodarstev v Sloveniji (Statistični urad RS, 2023) nakazuje, da je bilo v celotnem letu 2020 skupno registriranih 68.331 kmetijskih gospodarstev. Od začasno objavljenih podatkov z dne 13. 10. 2021 do konca leta 2020 se je na novo registriralo

416 kmetijskih gospodarstev. V Osrednji Sloveniji se je število kmetijskih gospodarstev povečalo iz 7.522 na 7.540 (Statistični urad RS – Baza SiStat, 2023).

5 Razvojne možnosti družinskih kmetij v Sloveniji

Globalizacija proizvodnje hrane in dobavnih verig, koncentracija procesov v proizvodnji hrane ter številni škandali s hrano so tako v ZDA kot v Evropi privedli do zahtev potrošnikov po večji preglednosti in informacijah o izvoru hrane. Potrošniki se sprašujejo o praksah proizvodnje hrane in zahtevajo večjo preglednost v dobavni verigi, saj so se razdalje med krajem proizvodnje in krajem potrošnje povečale in postajajo vse bolj nepregledne (Feldmann & Hamm, 2015). Potrošniki se tako raje preusmerjajo k lokalni hrani, t.i. hrani, ki je prepotovala le kratke razdalje, ali k hrani, ki jo neposredno trži proizvajalec na tržnici ali neposredno na kmetiji.

V Sloveniji spodbujamo lokalno pridelavo hrane tudi z raznimi projekti, med njimi tudi Dobrote slovenskih kmetij (Slika 6) (Pridobljeno na https://www.dobroteslovenskihkmetij.si/) - organizacija, ki ocenjuje, razstavlja slovenske izdelke in promovira pristno slovensko, lokalno pridelano in predelano hrano. Prav tako tudi oznake kakovosti, ki jih je opredelilo Ministrstvo za kmetijstvo, gozdarstvo in prehrano, zelo pomagajo odjemalcu pri izbiri hrane za nakup. Bogovič (2021) meni, da so »kratke prehranske verige tiste, ki ponujajo nove priložnosti in varujejo okolje«. Kratke prehranske verige odjemalcu omogočajo, da dobi na kmetiji svežo in kakovostno pridelano hrano. Ker je prehranska veriga krajša, pomeni, da je delo kmeta tudi bolj pošteno plačano. Bogovič ocenjuje, da je to izredna priložnost za manjše kmetije, ki na takšen način lahko zaslužijo za svoj obstoj. Ko se hrana proda na lokalni ravni, se zagotovi, da je onesnaženje okolja manjše, saj se izognemo daljšim prevozom transporta hrane. Prav tako zavarujemo okolje s tem, ko se izognemo procesiranju in pakiranju hrane ter drugim nastalim odpadkom.

Slika 6: Katalog Dobrote slovenskih kmetij
Vir: Kmetijsko gozdarska zbornica Slovenije, 2021

Raziskava Analiza trga za izgradnjo lokalne blagovne znamke v kmetijstvu, izvedena v Sloveniji leta 2021, prikazuje, da kar 70 % anketiranih ljudi, zajetih v raziskavi, kupuje lokalne izdelke na domu pri ponudnikih, 52 % jih kupuje v prodajalnah z živili (Spar, Hofer, Lidl, Mercator), 28 % jih kupuje na tržnicah, 26 % v prodajalnah kmetijskih ponudnikov, 11 % v specializiranih prodajalnah za lokalne izdelke, 8 % jih kupuje preko spletne prodajalne, le 2 % vprašanih pa pridelujeta izdelke doma ali pa jim izdelke dostavijo ponudniki (Perko, 2021, str. 46).

Iz izsledkov zgornje raziskave razberemo, da večina anketiranih kupuje lokalne pridelke neposredno na domu ponudnika, kar si slovenske kmetije tudi želijo. Neposredna prodaja na domu je pomembna tako za kmetije kot za potrošnike, saj imajo kmetije od tega zaslužek, odjemalci pa pridobijo zagotovljeno kakovostno lokalno pridelano hrano. Družinske kmetije so za Slovenijo ključne, saj prebivalstvo oskrbujejo s hrano, od odjemalcev pa je odvisno, ali bodo uspevale še v prihodnje. V sodobnih razmerah je cilj delujočih kmetijskih trgov doseči skupni cilj v korist kmetov, istočasno pa zadovoljiti povpraševanje po kakovostnih in zdravih izdelkih pristnega lokalnega porekla. Denarna pomoč kmetijam, t. i. subvencije, so močno orodje, vloga države pa je, da spodbuja pridelavo, dodaja vrednosti, da se ustvarjajo delovna mesta, spodbuja nasledstvo družinskih kmetij ter s tem razvoj posameznih regij. Naklonjen odnos do nakupa pridelkov in ostalih živil lokalnih ponudnikov prinaša podporo lokalnemu gospodarstvu in okolju.

Krovna usmeritev Strateškega načrta Skupne kmetijske politike 2023-2027 za Slovenijo narekuje »Trajnostno pridelavo hrane na celotnem območju države in povečanje samooskrbe«. Poudarjena je pomembnost vseh območij in vseh kmetijskih gospodarstev ne glede na velikost, usmeritev in tržno usmerjenost. Strateški načrt 2023-2027 podaja nabor ukrepov oziroma intervencij za uresničevanje ključnih ciljev skupne kmetijske politike in zagotavlja pogoje za konkurenčno pridelavo in predelavo hrane. Prepoznava, da imajo mladi kmetje osrednje mesto v razvoju kmetijstva, oblikovane so linije enostavnejšega dostopa do investicijskih podpor za majhne kmetije, poseben poudarek pa je na pridelavi hrane z višjo dodano vrednostjo, zlasti ekološka pridelava in predelava ter drugih proizvodov iz shem kakovosti (Poročilo o strateškem načrtu SKP za leto 2021, 2023, str. 55).

6 Raziskava z razpravo

Na podlagi skupnih zbranih odgovorov, pridobljenih z anketo, smo izdelali analizo in interpretirali odgovore. S prvimi tremi vprašanji smo anketirance povprašali po spolu, starosti ter sedežu kmetije oziroma kje se njihova kmetija nahaja. V raziskavi je sodelovalo 31 družinskih kmetij iz Osrednjeslovenske regije. Od tega je bilo (Tabela 2) 12 anketirancev ženskega spola in 19 anketirancev moškega spola. Anketirali smo populacijo nad 18 let, saj ima ta že poslovno in pravno sposobnost za vodenje domače kmetije. Največ anketirancev je bilo starih od 40 do 59 let, kar predstavlja 54,8 % celotne populacije. To je populacija, ki lahko svoje dolgoletne izkušnje prenaša na svoje potomce in uvaja sodobne tehnologije na svoji kmetiji. 38,7 % je bilo starih od 18 do 39 let, 6,5 % je bilo starih 60 let in več.

Tabela 2: Demografski podatki

Vprašanje	Odgovor	N	N[%]
Spol	Moški	19	61,3
	Ženski	12	38,7
Starost	od 18 do 39	12	38,7
	40 do 59	17	54,8
	60 in več	2	6,5

Vir: Lasten vir, 2023

V nadaljevanju predstavljamo glavna vprašanja iz ankete ter interpretacijo, ki je ključna za razpravo članka.

Vprašanje št. 4 - S čim se ukvarjate?

Pri vprašanju št. 4 smo kmete povprašali, s čim se ukvarjajo oziroma katera je njihova primarna dejavnost. V večji meri se v tej regiji anketiranci ukvarjajo z živinorejo in poljedelstvom ter zelenjadarstvom. Manj se jih ukvarja s sadjarstvom in gozdarstvom.

Vprašanje št. 5 – Na kakšen način kmetujete?

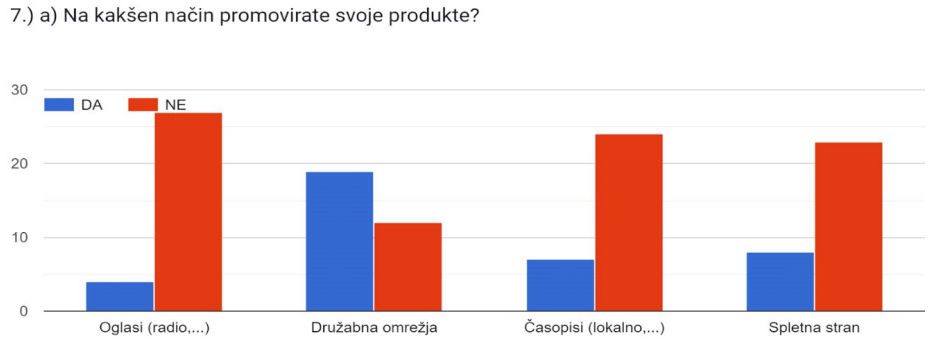
Pri vprašanju št. 5, na kakšen način anketiranci kmetujejo, je 59 % vprašanih odgovorilo, da kmetuje konvencionalno, od tega se jih 35 % ukvarja z ekološko pridelavo in 6 % jih kmetuje na biodinamičen način.

Vprašanje št. 6 – Ali pridelujete za lastne potrebe ali produkte tudi tržite?

Zanimalo nas je, ali kmetije pridelujejo za lastne potrebe ali le-te tudi tržijo. Na vprašanje št. 6 jih je 74,2 % odgovorilo, da svoje pridelke v večji meri pridelujejo zase in tudi prodajajo na trgu. Tako si zagotovijo svojo hrano in dodaten prihodek. 19,3 % izprašanih kmetij svoje pridelke prideluje izključno za prodajo, 6,5 % jih prideluje samo za svoje potrebe in jih ne prodaja na trgu.

Vprašanje št. 7a - Na kakšen način promovirate svoje produkte?

Zanimal nas je tudi podatek o tem, kako kmetije predstavljajo svoje produkte javnosti oziroma na kakšen način se kmetije predstavljajo. Zanimalo nas je, katera orodja kmetije uporabljajo za predstavitev svojih produktov. Raziskava na vprašanje 7a (Slika 7) je pokazala, da se oglasov na radiju poslužujejo 4 anketiranci, medtem ko 27 anketiranih ne uporablja radija za predstavitev svojih produktov. Družabnih omrežij se poslužuje 19 anketiranih, medtem ko jih 12 tega orodja ne uporablja. Časopis kot orodje za predstavitev svojih produktov: 24 anketiranih ga ne uporablja, uporablja ga le 7 anketirancev. Spletno stran pa uporablja 8 anketiranih, medtem ko je 23 anketiranih ne uporablja.



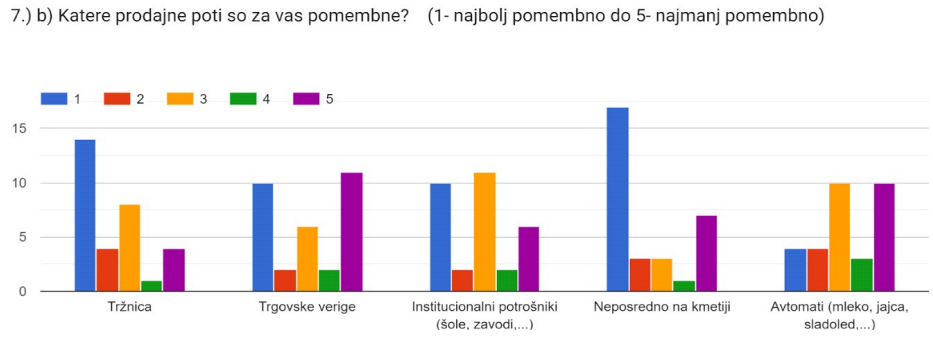
Slika 7: Na kakšen način promovirate svoje produkte?
Vir: Lasten vir, 2023

Iz odgovorov vprašanja št. 7a lahko razberemo, da se anketiranci najpogosteje poslužujejo promocije preko družabnih omrežij, kot so Facebook in Instagram, kar je možno tudi zaslediti. Kmetije, ki so dejavne na družabnih omrežjih in ki ta promocijski kanal uporabljajo, tedensko ali mesečno objavljajo novice o prodaji svojih pridelkov, do razprodaje. Objavljajo tudi vsebine o dnevnem delu na kmetiji, prikazujejo poučne vsebine, ki sledilca oziroma potencialnega odjemalca pritegnejo k ogledu. S tem kmetije pridobivajo nove sledilce in všečke ter potencialne odjemalce. Več všečkov kot ima profil kmetije na družabnem omrežju, bolj je kmetija znana in zanimiva za ogled. Kmetije v tej regiji se manj poslužujejo promoviranja produktov preko oglasov na radiu ter v časopisih. Tudi promoviranja preko spletnih strani se manjše družinske kmetije v tej regiji manj poslužujejo.

Vprašanje št. 7b - Katere prodajne poti so za vas pomembne?

Zanimala nas je pomembnost prodajnih poti s strani anketirancev. Anketiranci so s številkami od 1 do 5 ocenili pomembnost prodaje na tržnici, pomembnost trgovskih verig, instuticionalnih potrošnikov (šole, zavodi), pomembnost prodaje neposredno na kmetiji in prodajo prek avtomatov. In sicer (Slika 8) je kar 14 anketirancev prodajo na tržnici postavilo na 1. mesto kot najpomembnejšo prodajno pot. 4 anketiranci so tržnico postavili na 2. mesto kot pomembno, 8 anketirancev na 3. mesto kot srednje pomembno, 1 anketiranec na 4. mesto kot manj pomembno ter 4 anketiranci na 5. mesto kot nepomembno. Trgovske verige je 10 anketirancev postavilo na 1. mesto, 2 anketiranca na 2. mesto, 6 anketirancev na 3. mesto, 2 anketiranca na 4. mesto in 11 anketirancev na 5. mesto.

Institucionalne potrošnike, kot so zavodi in šole, je 10 anketiranih postavilo na 1. mesto, 2 anketiranca na 2. mesto, 11 jih je postavilo na 3. mesto, 2 anketiranca na 4. mesto in 6 anketirancev na 5. mesto. Prodajo neposredno na kmetiji je 17 anketirancev ocenilo s 1. mestom, 3 anketiranci z 2. mestom, prav tako 3 anketiranci s 3. mestom, 1 anketiranec s 4. mestom in 7 anketiranih s 5. mestom. Avtomat za prodajo jajc, mleka, sladoleda so 4 anketiranci ocenili z 1, prav tako so ga 4 anketiranci ocenili z 2, 10 ga je ocenilo s 3, 3 anketiranci s 4 in 10 anketiranih ga je ocenilo s 5.



Slika 8: Katere prodajne poti so za vas pomembne? (1-najbolj pomembno, 5 najmanj pomembno)
Vir: Lasten vir, 2023

Kar zadeva prodajne poti, je kmetijam v tej regiji najbolj pomembna prodaja neposredno na kmetiji. Želijo si, da bi odjemalci prihajali neposredno na kmetije po pridelke. S tem bi ti spoznali kmetijo ter vztrajno delo na njej in se znova vračali nazaj po pridelke. Zelo jim je pomembna tudi prodaja na tržnici, ki pa je dandanes slabo obiskana. Manj so jim pomembne trgovske verige in prodaja preko avtomatov. Pomembna pa jim je tudi prodaja institucionalnim potrošnikom, kot so šole in zavodi.

Vprašanje št. 8 - Kam bi še želeli prodajati svoje produkte?

Vprašanje št. 8 je bilo odprto vprašanje. Na vprašanje, kam bi kmetije še želele prodajati svoje pridelke, je bilo izraženih veliko različnih želja. Večina si jih želi prodajati na svoji kmetiji. Izrazili so željo, da bi prodajali tudi v restavracije, javne zavode, domove starejših občanov, vrtce, šole, od vrat do vrat oziroma neposredno strankam na dom, kar se v praksi ponekod v Sloveniji že izvaja na terenu.

Vprašanje št. 9a - Imate lastno blagovno znamko, pod katero vas bi ljudje prepoznali?

Raziskali smo tudi pomen blagovne znamke, saj ta kmetiji daje vrednost in možnosti dodatne predstavitve na trgu. Je obljuba kmetije, da bo odjemalcu ponudila le najbolj kakovosten pridelek. Znamke posredujejo jamstvo za kakovost pridelka odjemalcu in predstavljajo vrednote kmetije. Na vprašanje št. 9a je 74,2 % anketiranih kmetij odgovorilo, da nimajo lastne blagovne znamke, pod katero bi jih ljudje prepoznali, medtem ko jo 25,8 % anketiranih kmetij ima.

Vprašanje št. 9b – Če ste odgovorili z DA. Ali opažate pozitiven učinek lastne blagovne znamke?

Za anketirance, ki so pri vprašanju 9a odgovorili, da imajo lastno blagovno znamko, je sledilo odprto podvprašanje 9b. Pri vprašanju 9b smo anketirance povprašali, ali jim blagovna znamka prinaša pozitiven učinek. 5 anketirancev je odgovorilo, da opažajo pozitiven učinek lastne blagovne znamke. 1 anketiranec je odgovoril, da deloma opaža pozitiven učinek, 1 je odgovoril, da z znamko ljudje kmetijo prepoznajo. 1 anketiranec pa je komentiral, da je izredno pomembno na Googlu optimizirati ključne besede, ki naključne odjemalce pripeljejo na spletno stran kmetije, ki lahko nato (p)ostanejo končni odjemalci.

Slovenija je majhna država in hkrati tako pestra dežela, kar zadeva tradicije in običaje, da se to odraža tudi v raznolikosti kulinarike, saj jo sestavlja kar 14 gastronomskih regij, osredotočenih na kakovostne domače kmetijske pridelke in živila. V Sloveniji so kmetijski pridelki in živila zaščiteni s shemami kakovosti glede na opredelitev v evropski ter nacionalni zakonodaji.

V Evropski uniji veljajo naslednje **evropske sheme kakovosti**, ki so predpisane z evropskimi uredbami:

– **Zaščitena označba porekla**

Z zaščiteno označbo porekla (Slika 9) se označuje kmetijske pridelke in živila, katera izvirajo le iz določene države ali kraja, regije. Primeri zaščitenih izdelkov so naslednji: sir Tolminc, Bovški sir, Ekstra deviško oljčno olje Slovenske Istre, Kočevski gozdni med, Kraški med (Inštitut za nutricionistiko, 2021).

Slika 9: Znamka označba porekla
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2023

- **Zaščitena geografska označba**

Z zaščiteno geografsko označbo (Slika 10) se označuje kmetijske pridelke in živila, ki izvirajo prav iz določene regije, države ali kraja, le da je pri tej označbi povezava med geografskim območjem ter končnim proizvodom manj tesna kot pri zaščiteni označbi porekla. Primeri zaščitenih izdelkov, so naslednji: Štajersko-prekmursko bučno olje, Kraški pršut, Ptujski lük (Inštitut za nutricionistiko, 2021).

Slika 10: Znamka geografska označba
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2023

- **Zajamčena tradicionalna posebnost**

Zajamčena tradicionalna posebnost (Slika 11) je posebnost, ki zaščiti predvsem način pridelave ali predelave. Kar se tiče proizvodnje, ta ni omejena na eno geografsko območje, ker te kmetijske pridelke ali živila lahko proizvajajo praktično vsi, ki se držijo predpisane recepture, postopka in same oblike. Primeri zaščitenih izdelkov v Sloveniji so: Orehova potica, Prekmurska gibanica, Idrijski žlikrofi, Belokranjska pogača (Inštitut za nutricionistiko, 2021).

Slika 11: Označba zajamčena tradicionalna posebnost
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2023

– **Ekološka pridelava**

Znak ekološka pridelava zagotavlja (Slika 12), da je bilo živilo pridelano v skladu z ekološkim načinom pridelave. Kmetijske pridelke oziroma živila, ki se tržijo v Sloveniji, je potrebno označevati z enotno označbo " ekološki " in z logotipom (Eko portal, 2014).

Slika 12: Znamka označba ekološka pridelava
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2023

Nacionalne sheme kakovosti so predpisane z Zakonom o kmetijstvu in veljajo samo na območju Slovenije. Mednje spadajo:

– **Označba višja kakovost**

Označba višja kakovost (Slika 13) je shema, ki zajema vse tiste kmetijske pridelke in živila, ki s svojimi lastnostmi med istovrstnimi prehranskimi pridelki ter živili izstopajo z boljšo kakovostjo, in le-ti se določijo glede na njihovo sestavo, fizikalno-kemične ali senzorične lastnosti ter glede na njihov način pridelave ali predelave. Primeri takšnih pridelkov oziroma izdelkov so: Kokošja jajca Omega plus, poltrdi sir brez konzervansov, piščančje meso in izdelki z navedbo »vir selena« (Inštitut za nutricionistiko, 2021).

Slika 13: Znamka označba višja kakovost
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2023

– **Izbrana kakovost**

Označba izbrana kakovost (Slika 14) je namenjena kmetijskim pridelkom oziroma živilom s posebnimi lastnostmi. Te se lahko nanašajo na sestavo, okolju prijazno pridelavo, kakovost surovin, dobrobit živali, posebno zdravstveno varstvo živali, na način krmljenja, na dolžino transportnih poti, predelavo, hitrost predelave surovin oziroma čim manjšo kasnejšo obdelavo pri skladiščenju in transportu (Ministrstvo za kmetijstvo gozdarstvo in prehrano, 2023).

Uporabljata se lahko dva **zaščitna znaka**:

- »izbrana kakovost« je znak, namenjen vsem proizvodom ne glede na poreklo osnovne surovine,
- »izbrana kakovost - Slovenija« se lahko uporablja izključno za proizvode, ki so pridelani in predelani v Sloveniji (Ministrstvo za kmetijstvo gozdarstvo in prehrano, 2023).

Slika 14: Znamka označba izbrana kakovost
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2023

– **Integrirana pridelava**

Označba integrirana pridelava (Slika 15) pomeni naravi prijaznejši način pridelave. Z uravnoteženim izvajanjem agrotehničnih ukrepov, z izvajanjem naravnih ukrepov pred fitofarmacevtskimi in biotehničnimi ukrepi, z nadzorovano uporabo gnojil in fitofarmacevtskih sredstev ter s kontrolno pridelavo se zmanjšujejo negativni vplivi kmetovanja na okolje in zdravje ljudi. Certificiranje pridelkov daje potrošnikom zagotovilo, da proizvodi ustrezajo višjim standardom kakovosti (Ministrstvo za kmetijstvo gozdarstvo in prehrano, 2023).

Slika 15: Znamka označba integrirana pridelava
Vir: Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2023

Zasebne blagovne znamke dosegajo vse kriterije, potrebne za zagotovitev certifikata ekološke pridelave, a jih po določenih značilnostih celo nadgrajujejo oziroma presegajo. Praviloma gre torej za izdelke najvišje kakovosti (Ministrstvo za kmetijstvo gozdarstvo in prehrano, 2023).

– **Biodar**

Znamka BIODAR (Slika 16) je kolektivna slovenska znamka za označevanje živil iz nadzorovane ekološke pridelave. Izdelki so pridelani ali predelani v skladu z veljavnimi predpisi za ekološko kmetijstvo in v skladu s standardi za ekološko kmetovanje, ki so v določenih zahtevah celo strožji od slovenske in EU zakonodaje (Eko portal, 2014).

Slika 16: Kolektivna znamka Biodar
Vir: Eko portal, 2014

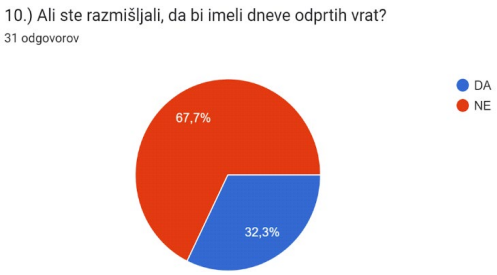
– **Demeter**

Demeter (Slika 17) je svetovna blagovna znamka za ekološke pridelke oziroma živila, ki so pridelana in predelana po biološko-dinamični metodi v skladu s smernicami Demeter. Znamko Demeter smejo uporabljati le pogodbeni partnerji, ki so podvrženi strogi kontroli. Predpogoj pa je, da je bodoči uporabnik blagovne znamke Demeter že najmanj 2 leti v ekološki kontroli (Eko portal, 2014).

Slika 17: Svetovna blagovna znamka Demeter
Vir: Eko portal, 2014

Vprašanje št. 10 - Ali ste razmišljali, da bi imeli dneve odprtih vrat?

Zanimalo nas je tudi (Slika 18), ali si anketiranci želijo imeti na svojih kmetijah dneve odprtih vrat. 67,7 % anketiranih je odgovorilo z NE, 32,3 % anketiranih kmetij pa je odgovorilo z DA.



Slika 18: Ali ste razmišljali, da bi imeli dneve odprtih vrat?
Vir: Lasten vir, 2023

Vprašanje št. 10a - Če ste odgovorili z DA, zakaj?

Vprašanju 10 je sledilo podvprašanje 10a. Anketiranci, ki so odgovorili z DA, so morali utemeljiti, zakaj. Izbirali so lahko med 4 odgovori: Promocija, Povečanje prodaje, Izobraževanje otrok, Drugo – odprti odgovor. Odgovorov je bilo 10. Po njihovih odgovorih sodeč, zakaj so se tako odločili, so poudarili predvsem

promocijo, saj bi se tako lahko bolje promovirali, povečali prodajo, omogočali pa bi tudi izobraževanje otrok z raznimi poučnimi delavnicami, kajti pomembno je, da otroke že od malega učimo stika z zemljo, živalmi in pridelavo zdrave domače hrane. Ključno je, da to otrok vzdržuje in pridobi možnost, da poizkusi in spozna delo na kmetiji ter se tudi sam vključi v doživetje opravil na kmetiji. Otrok bo tako spoznal, koliko truda je potrebno vložiti v pridelavo nekega pridelka, da bo cenil domačo hrano, spoštoval naravo ter v bodoče podpiral kmetijstvo z nakupom hrane lokalnih pridelovalcev.

Eden od anketirancev je podal izjavo, da organizirajo dneve nabiranja orehov, ker imajo premalo družinskih članov, ki bi sodelovali, in preveč pridelka za spravilo. Ljudje se tako udeležijo dneva nabiranja orehov, si jih sami naberejo in plačajo nižjo ceno. Hkrati pa si ljudje nato tudi sami sušijo izdelke (orehe), kar pomeni, da na domačiji ne potrebujejo veliko prostora za sušenje. Kmetija s takim načinom omogoča izobraževanje ljudi, promocijo in povečuje prodajo, saj takrat ponudijo tudi domači orehovec, čaj in druge produkte iz oreha.

Vprašanje št. 10b - Če ste odgovorili z NE, zakaj?

Vprašanju 10 je sledilo tudi podvprašanje 10b. Anketiranci, ki so odgovorili z NE, so morali prav tako utemeljiti, zakaj. Na voljo so imeli 6 odgovorov: Delo z ljudmi (nepripravljenost), Poseganje v ritem na kmetiji, Nespoštovanje obiskovalcev do dela na kmetiji, Uničenje lastnine kmetije, Vznemirjenje živali na kmetiji, Drugo – odprti odgovor. Odgovorov je bilo 21. Večina jih je odgovorila, da si ne želi imeti dneva odprtih vrat zaradi poseganja v njihov ritem na kmetiji, zaradi nespoštovanja obiskovalcev do dela na kmetiji, zaradi vznemirjanja živali ter uničevanja lastnine kmetije.

Vprašanje št. 11a - Ali se udeležujete katerega izmed izobraževalnih dogodkov z vašega področja?

Pri vprašanju št. 11a smo želeli izvedeti, ali kmetje in kmetice nadgrajujejo znanja na kmetijskem področju. Povprašali smo, ali se udeležujejo katerega izmed izobraževalnih dogodkov, kot so tečaji za uporabo fitofarmacevtskih sredstev, obrezovanje sadnega drevja, biodinamični tečaji, sušenje sadja in izdelava sira. Navedli smo tudi odgovor Drugo kot odprti odgovor.

26 odgovorov anketirancev se je nanašalo na udeležbo na tečajih iz fitofarmacevtskih sredstev, 6 odgovorov se je navezovalo na tečaj obrezovanja sadnega drevja, 2 odgovora sta se nanašala na udeležbo na biodinamičnih tečajih, 2 odgovora na tečaj sušenja sadja ter 6 odgovorov se je nanašalo na tečaj za učenje izdelave sira. Iz odgovorov lahko razberemo, da kmetije v tej regiji odlično skrbijo za svoje znanje preko udeležbe na tečajih, predavanjih, s praktičnimi izobraževanji, in sicer se anketiranci v večji meri redno udeležujejo tečajev o uporabi fitofarmacevtskih sredstev. Večina se jih udeležuje tudi tečajev o obrezovanju sadnega drevja in tečajev o izdelavi sira. Manj se jih udeležuje dogodkov, povezanih s sušenjem sadja, in biodinamičnih tečajev.

Nekateri anketiranci so pod odgovor Drugo kot odprto vprašanje dodatno izpostavili, da se učijo tudi računovodstva, vzgoje in oskrbe malin, se izobražujejo na področju vrtnarstva in predelave, skrbijo za znanje z branjem literature in se izobražujejo pri izkušenih okoliških prebivalcih.

Vprašanje št. 11b - Ali se udeležujete katerega izmed naslednjih kmetijskih dogodkov?

Pri vprašanju št. 11b smo želeli izvedeti, kakšna je udeležba na kmetijskih dogodkih s strani anketiranih. Povprašali smo, ali se udeležujejo katerega izmed kmetijskih dogodkov, kot so sejmi, razstave, tržnica, tekme (orači, kosci ...). Navedli smo tudi odgovor Drugo kot odprt odgovor za anketirance.

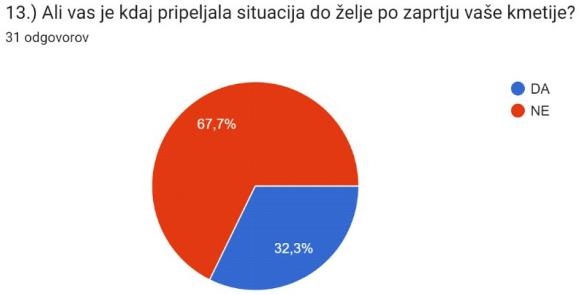
24 odgovorov je bilo s strani anketiranih navedenih za udeležbo na sejmih, 8 odgovorov za razstave, 11 odgovorov za udeležbo na tržnicah, 2 odgovora za tekme (orači, kosci) ter 5 odgovorov pod Drugo, v katerem so navedli, da se ne udeležujejo ničesar. Iz odgovorov lahko razberemo, da se anketiranci v večji meri udeležujejo kmetijskih sejmov po Sloveniji, razstav živali in tržnic. Manj pa se udeležujejo kmetijskih srečanj, kot so tekme (orači, kosci …).

Vprašanje št. 12 - Imate interes po razširitvi dejavnosti na vaši kmetiji?

V nadaljevanju nas je zanimal tudi podatek o obstoju kmetijstva v tej regiji, zato smo anketirance povprašali, ali imajo interes po razširitvi dejavnosti. Na vprašanje št. 12 je 54,8 % anketiranih odgovorilo, da imajo interes po širitvi dejavnosti na svoji kmetiji, 45,2 % anketiranih pa interesa po širitvi dejavnosti nima.

Vprašanje št. 13 - Ali vas je kdaj pripeljala situacija do želje po zaprtju vaše kmetije?

Zanimalo nas je tudi trenutno razmišljanje anketiranih kmetij glede nadaljevanja tradicije njihove kmetije v bodoče. Anketirance smo povprašali, ali jih je kdaj situacije pripeljala do želje po zaprtju kmetije. 32,3 % anketirancev (Slika 19) je situacija že pripeljala do želje po zaprtju kmetije, 67,7 % anketirancev pa o tem ni razmišljalo. To je pozitiven podatek, ki nakazuje, da smo na pravi poti, da se kmetijstvo v Osrednjeslovenski regiji ohrani.



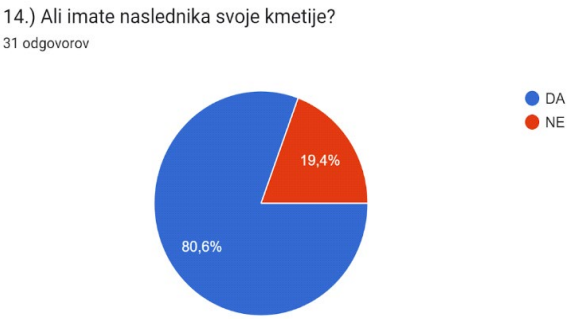
Slika 19: Ali vas je kdaj pripeljala situacija do želje po zaprtju vaše kmetije?
Vir: Lasten vir, 2023

Vprašanje št. – 14 - Ali imate naslednika na svoji kmetiji?

Za ohranjanje kmetijstva v Sloveniji je ključno, da ima vsaka kmetija mladega prevzemnika oziroma naslednika kmetije, ki bo tradicijo kmetije vodil naprej. Na vprašanje, ali imajo anketiranci naslednika kmetije (Slika 20), jih je 80,6 % vprašanih odgovorilo, da imajo naslednika kmetije, 19,4 % vprašanih pa naslednika kmetije nima.

Kaj bo z nasledstvom kmetij, je trenutno že odprto vprašanje sodobnega časa. K boljšemu zanimanju mladih za kmetijstvo pripomorejo predvsem nove tehnologije v kmetijstvu, kot so robotika, sodobni kmetijski stroji, mehanizacija, digitalizacija in drugo, kar omogočajo lažje delo na kmetijah. Prav tako ne smemo izključiti dodeljevanja podpore države (Ministrstva za kmetijstvo, gozdarstvo in prehrano) iz Skupne kmetijske politike 2023-2027, katere strateški načrt je 28. 9. 2022 potrdila

Vlada Republike Slovenije, saj ta z denarnimi sredstvi omogoča mladim prevzemnikom lažji začetni zagon dejavnosti kmetije.



Slika 20: Ali imate naslednika kmetije?
Vir: Lasten vir, 2023

Hipoteza 1: Anketiranci (kmetije iz Osrednjeslovenske regije) vidijo dan odprtih vrat kot priložnost pri promociji kmetije. Hipoteza 1 je ovržena, saj več kot polovica anketiranih nima zanimanja za dneve odprtih vrat na svoji kmetiji, in sicer zaradi poseganja v njihov ritem na kmetiji, zaradi nespoštovanja obiskovalcev do dela na kmetiji, zaradi vznemirjanja živali ter uničevanja lastnine kmetije.

Hipoteza 2: V Osrednjeslovenski regiji se bo kmetijska panoga ohranila. Hipoteza 2 je potrjena. V Osrednjeslovenski regiji ima več kot polovica vprašanih naslednika na svoji kmetiji. Menimo, da z učinkovitim prenosom znanja in z zanimanjem mladih za kmetijstvo, s pridihom novih sodobnih tehnologij in z vplivom vplivnežev, ki promovirajo kmetijsko mehanizacijo in ustvarjajo na mlade vtis, lahko pričakujemo, da se bo kmetijstvo v Osrednjeslovenski regiji ohranilo.

Hipoteza 3: Trgovske verige predstavljajo za anketirance najpomembnejšo prodajno pot. Hipoteza 3 je ovržena. Glede na izsledke raziskave so trgovske verige anketirancem najmanj pomembne. Večji pomen za prodajo svojih produktov anketiranci dajejo neposredni prodaji na kmetiji in prodaji na tržnici.

7 Zaključek

7.1 Povzetek rezultatov

Družinske kmetije v Osrednjeslovenski regiji se v večji meri ukvarjajo z živinorejo, poljedelstvom ter zelenjadarstvom. Večina jih kmetuje na konvencionalen način. Svoje produkte v večji meri pridelajo zase in te tudi tržijo, saj jim je prodaja produktov pomembna zaradi zaslužka. Najbolj pomembne prodajne poti anketirancem predstavljajo tržnice ter prodaja neposredno na kmetijah. Predvsem si želijo prodajati svoje proizvode neposredno stranki na svojem domu, na svoji kmetiji. Večina anketiranih nima blagovne znamke za svoje produkte, kdor pa jo ima, opaža pozitiven učinek znamke, saj ta omogoča učinkovitejšo promocijo. Večina kmetij ima tudi interes po razširitvi dejavnosti na kmetiji. Več kot polovica vprašanih ne razmišlja o zaprtju kmetije in tudi več kot polovica izprašanih kmetij ima naslednike, ki bodo peljali tradicijo kmetije naprej.

Z raziskavo želimo vplivati na posameznike, naj kupujejo hrano lokalnih pridelovalcev. Vplivati želimo tudi na slovenske družinske kmetije, da se poskušajo bolj uveljaviti na trgu ali razširiti svojo dejavnost ter da svoje znanje in dolgoletne izkušnje prenašajo na potomce ter jih spodbudijo h kmetovanju. S tem se bo zagotovilo, da se kmetijstvo ohrani za prihodnje generacije in poveča samooskrba.

Prejeli smo manj odzivov na anketni vprašalnik, kot smo pričakovali. Zaradi trenutnih poplavnih razmer, ki so se zgodile, kmetije na severnem območju Osrednjeslovenske regije niso želele sodelovati, kar je povsem razumljivo. Po podatkih Statističnega urada Republike Slovenije je v Osrednjeslovenski regiji trenutno registriranih 7.540 kmetijskih gospodarstev. V želji, da bi za raziskavo zbrali čim več odgovorov za diskretno obravnavo članka, smo zasledili, da kontaktnih podatkov o 7.540 delujočih kmetijskih gospodarstev ni možno pridobiti na portalih na spletu, kjer nekatere kmetije svoje pridelke oglašujejo. Ugotavljamo, da so to male kmetije, ki kmetujejo in prodajajo svoje pridelke zadrugam, mesnicam in za to ne potrebujejo oglaševanja po spletu.

Članek je lahko povod za nadaljnjo raziskavo, da se v preostalih statističnih regijah v Sloveniji izdela podobna analiza o tem, kako družinske kmetije razmišljajo o sebi glede nasledstva in širitve dejavnosti, kako se promovirajo, in če imajo ambicije za

nadaljevanje svoje tradicije. Izdelane raziskave bi lahko nato med seboj primerjali na podlagi tega, kakšno je stanje samorefleksije, oziroma lastnega razmišljanja družinskih kmetij med regijami.

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SODELOVALNI MODELI V TRAJNOSTNO USMERJENI SKUPNOSTI

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Z družbenimi inovacijami lahko vzpostavljamo in zagotavljamo različne podjetniške in gospodarske rešitve, ki ustvarjajo vključujočo družbo. Zato smo v Etri skupini osredotočeni na takšne družbene inovacije, s katerimi dosegamo kakovost življenja vsakega posameznika ter s katerimi krepimo in spodbujamo aktivno vključevanje. Svoje delovanje združujemo v 5-ih krožnih zgodbah: Partnerstvo za vključujočo družbo, Mreža NVO za krožno gospodarstvo, Hrane ne mečemo stran, Make in Slovenija ter Flora Viva. Spodbujamo pristop sodelovanja na sopodjetniški način, ki omogoča prave rešitve ter vključene deležnike usmerja v prevzem odgovornosti za delovanje in prispevanje v dobrobit sebe in drugih in se kaže kot družbeni učinek. Pri tem predstavljajo skupnostne storitve temeljne gradnike trajnostne in vključujoče družbe, ki jih lahko uresničimo z aktivnim partnerskim in medsektorskim povezovanjem deležnikov.

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Ključne besede:
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1 Uvod

Posledice dolgožive družbe sprožajo pritisk na različne družbene sisteme. To ustvarja potrebo po družbenih inovacijah, ki bodo na eni strani zagotavljale ustrezne storitve za posameznika, na drugi strani pa učinkovitost in finančno vzdržnost celotne družbe. Z družbenimi inovacijami lahko vzpostavljamo in zagotavljamo različne podjetniške in gospodarske rešitve, ki ustvarjajo vključujočo družbo. Ta preskok za večji družbeni in okoljski učinek je danes prepotreben in nujen.

V Etri skupini smo usmerjeni v družbene inovacije, ki prinašajo drugačne medčloveške in družbene odnose. Vedno smo pozorni na posameznika in delo prilagajamo po meri človeka. Vključujočo družbo soustvarjamo z našo strategijo na dveh pomembnih področjih. Na eni strani je to zaveza za kakovost življenja za vsakega posameznika in boljša priložnost za delo, vseživljenjsko izobraževanje in ustvarjanje ter s tem bolj dostojen, varen in aktiven način življenja v zdravem in čistem okolju. Na drugi strani pa ustvarjamo in spodbujamo aktivno vključevanje svojih zaposlenih in drugih sodelavcev v demokratično odločanje in soupravljanje družbe. S tem posamezniku pomagamo, da spremeni svoje življenje na bolje, da je vključen v družbo, da dela in s tem prispeva tako k družbeni kot osebni rasti. Strategijo uresničujemo v okviru 5-ih krožnih zgodb: Partnerstvo za vključujočo družbo, Mreža NVO za krožno gospodarstvo, Hrane ne mečemo stran, Make in Slovenija ter Flora Viva.

V družbi lahko boljše življenje posameznika ter učinkovitejšo in trajnostno naravnano družbo zagotovimo z vzpostavitvijo skupnostnih storitev, ki izhajajo iz potreb vsakega posameznika. Vključujoča družba temelji na konceptu »družbe po meri človeka«, ustvarjanju sobivanja v skupnosti in ravnovesju v medgeneracijskem sobivanju, pri čemer predstavljajo skupnostne storitve ključne gradnike takšne družbe.

2 Vključujoča družba

Vključujoča družba temelji na načelih socialne pravičnosti tako posameznika kot skupin in ne razlikuje glede na starost, spol, narodnost, zmožnost, socialno-ekonomski položaj ali drugo značilnost (Lutfiyya in Bartlett, 2020). Koncept vključujoče družbe je večdimenzionalen in povezan s prikrajšanostjo posameznika. Temelji na potencialu in potrebah posameznika, ti pa ustvarjajo izhodišče za »družbo

po meri človeka« (Buckmaster in Thomas, 2009). V vključujoči družbi vsi sodelujejo z namenom ustvarjanja blaginje prebivalstva. Rezultat predstavlja močno, trdno in povezano skupnost, v kateri je posameznik motiviran za sodelovanje in participacijo v skupnosti (Van Gijzel , 2014),

2.1 Vključujoča skupnost

V vključujoči skupnosti lahko posameznik razvije občutek pripadnosti in je motiviran za aktivno participacijo. To pa zagotavlja dolgoročno in trajnostno pot za vzpostavitev skupnosti, ki bo temeljila na trajnostnem gospodarstvu (Kiyota et al., 2015). V vključujoči skupnosti imajo ključno vlogo trajnostne organizacije, ki pri odločanju upoštevajo interese deležnikov iz širšega okolja, se pri tem zavedajo vpliva svojih odločitev na okolje in družbo ter zasledujejo dolgoročno dobičkonosnost in družbeno blaginjo (Freeman, 2011).

V vključujoči skupnosti je pomembno sodelovanje in povezovanje, rešitve pa ustvarjajo posamezniki, na katere se problem navezuje. Povezovalno sodelovanje posamezniku omogoča biti raziskovalec prihodnosti, izhaja pa predvsem iz svojih potreb in interesov. V vključujoči skupnosti se mora vsak posameznik počutiti vključenega in imeti možnost sodelovanja in participacije v skupnosti (Van Gijzel , 2014).

Etri skupina predstavlja primer delovanja vključujoče organizacije v širšem družbenem smislu. Upošteva vidike trajnosti in krožnega gospodarstva ter človeka postavlja v središče delovanja. Etri skupina deluje po principu treh načel: ergonomije, etične ekonomije in ekologije. Etri poslovni model pa je osredotočen na zniževanje stroškov, sodelovanje, enakopravnost, inovativnost ter poklicno in družbeno integracijo ranljivih skupin (Props in Puh, 2018).

S pomočjo Etri načel se pri posamezniku in v družbi krepijo dostojanstvo, odgovornost, pravičnost ter preglednost in zanesljivost. Dostojanstvo je temelj delovanja vključujoče in trajnostne družbe, v kateri vsak posameznik najde svoje mesto, ki ga izpolnjuje in mu omogoča karierni in osebni razvoj. Za učinkovito delovanje v skupnosti je pomembna odgovornost do samega sebe, sočloveka, organizacije, lokalne skupnosti, okolja in kulturne dediščine, s čimer se prispeva k trajnostnemu razvoju organizacij, skupnosti in celotne družbi. Pravičnost temelji na odprtih in spoštljivih odnosih tako v organizaciji, skupnosti kot družbi. Za

preglednost in zanesljivost je pomembno spoštovanje zakonskih predpisov ter interesov deležnikov, s čimer se gradi konkurenčno trajnostno gospodarstvo ter vključujoča družba (Grintal in Puh, 2023).

2.2 Skupnostne storitve

Skupnostne storitve predstavljajo storitve, ki dopolnjujejo oskrbo, ki jo posamezniku omogoča in zagotavlja družina. Sem sodijo tako neposredna oskrba kot tudi nadzor, svetovanje, različna pomoč in podpora ter izvajanje sprememb v domačem okolju (Stone, 2011). Skupnostne storitve omogočajo posamezniku dostojno življenje ne glede na njegov finančni položaj, spol, starost, mesto bivanja ali kateri koli drug status (Grintal in Puh, 2023). Z vključevanjem v skupnostne storitve in s koriščenjem skupnostnih storitev posameznik občuti manjši fizični, finančni in čustveni napor ter višjo stopnjo zadovoljstva in kakovosti življenja (Schore et al., 2007).

Udejanjanje skupnostnih storitev je pogojeno z aktivnim partnerskim in medsektorskim povezovanjem različnih deležnikov, pri čemer so vse aktivnosti usmerjenje v ustvarjanje vključujoče družbe oz. »družbe po meri človeka«. Izhodišča skupnostnih storitev temeljijo na osnovnih psiholoških potrebah posameznika, pri čemer se upoštevajo načela pravičnosti, dostojanstva, odgovornosti, preglednosti in zanesljivosti (Grintal et al., 2023).

2.3 Merjenje družbenih učinkov

Agenda 2030 poziva vse akterje v gospodarstvu, naj prispevajo k trajnostnemu in vključujočemu razvoju. Ker si finančni in podjetniški sektor prizadevata načrtovati, izvajati in ocenjevati svoje strategije vpliva, so organizacije socialne solidarnostne ekonomije (SSE) pod vse večjim pritiskom, da družbi pokažejo svojo dodano vrednost. Zunanji donatorji in vlagatelji zahtevajo dokaze o tem, kako se uporabljajo viri in kakšni so rezultati. Javne politike, ki dajejo večji poudarek konkurenci pri javnih naročilih, izbiri uporabnikov in učinkovitosti, zahtevajo dodatno pozornost merjenju družbenega učinka (OECD, 2021).

Merjenje družbenega učinka se vse bolj razume kot sestavni del neopredmetene tržne infrastrukture, ki je potrebna ne le za usmerjanje ponudbe kapitala v trajnostne in odgovorne naložbene priložnosti, temveč tudi za združevanje in organiziranje povpraševanja v socialni in solidarnostni ekonomiji. Kljub znatnemu napredku in

vse večjemu mednarodnemu interesu za večjo usklajenost še ni splošno dogovorjenega pristopa za merjenje družbenega učinka. Obstaja več metodologij, ki pa niso nujno skladne in primerne za potrebe vseh organizacij. Pogosto uporabljene metode segajo od zbiranja povratnih informacij deležnikov do izvajanja celovitih ocen učinka, ki lahko vključujejo tudi vrednotenje denarne vrednosti. Raznolikost razpoložljivih orodij in virov je težko obvladljiva, zlasti za manjše ali manj izkušene subjekte (OECD, 2021). Je pa pomembno izpostaviti pomen merjenja družbenega učinka za socialno podjetje, saj merjenje pripomore k širjenju dobrih idej, k pozitivnim spremembam ter k izboljšanju slabše delujočih praks. Prepoznati ga je potrebno kot prizadevanje za ustvarjanje družbene vrednosti na sistemski, trajnostni in inovativen način (Taylor, 2021).

V Sloveniji je sprejeto, da z letom 2024 vsa registrirana socialna podjetja obvezno izvedejo merjenje družbenega učinka.

Prejšnje Ministrstvo za gospodarski razvoj in tehnologijo (2022) je predstavilo priporočen model merjenja, ki ga je oblikoval Inštitut za ekonomska raziskovanja. Model socialna podjetja usmerja in vodi skozi proces merjenja, jim pomaga opredeliti kazalnike in merske enote ter predvideti načine in aktivnosti za izboljšanje družbenih učinkov, ki jih ustvarjajo s svojim delovanjem. Čeprav obstajajo smernice, se mora na koncu vsako socialno podjetje odločiti, kako izbrati in razviti najprimernejšo strategijo merjenja družbenega učinka na podlagi svojih potreb in konteksta (OECD, 2021).

V Jazon d.o.o., ki je del Etri skupine, so bili leta 2014 kot prvemu v Sloveniji izmerjeni družbeni učinki po SROI metodi. To nefinančno poročilo je bila izredno pomembna osnova za pristop k investiranju in s tem k nadaljnjemu razvoju v letih, ko to področje še ni imelo prave vloge v družbi in gospodarstvu.

3 5 krožnih zgodb v Etri skupini

Krožne zgodbe so sodelovanja za trajnostno prihodnost. V krožnih zgodbah Etri skupine naslavljamo spremembo v družbi, produkt ali storitev, ki nastane v procesu sodelovanja med različnimi deležniki s skupnim ciljem ter usmerjenimi interesi, to je ustvariti spremembe v družbi na različnih trajnostnih področjih. V Etri skupino so vključeni strokovnjaki za socialno gerontologijo, kadrovski management,

agronomijo, okoljevarstvo, ekonomijo, živilsko tehnologijo, kineziologijo in podjetništvo.

V krožnih zgodbah delujemo po Etri načelih in predstavljamo izvedbo rešitve za prepoznan skupnostni oziroma družbeni izziv preko povezovanja, učenja in pilotiranja. Cilj krožnih zgodb je pri povezanih deležnikih ter v širši družbi ustvariti merljive družbene učinke in predstaviti smernice in priložnosti za ljudem in okolju prijazne spremembe delovanja. Končni rezultat krožne zgodbe je zastavljeni skupni cilj oziroma definicija rešitve za zastavljeni izziv.

5 krožnih zgodb Etri skupine so: Partnerstvo za vključujočo družbo, Mreža NVO za krožno gospodarstvo, Hrane ne mečemo stran, Make in Slovenija ter Flora Viva.

3.1 Partnerstvo za vključujočo družbo

Krožna zgodba Partnerstvo za vključujočo družbo naslavlja družbeno potrebo po gradnji vključujoče družbe za socialno izključene skupine v lokalnih skupnostih, z ustvarjanjem priložnosti in delovnih mest po meri človeka ter iskanja novih priložnosti za izvajanje družbene odgovornosti, povezovanja in sodelovanja za trajnostni razvoj. Osredotoča se na zmanjševanje predsodkov in stereotipnega razmišljanja. Uporablja se pristop medsektorskega povezovanja in razvoja skupnostnih storitev. Za osvajanje ključnih strokovnih znanj pri inovativnem in interdisciplinarnem iskanju se uporabljajo nove oblike sodelovanja za trajnostni razvoj in vključujočo družbo.

3.2 Mreža NVO za krožno gospodarstvo

Krožna zgodba Mreža NVO za krožno gospodarstvo povezuje nevladne organizacije na področju trajnostnega razvoja in krožnega gospodarstva. Glavni namen je spreminjanje navad potrošnika, družbe in gospodarstva v smeri krožnega gospodarstva in trajnostnega razvoja, ki se izvaja preko Akademije drug za drugega.

3.3 Hrane ne mečemo stran

Krožna zgodba Hrane ne mečemo stran se osredotoča na razvoj procesov v pridelavi in predelavi hrane ter porabi potencialnih presežkov. Delovanje v konkretnem prostoru, z opremo in znanjem, ki omogoča nove scenarije v verigi preskrbe s hrano

ter razvoj novih izdelkov iz sodelovalnega poslovnega modela. Iz hrane, ki najverjetneje ne bi prišla na prodajne police, se ustvarja nova vrednost, s tem pa priložnosti za nova delovna mesta ter grajenje vključujoče družbe.

Pomemben korak na tej krožni zgodbi smo dosegli z Mini tovarno, ki je uradno odprla svoja vrata 24. aprila 2023, s katero uresničujemo scenarije prerazporejanja presežkov hrane ter izvedbo programov ozaveščanja splošne in specifičnih javnosti o problematiki zavržene hrane. Mini tovarna je sprejemna točka za donirane presežke prehranskih pridelkov in izdelkov, z donacijo redno izvajamo raziskovalni pristop potencialov v treh smereh: na razvoju novih izdelkov, v »Food Waste Lab-u« ter v razvoju sodelovanja s humanitarnimi organizacijami za razdelitev pripravljene hrane med posameznike na način, da ohranjajo njihovo dostojanstvo. Njihov cilj je, da Mini tovarna prispeva ključno vlogo v prvem primeru trajnostne oskrbovalne verige brez odpadka.

3.4 Make in Slovenija

Krožna zgodba Make in Slovenija je promotor tradicije, trajnosti in družbene odgovornosti v slovenskem modnem sektorju in drugih tradicionalnih industrijah. Spodbuja odgovorno nabavo in proizvodnjo z vgrajeno trajnostjo v sisteme, organizacije in posameznike ter spodbuja in privablja samostojne blagovne znamke, start-upe in kreativce, da proizvajajo v Sloveniji in izkoristijo znanje, ki ga imajo slovenska podjetja.

3.5 Flora Viva

S krožno zgodbo Flora Viva se na prvo mesto postavlja naravo in skrb za biodiverziteto. Tako smo osredotočeni na dvig ravni znanja in kompetenc zaposlenih ter na razvoj dejavnosti na področju semenarjenja, omejevanja razraščanja invazivnih rastlin in zaraščanja habitatnih rastlin, prav tako pa smo osredotočeni na pretvorbo odpadne biomase invazivnih rastlin v sekundarno surovino, ki se lahko učinkovito uporabi v krožnem gospodarstvu.

4 Zaključek

Dolgoživa družba narekuje potrebo po oblikovanju učinkovitih in finančno vzdržnih družbenih sistemov. Ti naj temeljijo na konceptu vključujoče družbe, v kateri se storitve oblikujejo glede na potrebe vsakega posameznika. V takšni družbi ustvarjamo pogoje za boljšo kakovost življenja in družbeno blaginjo. Skupnostne storitve predstavljajo v »družbi po meri človeka« temeljne gradnike trajnostne in vključujoče družbe, uresničimo pa jih lahko le z aktivnim partnerskim in medsektorskim povezovanjem različnih deležnikov.

Z izkušnjami v Etri skupini bomo v prihodnje gradili pristop sodelovanja na sopodjetniški način, ki bo tako investitorjem kot podjetnikom že na samem začetku omogočal pravilno smer idej, produktov, storitev in rešitev. Vsi vključeni v sodelovanje bodo tako prevzeli odgovornost, da bodo delovali in prispevali v dobrobit sebe in drugih.

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O avtoricah

Barbara Grintal je docentka socialne gerontologije na Alma Mater Europaea. Njeno delo se osredotoča na raziskovanje s področij digitalne pismenosti, ekonomskega položaja, delovne aktivnosti in socialne vključenosti starejših ljudi, aktivnega staranja ter novih modelov delovanja v dolgoživi družbi.

Lenka Puh je družbeno odgovorna podjetnica in družbena inovatorka, ki v ospredje svojega delovanja postavlja humanizacijo delovnih mest ter delo kot osnovno človekovo potrebo in pravico, zato zaposluje tudi ranljive skupine in invalide.

PRILAGOJENOST TURISTIČNIH KMETIJ GIBALNO OVIRANIM OSEBAM

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Turizem na deželi se je skozi leta vse bolj razvijal, prilagajal se je potrebam in željam gostov. V današnjem času se vse bolj zavedamo, da moramo prilagajati turistične kmetije in ostale turistične točke različnim ciljnim skupinam, ena izmed njih so tudi gibalno ovirane osebe. Zaradi svojih omejitev so marsikdaj prikrajšane za določene izkušnje in doživetja. S tem namenom smo se odločili preveriti pripravljenost turističnih kmetij na prihod gostov z omejitvami. Izvedli smo raziskavo o prilagojenosti kmetij gibalno oviranim osebam na območju Dolenjske in Bele krajine, pri čemer se je pokazalo, da večina turističnih kmetij nima urejenih prostorov in prilagojene ponudbe, kar je bistvenega pomena pri vključevanju gibalno oviranih oseb v aktivnosti turističnih kmetij in bivanje. Se pa turistični ponudniki zavedajo, da bodo morali v prihodnje svojo ponudbo prilagoditi tudi gibalno oviranim osebam, pri čemer bi bile potrebne finančne spodbude države Slovenije, ki je po svoji dostopnosti označena kot država, prijazna za invalide.

Ključne besede:
turistične kmetije,
gibalno ovirane osebe,
prilagoditve,
povpraševanje,
prilagojena kmetija

Univerzitetna založba
Univerze v Mariboru

1 Uvod

V preteklosti so bile počitnice dostopne le najbogatejšim prebivalcem iz mest, danes pa predstavlja preživljanje prostega časa na kmetijah zanimiv in poučen način oddiha. Turizem na kmetijah je v današnjem času zelo priljubljena dejavnost, zato lahko v Sloveniji opažamo rast turističnih kmetij. Med seboj se razlikujejo predvsem po ponudbi in dejavnostih, ki jih na kmetijah omogočajo. Nekatere imajo poudarek na ponudbi kulinarike in vin, spet druge na rekreativnih in animacijskih dejavnostih. Cilj turističnih kmetij je gostom ponuditi doma pridelano hrano, nastanitvene kapacitete ter približati prvobitno naravo in gostoljubje na pristen, poučen način. Njihova ponudba je odvisna od lege kmetije in okolja, v katerem se nahaja, pri čemer gre za pestro, raznoliko in avtentično ponudbo. Prav je, da so počitnice omogočene in dostopne vsem, pri tem pa ugotavljamo, da so določene osebe pri tem resno ovirane.

Osnovno izhodišče pri obravnavi dostopnega turizma je potreba ljudi, ki živijo z eno od invalidnosti, po razvedrilu, rekreaciji, druženju, rehabilitaciji in vključevanju v družbo. Že Splošna deklaracija o človekovih pravicah, sprejeta leta 1948, govori o pravici do svobodnega gibanja, počitka in prostega časa, kar omogoča vsem skupinam gibalno oviranih oseb, da lahko funkcionalno in neodvisno, pravično in z dostojanstvom koristijo turistične produkte. Ko govorimo o začetkih »turizma za vse« v Sloveniji, ne moremo mimo invalidskih društev in zvez, ki omogočajo letovanje posameznikom in skupinam v svojih počitniških objektih in tudi rehabilitacije v zdraviliščih. Nevladne organizacije so bile pomemben dejavnik, ki je dostopni turizem približal slovenskim turističnim ponudnikom. Tudi Slovenska turistična organizacija si vedno bolj prizadeva v slovenskem in mednarodnem prostoru uveljaviti Slovenijo kot dostopno, urejeno, prijazno, ekološko in zanimivo destinacijo (Žnidaršič, 2020, str. 2)

V našem prispevku se osredotočamo na prilagojenost turističnih kmetij za gibalno ovirane osebe, kar se nanaša na dostopnost objektov, prilagojenost nastanitev, prevozne možnosti in druge storitve, ki omogočajo gibalno oviranim osebam prijetno in udobno bivanje na turističnih kmetijah. To je pomemben korak k zagotavljanju enakih možnosti za vse goste, zato smo na območju Dolenjske in Bele krajine izvedli raziskavo in preverili, kako so kmetije pripravljene na prihod te

ranljive skupine gostov, ki potrebuje določene prilagoditve, da lahko doživi celostno izkušnjo.

2 Teoretično raziskovanje

2.1 Vloga turističnih kmetij na podeželju

Turizem na kmetijah je specifična oblika turizma, katerega glavni namen je "vrnitev k naravi", torej na podeželje. Hkrati pa moramo ponovno razmisliti tudi o pomembnosti podeželskega turizma za skupnost, kajti namen podeželskega turizma je zagotoviti, da se turizem razvija znotraj skupnosti, saj podpira tri področja: gospodarstvo, okolje in kulturo. Pomembno je, da se gospodarski razvoj podeželskega turizma osredotoča na upoštevanje trajnostnega razvoja, varstva okolja in na omejeno poseganje v naravno dediščino podeželja. Zagotavljanje avtentičnosti kulturne dediščine podeželja je ključno za promoviranje podeželskega turizma, saj vse več turistov stremi k avtentičnemu preživljanju oddiha. Prav podeželski turizem predstavlja za skupnost sredstvo gospodarskega razvoja, ki prinaša nove priložnosti za priliv dodatnega kapitala, možnost novih zaposlitev ter deluje kot spodbuda za razvoj kraja in za podjetništvo prebivalcev. Republika Slovenija z zakoni in pravilniki določa podlago za odprtje in obratovanje turističnih kmetij. Na državnem portalu za poslovne subjekte (https://spot.gov.si/sl/dejavnosti-in-poklici/dejavnosti/turisticna-kmetija-z-nastanitvijo/) dobimo sledečo definicijo turistične kmetije in njenega obratovanja: «Dejavnost turistične kmetije z nastanitvijo se opravlja kot dopolnilna dejavnost turizem na kmetiji, ki je gostinska dejavnost in jo opravlja kmet na svoji kmetiji. Za opravljanje gostinske dejavnosti je potrebna registracija živilskega obrata pri Upravi za varno hrano, veterinarstvo in varstvo rastlin. Prostori, namenjeni opravljanju dopolnilne dejavnosti turistična kmetija z nastanitvijo, morajo biti urejeni v objektih, ki jih ima nosilec kmetije ali člani kmetije, na kateri se opravlja kmetijska dejavnost, v lasti, najmanj desetletnem najemu ali ima na njej vpisano stavbno pravico za najmanj deset let.« (SPOT, 2023).

Turističnih kmetij na Jugovzhodu Slovenije je kar nekaj. Vendar jih je le 10 z nastanitvijo, 11 je izletniških, 2 delujeta kot vinotoča, 1 nudi prostor za kampiranje, ni pa nobene osmice ali domače delikatese, kot je razvidno iz evidenc Združenja Turističnih kmetij Slovenija (Združenje turističnih kmetij Slovenija, 2023). Za potrebe raziskave smo se obrnili na splošno spletno iskanje, kjer smo našli primeren

vzorec za raziskavo, saj naš raziskovani prostor predstavlja območje Dolenjske in Bele krajine, in ne celotni Jugovzhodni del Slovenije. To iskanje je bilo produktivno in odkritih je bilo 30 kmetij, kasnejših anketirancev.

Podeželski turizem je še posebej pomemben v državah v razvoju, kjer so kmetijska zemljišča zaradi rasti prebivalstva razdrobljena. Napredek, ki ga podeželski turizem lahko zagotavlja revnim gospodinjstvom, ustvarja dodatne možnosti za razvoj. V razvitih državah pa podeželski turizem obstaja v obliki zagotavljanja nastanitev na slikovitih lokacijah, idealnih za počitek in sprostitev. Najpomembnejše lastnosti podeželskega turizma so: (1) mirno okolje, (2) odsotnost hrupa, (3) ohranjeno okolje, (4) komunikacija z gostitelji, (5) domača hrana in (6) spoznavanje kmečkih opravil (Obajdin, 2014).

2.1.1 Upad turističnih kmetij v Sloveniji

Da turizem na kmetijah, ki se ukvarjajo z gostinsko dejavnostjo, upada, lahko razberemo iz raziskave, ki jo je izvedla Kmetijsko gozdarska zbornica Slovenije (chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.kgzs.si/uploads/dokumenti/strokovna_gradiva/analiza_dopolnilnih_dejavnosti.pdf), kar je predstavljeno v Tabeli 1. Medtem ko znotraj posamezne dejavnosti sam upad števila turističnih kmetij ni drastičen, pa je skupni seštevek kmetij, ki so prenehale z gostinsko dejavnostjo, v skupno vseh štirih navedenih dejavnostih 95. Z drugimi besedami, v Sloveniji je v štirih letih 95 kmetij prenehalo s turistično dejavnostjo. Rezultat te analize se nanaša na štiriletno obdobje, kar je verodostojen pokazatelj za upad turizma na kmetijah, ki se ukvarjajo z gostinsko dejavnostjo.

Tabela 1 Turizem na kmetiji, ki se ukvarja z gostinsko dejavnostjo

	28. 12. 2018	1. 1. 2015
Izletniška kmetija	479	500
Turistčna kemtija z nastanitvijo	468	490
Vinotoč	95	141
Osmica	32	38

Vir: KGZS, 2018

Pod turizem na kmetiji pa ne sodi le gostinska dejavnost, temveč tudi negostinska. V Tabeli 2 lahko vidimo, da se trendi spreminjajo, ne prihaja namreč do upada dejavnosti, temveč do njenega povečevanja ali celo do ustvarjanja novih tržnih niš. V tem štiriletnem obdobju, ki je zajeto za obdelavo teh podatkov, vidimo, da so se na novo pojavili muzeji in tematske zbirke, tematski parki, apiturizem ter športni ribolov na vodnih površinah na kmetiji.

Tabela 2 Turizem na kmetiji, ki se ne ukvarja z gostinsko dejavnostjo

	28. 12. 2018	1. 1. 2015*
Oddajanje površin za piknike	230	187
Ježa živali	120	104
Prevoz potnikov z vprežnimi vouili in traktorji	102	57
Muzeji in tematske zbirke	53	
Tematski parki	32	
Apiturizem	31	
Športni ribolov na vodnih površinah na kmetiji	1	

Vir: KGZS, 2018

2.2 Gibalno ovirane osebe

Med gibalno ovirane osebe spadajo ljudje, ki uporabljajo invalidski voziček ali imajo druge težave pri gibanju. Gibalno ovirane osebe so najbolj vidne med vsemi skupinami, saj si pri svojih težavah pogosto pomagajo s pripomočki, kot so vozički, palice, bergle, hojice idr. Njihove potrebe so tesno povezane z grajenim okoljem, kjer se srečujejo z največjimi težavami (Laura, 2010). Gibalno ovirane osebe delimo na lažje, zmerno, težje in najtežje gibalno ovirane. Lažje gibalno ovirane osebe so pri gibanju samostojne, potrebujejo le lažje prilagoditve in niso odvisne od pripomočkov. Zmerno gibalno ovirane osebe občasno potrebujejo fizično pomoč in imajo težave pri hoji po neravnem terenu in stopnicah. Težje gibalno ovirane osebe so pri gibanju odvisne od drugih oseb. Najtežje gibalno ovirane osebe pa imajo zelo hude motnje gibanja, ki povzročajo popolno funkcionalno odvisnost (Svetina, 2007, str. 12). Celotna infrastruktura določene destinacije mora biti prilagojena potrebam gibalno oviranih oseb. Pri gibalno oviranih osebah so največji problem ovire v grajenem okolju. Delimo jih na dve vrsti, in sicer na ovire pri obvladovanju zunanjega okolja in na ovire pri obvladovanju notranjega prostora, tu so mišljene arhitekturne ovire. Z grajenimi ovirami se posamezniki srečujejo na cestah in drugih javnih površinah. Med grajene ovire v notranjem okolju sodijo arhitekturne ovire, ki onemogočajo gibalno ovirani osebi dostop do zgradbe, njeno uporabo pa otežujejo

ali onemogočijo. Med mnoge ovire sodijo preozka, pretežka ali vrtljiva vrata , stopnice idr. Pri odpravljanju grajenih in arhitekturnih ovir je potrebno razlikovati, za koga gre in kje. Najboljša možnost je oblikovanje univerzalne rešitve, kjer bo okolje dostopno za vse. Dostopnost je močno povezana s prostornostjo in je zato pomemben dejavnik pri izgradnji okolja brez ovir (Vovk, 1989).

V nadaljevanju predstavljamo prilagojeno ponudbo pri posameznih ponudnikih za gibalno ovirane osebe, in sicer:

- **Nastanitev:** Za gibalno ovirane osebe priporočajo sobe v pritličju oz. čim bližje vsem skupnim prostorom. V nasprotnem primeru mora biti dostop do sobe popolnoma prilagojen. Sobe morajo imeti dovolj široka vrata, kljuke vrat morajo biti večje in postavljene nižje kot običajno. Zaradi varnosti je pomembno, da je čim več nastanitvenih kapacitet za osebe s posebnimi potrebami v pritličju.
- **Kopalnice in sanitarije:** Velikost toaletnih prostorov mora biti večja kot običajno, saj mora omogočati vstop in gibanje invalidni osebi na vozičku ter njenemu morebitnemu spremljevalcu. Pomembno je tudi, da so tuši brez kabin. Sanitarije naj bodo opremljene čim bolj enostavno (ročne pipe, ročna stikala za prižiganje in ugašanje luči na višini, ki je dosegljiva tudi za osebe na vozičku). Notranja oprema v objektih naj bo brez ostrih robov ter predmetov, kjer bi lahko prišlo do poškodb.
- **Bivalni prostori**: V spalnici je pomembno, da je postelja višja in širša kot običajno ter da je okoli nje dovolj prostora za gibanje invalidne osebe.
- **Restavracija in drugi prostori v objektu**: Dostop do restavracije mora biti prav tako kot vse zgoraj predstavljeno prilagojen za potrebe gibalno oviranih oseb.
- **Izhod v sili**: Osebje mora biti usposobljeno za evakuacijo invalidov iz prostorov. Zato je priporočljivo, da so varnostniki objekta seznanjeni s prostori in številkami sob, v katerih so nastanjeni invalidi. Prav zato bi bilo s stališča varnosti dobro, da je invalidom na razpolago čim več sob v pritličju, posebej v primeru požara, saj takrat v zgradbi pogosto blokirajo dvigala z vozičkom in tako invalidna oseba ne mora priti po stopnicah iz enega nadstropja v drugega.
- **Recepcija**: V recepciji mora biti delovni pult nižji od običajnega, zaradi lažje komunikacije invalidnih oseb z osebjem, prav tako pa mora biti na voljo

primeren sedež za tiste, ki sicer ne uporabljajo invalidskega vozička, potrebujejo pa kljub temu pozornost in udobje (Svetina, 2007, str. 12).

- **Dostopnost**: povezana je z izzivi, ki se nanašajo na to, ali je mogoč fizični dostop do nastanitvenih možnostih in ali je enostavno uporabljati in uživati turistične vire, prisotne na področju, kjer se nastanitveni objekt nahaja (Nacionalno turistično združenje - Slovenija, 2011, str. 3).

2.2.1 Načini prilagajanja ponudbe ljudem s posebnimi potrebami

Obstaja več pogojev, kje vse se mora turistična ponudba prilagoditi osebam s posebnimi potrebami, da bi jim lahko zagotovili ugodno bivanje ali obisk na določeni turistični točki. V nadaljevanju te kriterije tudi predstavljamo (Nacionalno turistično združenje - Slovenija, 2011, str. 3):

- **Prilagojenost infrastrukture**: to je predpogoj za izvajanje turistične dejavnosti. Najpogosteje se prilagojenost infrastrukture kaže v povezavi z okoljem namestitve osebe - lokacija, bližina storitve idr. (Cameron, Darcy & Foggin, 2003, str. 16).
- **Dostopnost informacij**: dovolj natančne in podrobne informacije so osnovna zahteva vsakogar, ki želi imeti prijetne in varne počitnice. Informacije o dostopnosti morajo biti ljudem s posebnimi potrebami lahko dosegljive in dostopne (Westcott, 2004, str. 8).
- **Znanje zaposlenih**: delo z invalidi zahteva specifično znanje ter veščine, zato bodo morala tista turistična podjetja, ki se srečujejo z invalidi, svoje zaposlene nujno seznaniti z različnimi oblikami invalidnosti ter jih primerno usposobiti (Nacionalno turistično združenje - Slovenija, 2011, str. 51).
- **Ekonomska dostopnost**: kupna moč gostov s posebnimi potrebami ni nujno drugačna od kupne moči ostalih gostov. Razumeti je potrebno dejstvo, da imajo invalidne osebe pogosto dodatne stroške zaradi izzivov, povezanih z dostopnostjo in s potrebo po pomoči - osebna asistenca idr. (Nacionalno turistično združenje - Slovenija, 2011, str. 4).

2.3 Integriran produkt dostopnega turizma

Dostopni turizem je usmerjen v osebe, ki jim je turizem iz zdravstvenih in drugih razlogov težje dostopen, to so predvsem gibalno in senzorno ovirane osebe, osebe z intelektualnimi in psihičnimi ovirami, starostniki, tisti, ki potujejo z otroki in imajo otroške vozičke ipd. Osnova za raziskovalni članek, ki preučuje prilagojenost turističnih kmetij gibalno oviranim osebam, so že izvedeni projekti in natečaji, ki jih izvajajo različne inštitucije samostojno ali povezane v skupni projekt. Eden izmed primerov dobre prakse na območju Slovenije je razvit integriran produkt dostopnega turizma, ki povezuje kulturno in naravno dediščino ter znamenitosti iz širšega območja (območje LAS Notranjske, LAS Zgornje Savinjske in Šaleške doline, LAS Med Snežnikom in Nanosom, LAS V objemu sonca, LAS Zasavje in LAS Po poteh dediščine od Turjaka do Kolpe) in je predstavljen z novimi tehnologijami. Predstavlja povečanje vključenosti ranljivih skupin v turistično ponudbo s skupno promocijo novih integriranih produktov in tudi na ta način pripomore k povečani prepoznavnosti LAS območij, ki prispevajo k osveščanju o pomenu kulturne in naravne dediščine ter ohranjanju le-te in poudarjajo potrebo po humanizaciji tehnologije. S tem prispevajo k prilagoditvam gibalno oviranih oseb ne le pri dejavnostih na turističnih kmetijah, temveč tudi pri dostopnosti kulturne dediščine in naravnih znamenitosti ranljivim skupinam.

Z namenom, da bi ranljive skupine lažje vključili v turistično ponudbo, prihaja do procesov, ki se izvajajo s skupno promocijo novih integriranih produktov in povečujejo prepoznavnosti posameznih območji. Žaberl (2013, str. 25) meni, da je za uspeh turizma potrebno osvojiti osnovno znanje o dostopnem turizmu, za kar pa lahko rečemo, da ni vedno tako. Tovrstno pomanjkljivost bo moč odpraviti z večjo osveščenostjo in z usposabljanjem lokalnega prebivalstva

2.3.1 Turizem za vse

Izraz »turizem za vse« se pogosteje uporablja, zlasti v socialnem kontekstu, namreč kot stališče, ki poudarja potrebe po počitnicah tudi za nižje dohodkovne skupine, včasih pa kot ožji, specifičen vidik, ki se osredotoča na potrebe gibalno oviranih turistov. Da bi se izognili nesoglasjem, ko se govori o dostopnosti in aktivnosti turizma v zvezi z invalidi, se je izoblikoval izraz »turizem za vse« (Leidner, 2006). Leidner v delu »Tourism accesssible for all in Europe« opozarja, da cilj dostopnega

turizma za vse ni ustvarjanje ločenih storitev za invalidne osebe, pač pa je cilj tega turizma enakopravna vključitev ljudi s posebnimi potrebami, zlasti invalidov in starejših oseb, v turistični sektor. Dolgoročn cilj tega turizma je vzpostavitev turističnega okolja, v katerem lahko vsi turisti aktivno sodelujejo ne glede na njihove individualne potrebe (starost, sposobnosti idr.).

Glede na to, da obstajajo številne definicije o dostopnem turizmu, pa v literaturi najpogosteje zasledimo definicijo, ki sta jo zapisala Darcy in Dickson. Menita, da dostopni turizem ni samo zagotavljanje dostopnosti invalidnim osebam, ampak tudi ustvarjanje vsestranskih turističnih produktov, ki so lahko dostopni in uporabni brez ovir za invalidne ljudi, družine z otroki in starostnike in ki na ta način ustvarjajo varno delovno okolje za zaposlene (Buhalis, Darcy &Ambrose, 2012). Za doseganje ciljev dostopnega turizma mora biti vsa storitvena veriga dostopna vsem. To pomeni, da morajo biti vse informacije o destinaciji, ponudbi, dogodkih in možnostih, da pridemo tja, dostopne tudi osebam s posebnimi potrebami. Informacije morajo biti prilagojene tudi za osebe, ki so slepe ali slabovidne (Leidner, 2006).

Ko zasledimo temo »turizem za vsakogar«, imamo v mislih tisto vrsto turizma, ki bi bila prijetna tudi za ljudi s posebnimi potrebami. V ta namen si številne organizacije prizadevajo za boljše in pravičnejše obravnavanje invalidov tudi na področju turizma. Z dostopnim turizmom se zavzemajo za ponudbo storitev in zmogljivosti, ki omogočajo osebam s posebnimi potrebami, da uživajo počitnice in preživljanje prostega časa brez posebnih ovir ali težav. Potrebno pa je poudariti, da dostopni turizem ni zgolj turizem za invalidne osebe, ampak je namenjen vsem, tudi osebam, ki nimajo npr. gibalnih ali vidnih težav (Vrečko, 2013).

3 Hipoteze in metodologija

Za pripravo prispevka smo zastavili naslednje hipoteze:

H1: Na območju Dolenjske in Bele krajine so se turistične kmetije v ponudbi pripravljene prilagoditi potrebam za gibalno ovirane osebe.

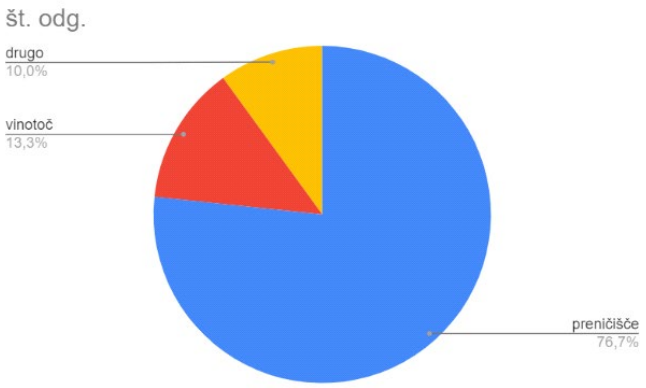
H2: Turistične kmetije na območju Dolenjske in Bele krajine bi za prilagoditev potrebam za gibalno ovirane osebe potrebovale finančne spodbude države.

Temo smo obdelali s pomočjo strokovne literature, spletnih virov in z anketiranjem lastnikov dopolnilne dejavnosti na turističnih kmetijah. 29. 8. 2023 smo izvedli raziskavo, v okviru katere smo anketirali 30 turističnih kmetij z različnimi osrednjimi dejavnostmi. Razlog za začetek in konec anketiranja na isti dan je v tem, da smo vse anketirance poklicali po telefonu. Predhodno jim je bil poslan anketni vprašalnik, vendar smo se zaradi premajhnega odziva odločili, da pokličemo na vsako turistično kmetijo in skupaj z nosilcem kmetije izpolnimo anketni vprašalnik. Vseboval je 11 vprašanj, izmed katerih so bila 3 namenjena demografskim podatkom anketiranih (ime oz. domače ime, naslov kmetije oz. lokacija, kdaj je bila ustanovljena, dejavnost turistične kmetije). Ostalih 9 vprašanj je bilo namenjenih preverjanju odnosa anketiranih oseb do možnosti prilagoditve poslopij za gibalno ovirane osebe.

4 Raziskava

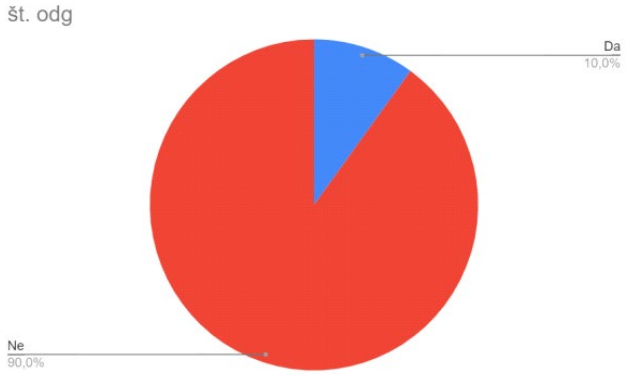
Prilagoditve turističnih kmetij gibalno oviranim osebam so v zadnjem času večje, vendar se pojavi vprašanje, ali je povečanje tovrstnih prilagoditev dovolj pogosto, da osebe z omejeno mobilnostjo ne bodo primorane iskati nastanitve, obrata oziroma poslopja dlje časa, saj le-ta niso posebej in točkovno oglaševana. Velik delež turističnih kmetij se osredotoča na ponudbo hišne hrane ali pa je njihov glavni fokus nastanitev. V raziskavi smo se osredotočili na turistične kmetije na območju Dolenjske in Bele krajine, pri čemer želimo izpostaviti, da je nekaj turističnih kmetij na tem prostoru v času epidemije koronavirusa (SARS-CoV-2) zaradi širših družbenih in globalnih razsežnosti zaprlo svojo dejavnost, nekateri pa niso želeli sodelovati v raziskavi, zato je vzorec kmetij majhen.

Prvi del ankete je demografski in vsebuje tudi del raziskave, ki se nanaša na podatke o tem, v kakšnem stanju so trenutno turistične kmetije na območju Dolenjske in Bele krajine. Velik delež turističnih kmetij ima nočitvene kapacitete, od 30 anketiranih jih je kar 23, ki delujejo kot kmetijski obrati z dopolnilno dejavnostjo, kar predstavlja 76,7 %. Dejavnost vinotoča ima registriranih 13,3 % kmetij, 10,0 % vprašanih pa je odgovorilo, da imajo registrirano neko drugo obliko dopolnilne dejavnosti. Pod odgovor drugo spada kombinacija dveh dejavnosti ali pa ponudba hišne, lokalne hrane, kot manjši lokalni market, z izključno domačimi pridelki iz okolice, kar je razvidno iz slike 1, ki ponazarja odgovore na vprašanje glede dejavnosti turistične kmetije.



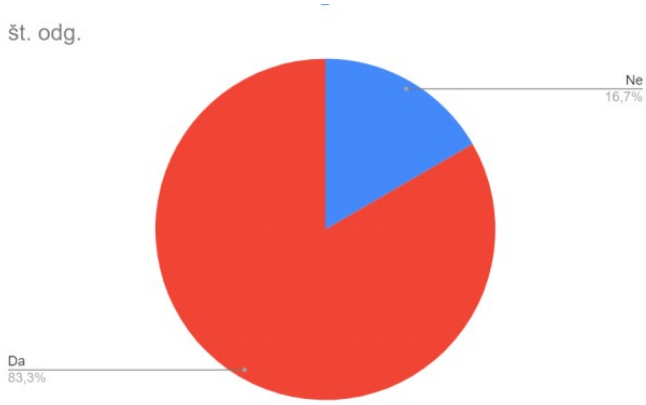
Slika 1: Dejavnosti na kmetiji
Vir: lasten.

Pri vprašanju št. 2.1 nas je zanimalo, ali imajo na kmetijah prilagoditve za gibalno ovirane osebe, kot npr. toaletne prostore, prilagojene gibalno oviranim osebam, parkirišče, dostop oziroma vhod, dostop do preostalih struktur kmetije (npr. jedilnica in prenočišče, če nista v isti stavbi idr.). Pri vprašanju, ali je kmetija dostopna gibalno oviranim osebam na način, da omogoča toaletni prostor, prilagojen invalidom, je 10,0 % (3 osebe) na to vprašanje odgovorilo z da, medtem ko je preostalih 27 odgovorilo z ne. To ponazarja slika 2.



Slika 2: Toaletni prostori, primerni za gibalno ovirane osebe?
Vir: lasten.

Na vprašanje 2.2, ali je parkirišče dostopno gibalno oviranim osebam, smo anketirancem pojasnili, da imamo v mislih asfaltirano ali tlakovano pot, saj so tovrstne poti najbolj primerne za dostop z invalidskim vozičkom in hoduljami. 5 anketiranih je odgovorilo, da nimajo takšnega dvorišča, torej popolnoma peščeno ali makadamsko-pesek in zemlja. Medtem pa je 25 anketirancev oziroma 83,3 % odgovorilo, da imajo ali asfaltirano ali tlakovano parkirišče, kar je razvidno iz slike 3.

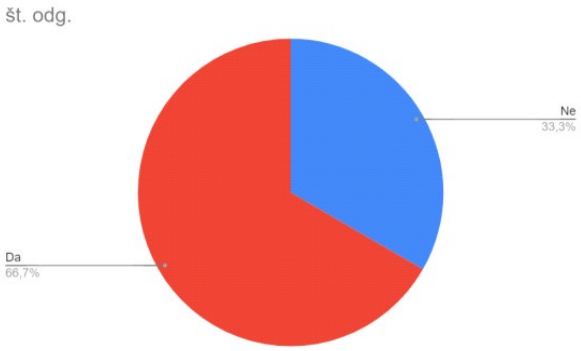


Slika 3: Primerno dvorišče?
Vir: lasten.

Vprašanje številka 2.3 sprašuje anketirance po dostopnosti glavnega objekta. S tem smo bili osredotočeni predvsem na prag vrat, zastavili pa smo si tudi vprašanje, ali vodi do teh vrat kakšna stopnica. Velikokrat imajo možnost postavitve rampe čez ali ob stopnicah, vendar se ob tem pozabi na prag, ki ga povzročijo določeni okvirji vrat. Tukaj smo dobili odgovor, da jih 50 % ima to prilagoditev, medtem ko 50 % ne, kar prikazuje slika 4.

Slika 4: Dostopnost pri vhodu
Vir: lasten.

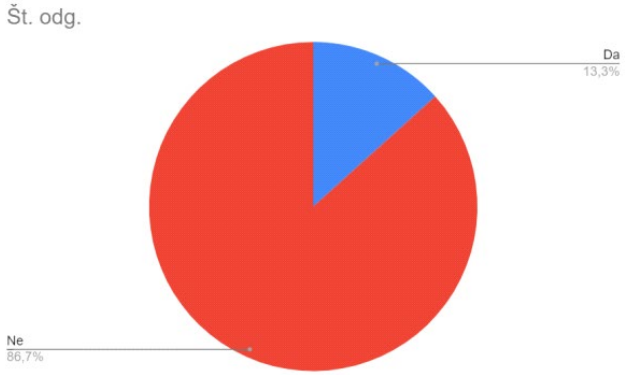
Na vprašanje 2.4, ali so gibalno oviranim osebam dostopni tudi preostali objekti oziroma strukture turistične kmetije, je 10 anketirancev odgovorilo z ne, 20 od 30 pa z da, kar predstavlja 66,7 % anketiranih turističnih kmetij. Pri tem vprašanju smo se posebej osredotočili na to, ali imajo restavracijo oziroma jedilnico in spalne prostore v dveh ločenih stavbah ali pa tudi kakšne druge prostore, kot so npr. telovadnica, recepcija, savna, fitnes idr. Odgovor na to vprašanje je ponazorjen s sliko 5.



Slika 5: Dostop do preostalih struktur kmetije
Vir: lasten.

2.5 vprašanje se nanaša na še preostale prilagoditve turistične kmetije, kot so npr. širok dostop do sobe, ročka pri kopalni kadi ter dvigalo, ali so le stopnice oz. če preostali del objekta ni dostopen klasično ali ni v istem nadstropju. Tukaj so se le 4

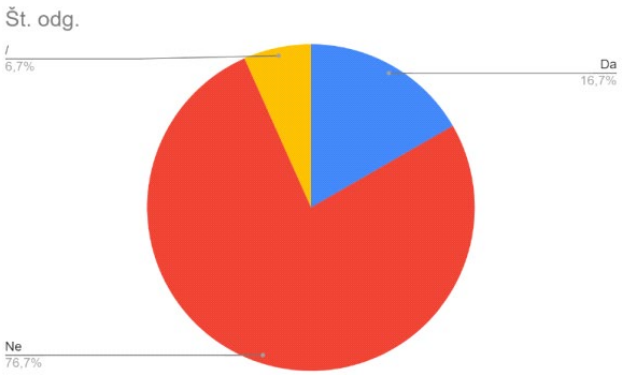
nosilci kmetij od 30, torej slabih 13,3 %, opredelili z da, preostalih 26, torej 86, 7 % pa z ne, kar je prikazano na sliki 6.



Slika 6: Preostale prilagoditve
Vir: lasten.

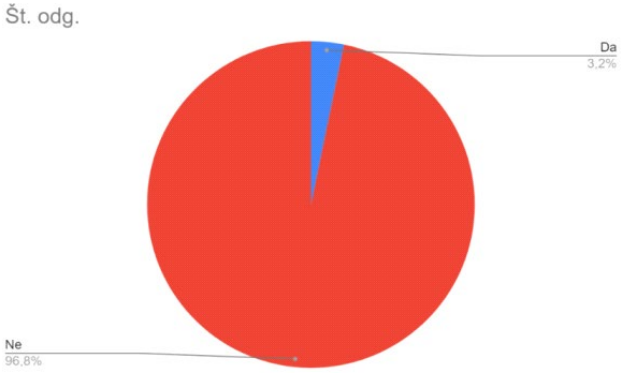
V drugem delu ankete, ki se nanaša na splošno stanje pripravljenosti turistične kmetije, da se s ponudbo prilagodi gibalno oviranim osebam, smo raziskali, v kolikor so se nosilci odločili za prilagoditve, na podlagi česa so se odločili, da storijo ta korak. Večina anketirancev je odgovorila, da so bile turistične kmetije zgrajene tako, da imajo npr. dovolj široko parkirišče, da omogočijo gibalno oviranim osebam invalidsko parkirišče. Nekatere kmetije pa so se odločile na podlagi sprotnega povpraševanja, da se temu prilagodijo. Velja opozoriti, da se je 15 od 30 turističnih kmetij iz tega vprašalnika začelo ukvarjati s turistično dejavnostjo že pred letom 2000, 1 od teh kmetij pa je aktivna že od leta 1841.

Vprašanje številka 3 se je glasilo, ali je bila prilagoditev odziv na pobudo o ozaveščanju gibalno oviranih oseb. Večina anketiranih, torej 76,7 %, jih je odgovorila z ne, kar predstavlja 23 odgovorov, vendar so med njimi tudi posamezniki, ki so odgovorili, da je bila osnova lastna zainteresiranost, ta del predstavlja 16,7 % oziroma 5 odgovorov, da prilagodijo turistično kmetijo vsem, ker se zavedajo pomembnosti samih prilagoditev. Majhen delček diagrama, 6,7 % oziroma 2 odgovora, pa so prispevale kmetije, ki so bile pri tem odgovoru neopredeljene, kar je prikazano na sliki 7.



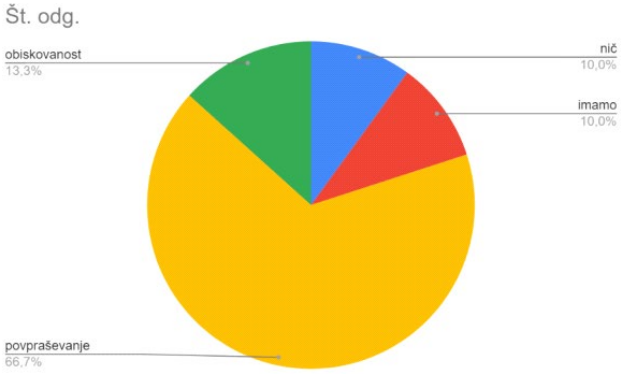
Slika 7: Prilagoditev kot odziv na pobudo o ozaveščanju gibalno oviranih oseb
Vir: lasten.

Pri vprašanju pod številko 4 nas je zanimalo, ali so imeli na turističnih kmetijah kakšno slabo izkušnjo z gibalno ovirano osebo in če DA, katero. Večina, torej kar 96,8 %, kar predstavlja 29 anketirancev, ni imela slabih izkušenj, razen ene turistične kmetije, vendar so težavo rešili s pogovorom in so se vsi skupaj prilagodili. Gibalno ovirana oseba je bila zelo razumevajoča. Slike 8 prikazuje graf o izkušnjah z gibalno oviranimi osebami.



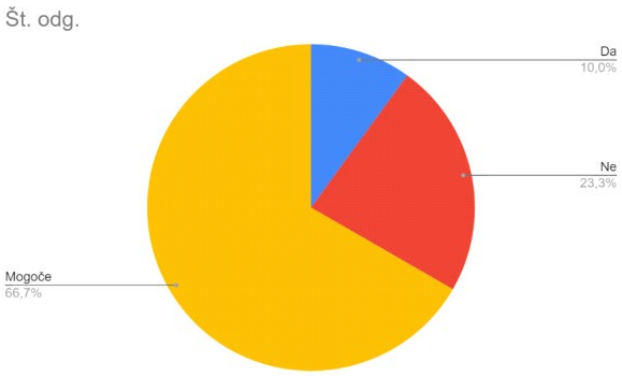
Slika 8: Slabe izkušnje z gibalno ovirano osebo
Vir: lasten.

Pri vprašanju pod številko 5 nas je zanimalo, kaj bi turistične kmetije spodbudilo k samim prilagoditvam za gibalno ovirane osebe. Nosilci turističnih kmetij so podali največ odgovorov, namreč, če bi bilo veliko povpraševanje, bi se prilagodili v skladu s svojimi zmožnostmi. Ta odgovor je predstavljal 66, 7 %, kar predstavlja 20 od 30 anketirancev. Je pa 13,3 % anketirancev odgovorilo, da bi jih do te poteze privedel tudi povečan obisk takšnih oseb, ki bi imele potrebe po prilagojeni nastanitvi. Vendar pa se tu pojavijo vprašanja z obeh strani, tekoča obiskovanost takšnih oseb in že samo povpraševanje po takšnih nastanitvah, saj je potrebno narediti poizvedbo, ali je potrebna prilagoditev s strani kmetije ali prilagoditi povpraševanje s strani gibalno oviranih oseb. Bil pa je sicer tudi majhen delež kmetij, ki so se na ta problem že prilagodile, kar predstavlja 10 %, oziroma 3 kmetije in kar je prikazano na sliki 9.



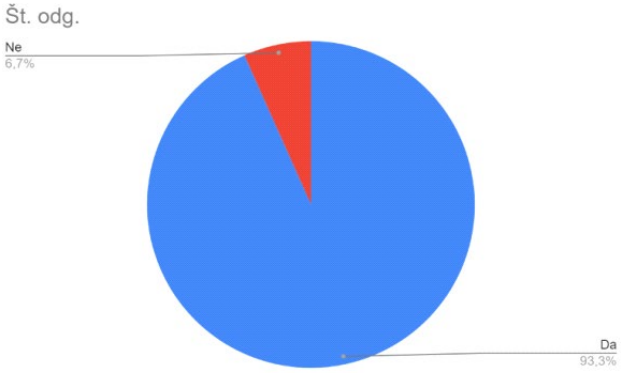
Slika 9: Spodbude k prilagajanju turističnih kmetij
Vir: lasten.

Pri vprašanju pod številko 6 nas je zanimalo, ali bi jih k sami prilagoditvi turistične kmetije gibalno oviranim osebam spodbudil certifikat »kmetija prijazna invalidom«. 66,7 % oziroma 20 kmetij meni, da bi se za to odločili, če bi obstajala možnost sofinanciranja prilagoditev s strani države. 10,0 % vprašanih, kar predstavlja 3 kmetije, se je opredelilo pozitivno, negativni odgovor pa je podalo 7 kmetij, kar predstavlja 23,3 % vprašanih in je predstavljeno s sliko 10.



Slika 10: Spodbuditev s certifikatom »kmetija prijazna invalidom«
Vir: lasten.

Z vprašanjem pod številko 7 smo se osredotočili na vprašanje, ali je pomembno prilagajati turistične kmetije gibalno oviranim osebam. Velika večina jih je odgovorila z da. Ta delež predstavlja 93,3 % oziroma 28 anketiranih lastnikov kmetij, kar pomeni, da se večina nosilcev kmetij zaveda, da je to ena izmed ranljivih skupin, ki jo je treba vključiti v doživetja in aktivnosti na kmetiji. Preostali dve kmetiji pa se s tem, da je treba kmetije posebej prilagajati tudi gibalno oviranim osebam, ne strinjata, kar lahko razberemo iz slike 11.



Slika 11: Ali je pomembno prilagoditi kmetijo gibalno oviranim osebam
Vir: lasten.

Zadnje odprto vprašanje v vprašalniku, številka 8, se je nanašalo na njihovo lastno mnenje, ali je pomembno prilagajati turistično kmetijo gibalno oviranim osebam. Večina jih meni, da je pomembno, saj nikoli ne veš, če boš tudi ti jutri v enakem položaju. Tudi sam trend gre v smer, da nas bo vse več, ki bomo potrebovali različne oblike pomoči in prilagoditev, in da se bodo morale turistične kmetije prilagoditi tako v infrastrukturi kot tudi v ponudbi. Načeloma lahko v to skupino ranljivih oseb vključimo tudi starejše osebe, ki prav tako potrebujejo določene prilagoditve. Pomembno je poudariti, da so pri tem anketiranci izpostavili, da bi financiranje s strani države pomagalo, da bi se prilagoditve izvedle v večjem obsegu in hitreje.

5 Razprava

Članek je osredotočen na prilagodljivost turističnih kmetij gibalno oviranim osebam, pri čemer izpostavljamo območje Dolenjske in Bele krajine. Da so bili odgovori natančni in točni, smo za mnenja poprosili lastnike oziroma nosilce dejavnosti. Na začetku smo postavili hipotezo H1: Na območju Dolenjske in Bele krajine so se turistične kmetije v ponudbi pripravljene prilagoditi potrebam gibalno oviranih oseb, ki smo jo ob koncu raziskave lahko potrdili. Prav tako smo potrdili hipotezo

H2: Turistične kmetije na območju Dolenjske in Bele krajine bi za prilagoditev potrebam za gibalno ovirane osebe potrebovale finančne spodbude države.

Evropska unija, Republika Slovenija, posamezne lokalne skupnosti, Lokalne akcijske skupine in mnogi drugi subjekti so aktivni v smeri spodbujanja prilagoditve infrastrukture in ponudbe gibalno oviranim osebam, toda ne le na turističnih kmetijah, pač pa tudi pri drugih turističnih ponudnikih. Obstaja kar nekaj natečajev, fundacij in projektov, kjer so te inštitucije delovale kot usmerjevalke in vzpodbujevalke, tako intelektualno kot finančno, v smeri boljšega razvoja. Eden izmed projektov - LAS Po poteh dediščine od Turjaka do Kolpe (https://las-ppd.si/interaktivni-turizem-za-vse/), ki smo ga predstavili v začetku prispevka, je povezan s projektom »Interaktivni turizem za vse«, ki je potekal pod okriljem Evropskega kmetijskega sklada za razvoj podeželja. Izvajal se je v letu 2019, v njem pa je sodelovalo šest različnih lokalnih akcijskih skupin. Cilji in rezultati tega projekta so povečanje vključenosti ranljivih skupin v turistično ponudbo s skupno promocijo novih integriranih produktov, osveščanje o pomenu kulturne in naravne dediščine in humanizacija tehnologije. Prav s takšnimi praksami lahko v prihodnje prispevamo

k še večji ozaveščenosti lastnikov kmetij z dopolnilno dejavnostjo in ostalih turističnih ponudnikov ne le na Dolenjskem in v Beli krajini, kjer je bila bazirana ta raziskava, temveč po celotni Sloveniji. Da se Slovenija ponaša s tovrstno ponudbo, je zaslediti tudi na portalu I feel Slovenia (https://www.slovenia.info/sl/potovalni-nacrt/dostopni-turizem), kjer so predstavljene smernice o dostopnem turizmu in kjer je Slovenija označena kot država, prijazna za invalide. V zadnjih letih so bile nove javne zgradbe ter drugi večji poslovni in turistični objekti zgrajeni s posluhom za ljudi z gibalnimi ovirami. Da bi obdržali ta ugledni naziv, ki lahko prinese turističnim kmetijam in drugim nosilcem ponudbe mesto v slovenskih in tujih revijah in v člankih o dostopnosti ponudbe gibalno oviranim osebam, pa bo potrebno še več ozaveščanja in spodbud države.

6 Zaključek

»Vsi za turizem, turizem za vse« bi lahko bilo geslo, ki predstavlja smernice sodobnega turizma. Enakost in možnost potovanja vseh, tudi tistih s težavami in motnjami v zdravju, je bila v preteklosti sekundarna tema, ki se ji ni posvečalo dovolj pozornosti. Danes pa je postala želja po enakopravnosti v turizmu primarni izziv, s katerim se sooča turistični sektor in na katerega opozarjajo mnoge organizacije. Zavest o dostopnejšem turizmu iz leta v leto narašča in tudi v literaturi zasledimo mnogo dobrih praks prilagajanja ponudbe odjemalcem. V Sloveniji je ta zavest še v razvoju, vendar je opazen napredek in obstajajo določeni turistični ponudniki, ki sledijo uspešnim tujim praksam (Vrečko, 2013, str. 24). Vrečko ocenjuje, da slovenski trg ni pripravljen na nove trende v dostopnem turizmu in da so gibalno ovirane osebe v večini primerov še vedno obrobni tržni segment ljudi. Pomembno je omeniti tudi, da prihaja do finančnih težav, ki podjetjem onemogočajo prilagajanje infrastrukture, zato je pomembno spodbujati državne ustanove pri sofinanciranju in grajenju potrebnih prilagoditev, da bi dosegli večje vključevanje gibalno oviranih oseb v turistične dejavnosti.

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XVII. International Conference on Logistics in Agriculture 2023: Conference Proceedings

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17th International Conference on Agricultural Logistics organized by: Landscape Governance College GRM Novo mesto, Grm Novo mesto – center of Biotechnology and Tourism, the Faculty of Organistion Studies, the Faculty of Logistics of the University of Maribor, the Municipality of Sevnica and Cooperatice Union of Slovenia. The central theme of this year's conference will be "Climate changes of logistics in agriculture". The conference has become traditional and paves the way for a different view of logistics in connection with agriculture.

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mednarodna posvetovanja,
zborniki

University of Maribor Press

17. MEDNARODNA KONFERENCA LOGISTIKA V KMETIJSTVU: KONFERNEČNI ZBORNIK

ANDREJ LISEC (ED.)
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17. mednarodno konferenco Logistika v kmetijstvu organizirajo Visoka šola za upravljanje podeželja Grm Novo mesto, Grm Novo mesto – center biotehnike in turizma, Fakulteta za organizacijske študije, Fakulteta za logistiko Univerze v Mariboru, Občina Sevnica, Zadružna zveza Slovenije in Fakulteta za organizacijske študije v Novem mestu. Letošnja osrednja tema je 'Podnebne spremembe logistike v kmetijstvu'. Konferenca je postala tradicionalna in posveča pozornost na različne poglede na logistiko v povezavi s kmetijstvom.

University of Maribor

Faculty of Logistics

9th November 2023
Novo mesto
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